

Feasibility of conducting a global inventory of mercury compound supply, use and trade

Mercury compound	Supplier	Declared purity
Hg ₂ Cl ₂	Sigma-Aldrich Co. LLC.	≥99.5%
HgCl ₂	Kemikad.d., Zagreb	99%
HgO-Red	Sigma-Aldrich Co. LLC.	≥99.5%
HgO-Yellow	May & Baker Ltd.	≥99.5%
HgS-Red	Mallinckrodt Chemical Works	99%
HgSe	Sigma-Aldrich Co. LLC.	99.9%



Srl **concorde** 

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Table of Contents

Executive summary.....	i
1 Background.....	1
1.1 Purpose.....	1
1.2 Scope.....	1
1.3 Definitions.....	2
2 Key data and information sources.....	3
2.1 Content.....	3
2.2 Global databases.....	3
2.3 Specialized and subscription databases.....	6
2.4 Regional databases.....	10
2.5 National trade databases.....	12
2.6 National and regional inventories.....	18
2.7 Industry contacts.....	21
2.8 Reporting under the Minamata Convention.....	21
2.9 Published literature and other sources.....	23
2.10 Data inconsistencies.....	24
3 Sources of mercury compounds.....	25
3.1 Mercury compounds of interest.....	25
3.2 Chemical companies producing mercury compounds.....	25
3.3 Mercury compounds generated by industrial processes.....	26
4 Uses of mercury compounds.....	27
4.1 Overview of mercury compound uses.....	27
4.2 Mercury compounds as intermediates.....	29
4.3 Mercury compounds as catalysts.....	30
4.4 Mercury compounds in laboratories and pharmaceuticals.....	30
4.5 Assessment of the available data and information.....	30
5 Trade flows of mercury compounds.....	31
5.1 Challenges in identifying mercury compounds.....	31
5.2 Harmonized System codes.....	32
5.3 Key exporting and importing countries.....	33
5.4 Assessment of the available data and information.....	33
References.....	34
Appendix 1 – (Non-exhaustive) listing of mercury compounds.....	36
Appendix 2 – Text and data visualizations from OEC World.....	41
Appendix 3 – Pricing of subscription databases.....	43

Feasibility of conducting a global inventory of mercury compound supply, use and trade

Executive summary

This study examines the available sources of data on global mercury compound production and trade, for the purpose of determining the feasibility of preparing a global inventory report and thereby facilitating a more detailed analysis.

Based on available sources of information, a global inventory of mercury compounds supply, uses and trade can be developed. There will be ambiguities and uncertainties in the inventory, but the level of understanding of the global uses and movement of mercury compounds will be improved.

Based on the observations reported in this feasibility study, one method of developing a detailed report would include the following approach.

Preliminary focus

The compounds (including the mercury compounds listed in the Minamata Convention) that appear to be most prevalent are:

- Ammoniated mercury
- Mercury(II) acetate
- Mercury(I) chloride, also known as calomel
- Mercury(II) chloride
- Mercury(II) iodide
- Mercury(II) nitrate
- Mercury(II) oxide
- Mercury(II) sulfate
- Mercury(II) sulfide
- Mercury(II) thiocyanate
- Phenylmercury(II) acetate

Likewise, the commodity codes (plus their subheadings) deserving priority attention have been identified as:

- 2852.10 – Inorganic or organic compounds of mercury, chemically defined, excluding amalgams
- 2852.90 – Inorganic or organic compounds of mercury, not chemically defined, excluding amalgams
- 3815.90 – Other reaction initiators, reaction accelerators and catalytic preparations, not elsewhere specified or included
- 2915.29 – Acids; saturated acyclic monocarboxylic acids; acetic acid and its salts
- 3824.90 – Chemical products, preparations and residual products of the chemical or allied industries
- 3808.50 – Insecticides, rodenticides, fungicides, herbicides, anti-sprouting products and plant-growth regulators, disinfectants and similar products containing specific chemical compounds

During the subsequent in-depth research it is possible that findings will point to additional compounds and commodity codes, which may then be included.

Comtrade and other databases using Comtrade data

Research should start with Comtrade data, and a determination of the criteria that should be used in exploring the database, e.g., imports, exports, re-exports, data years (e.g., 2020 to the present), commodity codes (see above), etc. Data extracted from Comtrade will provide a general overview of global mercury trade. It is well known the data are flawed, but they can be used to identify major trade partners and trends. In parallel, the algorithm used by Chatham House and/or other database managers to deal with asymmetrical data – and otherwise improve the quality of the trade data – should be explored for further insights into their methods.

Other inventories and public trade databases

The next step may be to extract relevant trade data from national inventories and national/regional trade databases (e.g., USITC, Eurostat, Mercosur), as relevant. Researchers could especially look into the commodity codes and related data of countries (e.g. Argentina, Uruguay) that have implemented code subheadings for more detailed data on specific mercury compounds.

Minamata documentation

After identifying countries apparently involved in the sourcing or production of mercury compounds, researchers may examine their Article 21 reports for information on stocks of mercury compounds. Other background information submitted to the Convention Secretariat, for example at the time of ratification, may also be consulted. This step is presented as a matter of due diligence since, based on the analysis in this study, these sources contain limited information on stocks and trade of mercury compounds.

Other (consultant) documentation and online information

As noted in the text and references for this feasibility study, certain consultant reports (e.g., GMA 2018, ZMWG 2022) should be reviewed for relevant information. Likewise, an online search (PubMed, etc.) to identify manufacturers and/or distributors of target compounds should be carried out. This step is expected to reveal a range of manufacturers and distributors, but few data on quantities and trading partners for mercury compounds traded internationally.

Subscription databases

Most importantly, based on the findings of other research efforts, targeted subscription services may be engaged to understand the trade of specific compounds in more detail: producer names and addresses, shipment quantities and dates, shipment values, origins and destinations, buyer names and addresses, etc. Access to most of the subscription databases is not prohibitively expensive. OEC World appears to be the most comprehensive of those reviewed for this study, although others may provide trade details and/or access to certain country data that OEC World does not. One path forward is to start with OEC World and Panjiva, and then possibly look at Datamyne and/or others that cover more Asian countries. As noted above, in cases where the trade data is processed with certain algorithms, a better understanding of their methods would be helpful.

Company interviews

During research for a more detailed report, contacts and interviews with industry associations and some of the companies identified may be initiated to learn more, if possible, about some of the detailed trade data, customs codes used, reports to local authorities, etc.

Review process

A review of the detailed report may include, among others, the Minamata focal points of the key countries involved in the trade of mercury compounds. They would typically engage any other national authorities who may have comments on the findings.

Implications for the Minamata Convention

The two tables below summarize the restrictions on mercury-added products and processes listed in Annexes A and B of the Convention – including revisions during COP-4 and considerations for COP-5 – indicating whether they use elemental mercury or mercury compounds.

Mercury uses restricted under Annex A of the Minamata Convention (per COP-4)

Mercury-added products (with some exceptions)	Containing mercury	Containing mercury compounds
Batteries (2020)		X
Switches and relays (2020)	X	
Fluorescent lamps (2020, except 2025 for CFL.i and CCFL)	X	
High pressure mercury vapour lamps (2020)	X	
Cosmetics including skin lightening soaps and creams (2020)		X
Pesticides, biocides and topical antiseptics (2020)		X
Non-electronic measuring devices, including barometers; hygrometers; manometers; thermometers; sphygmomanometers (2020)	X	
Strain gauges used in plethysmographs (2025)	X	
Electrical and electronic measuring devices, including melt pressure transducers, melt pressure transmitters and melt pressure sensors (2025)	X	
Mercury vacuum pumps (2025)	X	
Tyre balancers and wheel weights (2025)	X	
Photographic film and paper (2025)		X
Propellant for satellites and spacecraft (2025)	X	
Dental amalgam (measures to be taken and restrictions)	X	

Manufacturing processes restricted under Annex B of the Minamata Convention

Manufacturing processes using mercury (with some exceptions)	Using mercury	Using mercury compounds
Chlor-alkali (2025)	X	
Acetaldehyde (2018)		X
Polyurethane systems (phase-out date to be considered at COP-5)		X
Vinyl chloride monomer (measures to be taken)		X
Sodium or potassium methylate or ethylate (measures to be taken)	X	

There is already substantial international concern about the use of mercury compounds in illegal skin-lightening creams. Recent studies (ZMWG 2022) highlight the physical and online trade of these products, and the general failure of e-commerce platforms and regulators to stop this illegal trade. Continued production and sales of these creams presents a serious health risk to

users of these products, as well as to children exposed through family members. Health effects associated with mercury-added skin lightening creams include severe skin rashes and kidney effects. More information on the sources of the mercury compound “feedstock materials” may assist a future COP in determining whether compound controls may help minimize this illegal trade.

At the upcoming Minamata Convention COP-5 (30 October - 3 November 2023, Geneva, Switzerland) there will also be a discussion of a prohibition on mercury use in polyurethane production. The trade data reviewed during this feasibility study suggests that there remains significant production and trade of the organic mercury compounds used in polyurethane production.

Accordingly, while only a minority of the products and processes listed in Annexes A and B involve mercury compounds, some of these may present uniquely challenging enforcement circumstances and/or adverse health consequences. The mercury compound inventory would help identify such situations.

In addition, there is also the possibility that mercury compounds, such as cinnabar or calomel, may be traded for the purpose of producing elemental mercury. This trade is not currently subject to the Article 3 consent procedures.

Feasibility of conducting a global inventory of mercury compound supply, use and trade

1 Background

1.1 Purpose

The objective of the Minamata Convention on Mercury is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. Under Article 3 of the Convention, control measures were adopted to restrict the global supply and trade of elemental mercury. However, for the most part, mercury compounds are not similarly regulated. Instead, under Paragraph 13 of Article 3 of the Convention, consideration of mercury compound controls would be evaluated at a later date:

The Conference of the Parties shall evaluate whether the trade in specific mercury compounds compromises the objective of this Convention and consider whether specific mercury compounds should, by their listing in an additional annex adopted in accordance with Article 27, be made subject to Paragraphs 6 and 8.

The purpose of this study is to inform the future Convention process under Paragraph 13. A logical first step in such a process would be to obtain data on the quantities and uses of mercury compounds in commerce globally. This study examines the available sources of data on global mercury compound production and trade, for the purpose of facilitating a more detailed analysis of global mercury compound supply and trade.

1.2 Scope

This study was prepared by Peter Maxson, consultant, under contract to the Natural Resources Defense Council (NRDC).

It explores the commercial trade data and other information on mercury compounds available in public access national and global databases, subscription databases, national inventories, published literature, Minamata Initial Assessments and other information developed and reported under the Minamata Convention on Mercury, contacts with company officials, and other relevant sources. The study includes the following main elements:

1. An assessment of the availability of information on the sources and quantities of mercury compounds produced annually;
2. An assessment of the availability of information on the global trade flows of mercury compounds, including identifying significant exporting and importing countries for each of the mercury compounds;
3. An assessment of the availability of information on the main uses of each of the mercury compounds;
4. An assessment of whether the available information is adequate for an understanding of the implications or potential consequences of the global trade of mercury compounds;

5. A possible path for follow-up work (e.g., additional data gathering efforts) that may be undertaken to better understand the ongoing production, trade and uses of mercury compounds.

1.3 Definitions

A “mercury compound” is defined in the Minamata Convention as any substance consisting of atoms of mercury and one or more atoms of other chemical elements that can be separated into different components only by chemical reactions.¹

The mercury compounds specified in Article 3, Paragraph 1(b) of the Minamata Convention, which requires Parties to identify individual stocks of mercury compounds exceeding 50 metric tons, are:

- mercury (I) chloride (calomel)
- mercury (II) oxide
- mercury (II) sulfate
- mercury (II) nitrate
- cinnabar (mercury sulfide ore) and (pure) mercury sulfide

Appendix 1 lists 177 of the more common mercury compounds, as well as elemental mercury. However, no observations are made regarding compounds that may warrant controls as this is outside the scope of this feasibility study.

¹ See the Minamata Convention on Mercury, Article 2(e).

2 Key data and information sources

2.1 Content

This section of the feasibility study identifies and characterizes key data and information sources on mercury compounds traded internationally. It is divided into six main categories:

- Global databases such as Comtrade and PubChem;
- Specialized and subscription databases such as Panjiva;
- Regional and national databases such as Mercosur, Eurostat and USITC;
- Industry sources of information;
- Reporting associated with the Minamata Convention such as Minamata Initial Assessments and Article 21 reports;
- Literature sources and reports such as peer-reviewed publications and consultant reports.

In each case this study discusses the geographic coverage, the scope of the data provided, and specific examples of the available data.

In addition, the utility of the available data and information is discussed, especially the extent to which the data are adequate to inform the Convention's consideration of possible controls on mercury compounds.

2.2 Global databases

A number of global databases are described below, along with a discussion and some examples of the available data.

PubChem

The PubChem database (<https://www.ncbi.nlm.nih.gov/pccompound>) identifies more than 9,500 mercury compounds. For each compound the database provides information on the chemical structure, safety information, molecular formula, molecular weight, names and identifiers, chemical and physical properties, spectral information, related records, chemical vendors, drug and medication information, agrochemical information, pharmacology and biochemistry, use and manufacturing, safety and hazards, toxicity, associated disorders and diseases, literature, patents, biomolecular interactions and pathways, biological test results, classification, and other information sources. A snippet of the data available via PubChem – in this case on sources of information regarding mercuric thiocyanate – is shown below. This database provides no information on quantities of compounds traded internationally, although it does give the names of vendors of various compounds.

[MERCURIC THIOCYANATE; mercury\(2+\):dithiocyanate: 592-85-8](#)

Source: [THE BioTek](#)

Deposit Date: 2021-11-10 Available Date: 2021-11-10 Modify Date: 2021-11-10

SID: 446820089 [CID: 11615]

[Summary](#) [PubChem Same Compound](#)

[MERCURIC THIOCYANATE; mercury\(2+\):dithiocyanate: 592-85-8](#)

Source: [Smolecule](#)

Deposit Date: 2021-11-09 Available Date: 2021-11-09 Modify Date: 2021-11-09

SID: 446458373 [CID: 11615]

[Summary](#) [PubChem Same Compound](#)

[MERCURIC THIOCYANATE; mercury\(2+\):dithiocyanate: 592-85-8](#)

Source: [BenchChem](#)

Deposit Date: 2021-11-07 Available Date: 2021-11-07 Modify Date: 2021-11-07

SID: 446388293 [CID: 11615]

[Summary](#) [PubChem Same Compound](#)

[Mercuric sulfocyanate: 592-85-8](#)

Source: [Parchem](#)

Deposit Date: 2017-12-20 Available Date: 2017-12-20 Modify Date: 2017-12-20

SID: 349974214 [CID: 11615]

[Summary](#) [PubChem Same Compound](#)

[Mercury\(II\) thiocyanate: 592-85-8](#)

Source: [AHH Chemical co.,ltd](#)

Deposit Date: 2015-09-21 Available Date: 2015-09-21 Modify Date: 2015-09-21

SID: 252373005 [CID: 11615]

[Summary](#) [PubChem Same Compound](#)

UN Statistics Division Comtrade database

All of the global databases are based on the World Customs Organization (WCO) 6-digit Harmonized System (HS) codes. The current HS codes group multiple mercury compounds together under a single HS code, making it impossible to identify trade in individual mercury compounds, as discussed below.

Accordingly, the UN Statistics Division Comtrade database (<https://comtrade.un.org/>) is based on the Harmonized System codes, which use the 6-digit HS code 2852 00 for mercury compounds. This code is divided into two main sub-headings or groups of mercury compounds:

- 2852 10 – mercury compounds, chemically defined
- 2852 90 – mercury compounds, not chemically defined

Since Comtrade receives its data from customs authorities in some 180 countries, the data are only as good as the data submitted by individual countries. The quality of these data has been addressed in other publications. The Comtrade data identify country trading partners, as well as the value and quantity of mercury compounds traded, but there are not currently any 6-digit HS codes that identify individual mercury compounds.

An analysis of Comtrade data by OEC World (<https://oec.world/en/profile/hs/compounds-inorganic-or-organic-of-mercury-excluding-amalgams?redirect=true>) determined that the value of global trade in mercury compounds (HS code 2852 00) in 2020 amounted to USD 15.9 million in global exports and USD 15.9 million in global imports.

Centre d'études prospectives et d'informations internationales

CEPII (Centre d'études prospectives et d'informations internationales) is the leading French center for research and expertise on the world economy. It contributes to the policy making process through its independent analyses of international trade, migration, macroeconomics and finance. The CEPII also manages databases, which are made available to the public.

Designed for analytical purposes, CEPII's databases are grouped by themes. One of these themes is international trade, and the BACI (Base pour l'Analyse du Commerce International) database (http://www.cepii.fr/CEPII/fr/bdd_modele/bdd_modele_item.asp?id=37) has its own dedicated webpage. BACI provides data on bilateral trade flows (value and quantity) for 200 countries at the product level (5000 products), using the 6-digit "Harmonized System" nomenclature.

BACI relies on data from the United Nations Statistical Division (Comtrade). In order to deal with data discrepancies, BACI employs a harmonization procedure with two main elements:

1. CIF (cost, insurance, freight) values, typically reported for imports, are estimated and removed from import values in order to better compare import values with mirror exports, which are typically reported as FOB (free on board) values.
2. The reliability of each country as a reporter of trade data is assessed. If a country tends to provide data that are very different from the mirror data of its trading partners, it will be considered as unreliable and will be assigned a lower weight in the determination of the reconciled trade flow value.

World Trade Organization

The WTO provides quantitative information in relation to economic and trade policy issues. Its databases (https://www.wto.org/english/res_e/statis_e/statis_e.htm) and publications provide access to data on trade flows, tariffs, non-tariff measures (NTMs), etc. While the WTO databases provide interesting consolidated trade data on such categories as merchandise and services, they do not drill down to the level of specific commodities.

Rotterdam PIC procedure

The Rotterdam Convention, implemented by many countries, requires advance notification to (and consent from) the receiving country for the export of substances severely restricted or banned in the exporting country, and the Prior Informed Consent (or PIC) Procedure applies to substances listed in Annex III of the Convention (www.pic.int). Among other substances, mercury compounds are listed in Annex III under the pesticide category.

The World Customs Organization (WCO) has assigned specific Harmonized System (HS) customs codes to the individual chemicals or groups of chemicals listed in Annex III, and each exporting Party is required to include the relevant HS codes for exported chemicals in the shipping documentation. Mercury compounds including inorganic mercury compounds, alkyl mercury compounds, and alkyloxyalkyl and aryl mercury compounds are identified by HS code 2852 10, while mixtures, preparations and articles containing mercury compounds are identified by HS code 3808 59.

Significant detail may be included in these notifications, including the names and addresses of exporters and importers, the chemical names and quantities of the mercury compounds traded, etc. However, some of these details may not be available without a formal request from the relevant government agency.

The following table provides an example of publicly accessible information for PIC exports from the European Union.

Year	Exporting EU Member State	Importing Country	Chemical / Mixture / Article Name	Type
2021	Belgium	Korea, Republic of	mercury(I) nitrate, monohydrate	Substance
2021	Belgium	New Zealand	mercury dichloride	Substance
2021	Belgium	Taiwan	mercury sulphate	Substance
2021	Belgium	United Kingdom	dimercury sulphate	Substance
2021	Belgium	United Kingdom	mercury di(acetate)	Substance
2021	Belgium	United Kingdom	mercury diiodide	Substance
2021	Belgium	United Kingdom	mercury dithiocyanate	Substance
2021	Belgium	China	Millon's reagent	Mixture
2021	France	Albania	464231 [Nessler's reagent]	Mixture
2021	France	Egypt	464231 [Nessler's reagent]	Mixture
2021	France	North Macedonia, Republic of	464231 [Nessler's reagent]	Mixture
2021	France	Thailand	497551 [Mercury standard solution for AAS]	Mixture
2021	Germany	China	mixture containing potassium tetraiodomercurate	Mixture

2.3 Specialized and subscription databases

Subscription databases often provide some free commercial data, but the more detailed information is available only by subscription. Subscription trade databases tend to cover limited groups of countries, and typically identify the shipment of mercury compounds, to the extent they are correctly reported on shipping documents.

Panjiva

Panjiva Inc. is a subscription-based global trade data website with import and export details on commercial shipments worldwide. Panjiva covers imports and exports for the United States, Mexico, Costa Rica, Panama, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela, China, Indonesia, India, Pakistan, Sri Lanka, the Philippines and Vietnam.

Panjiva can provide quite detailed data (as available on shipping documents) on shipments between the countries on the above list, as well as imports to these countries from others not on this list. Although details are not reproduced here, the range of information available for shipments may include:

- shipping date
- consignee name, phone number and website or other profile
- shipper name, full address and website or other profile
- shipment origin
- shipment destination
- port of lading
- port of lading country and UN/LOCODE
- port of unlading
- port of unlading country and UN/LOCODE
- transport method
- Harmonized System (HS) and subheading commodity code(s) of the goods
- description of goods shipped

- whether or not the goods are containerized
- volume of the shipment
- weight of the shipment
- value of the shipment
- source of the above data

One of the drawbacks of subscription databases, as seen in the table above, is that the “goods shipped” are often a group of chemicals (including non-mercury chemicals) combined in the same shipment, along with a weight and/or value for the whole group, rather than the individual elements of the shipment.

According to one online source, four of the most frequently consulted prescription global trade websites with similarly detailed data are the following, with indications of the countries covered:

- **importgenius.com** (US, India, Sri Lanka, Vietnam, Russia, Ukraine, Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Peru, Paraguay, Uruguay, Venezuela)
- **seair.co.in** (Colombia, Argentina, Peru, Venezuela, Chile, Ecuador, Bolivia, Paraguay, China, Indonesia, Pakistan, Bangladesh, Russia, South Korea, Vietnam, Philippines, Ethiopia, Kenya, Uganda, Liberia, Mexico, USA, Panama, EL Salvador, Russia, UK, Ukraine)
- **importkey.com** (China, India, Vietnam, Thailand, Bangladesh, Philippines, Germany, United Kingdom, Turkey, United States, Mexico)
- **datamyne.com** (Argentina, Australia, Bolivia, Brazil, Canada, Chile, China, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, India, Indonesia, Japan, Korea, Mexico, Nicaragua, Pakistan, Panama, Paraguay, Peru, Philippines, Russia, South Africa, Sri-Lanka, United Kingdom, United States, Uruguay, Venezuela, Vietnam, and all of the EU countries)

OEC World

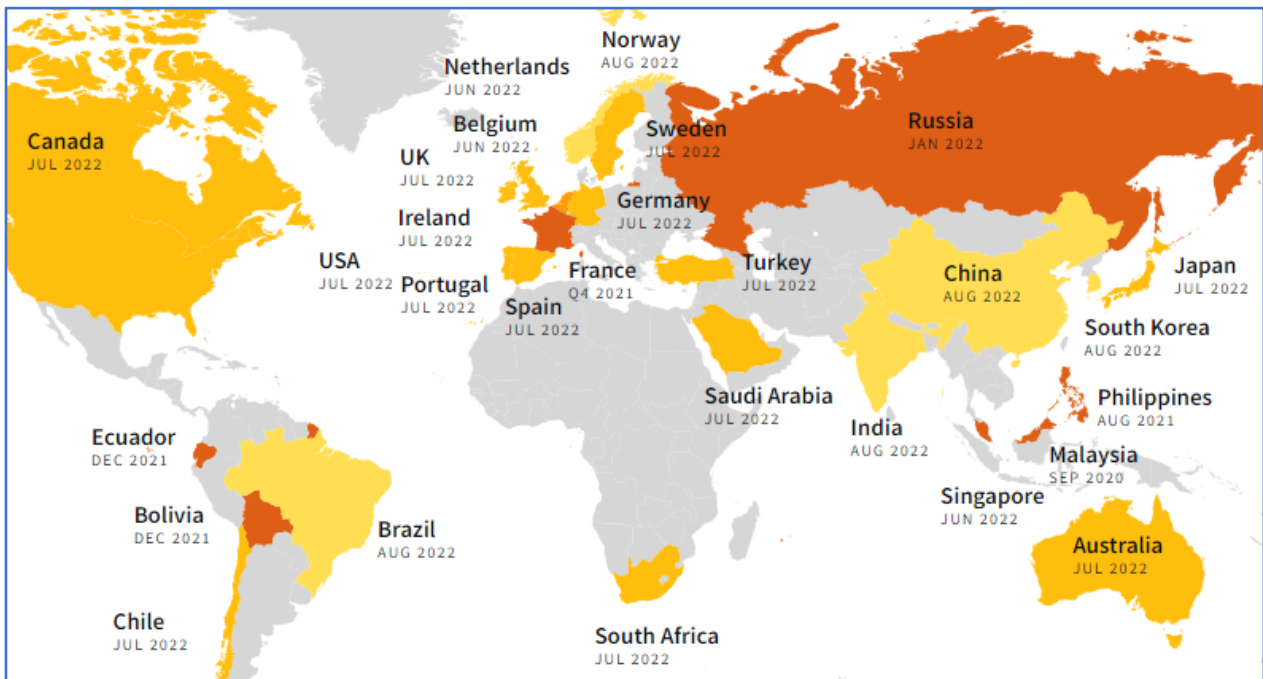
One of the more comprehensive subscription commercial data services, OEC World (<https://oec.world/en>), provides data on company-level sea transport drawn from Bill of Lading records issued by a carrier or agent to acknowledge the receipt of a shipment. These records are listed by country and month, and include names and contact information for the companies involved in the transport of commodities through a subset of ports in a given country. These datasets are not a complete picture of all trade coming into and out of a country, but offer considerable detail regarding the composition of individual freight-level shipments.

Available commercial data is drawn from company shipment records and/or national datasets as indicated for the following countries:

	Company shipment records	National datasets			Company shipment records	National datasets
Algeria	X			Japan	X	X
Australia	X	X		Kuwait	X	
Austria				Malaysia	X	X
Bahrain	X			Mexico	X	
Bangladesh	X			Netherlands	X	X
Belgium	X	X		Norway	X	X
Bolivia		X		Oman	X	
Brazil		X		Pakistan	X	
Canada	X	X		Philippines	X	X
Chile		X		Poland		

	Company shipment records	National datasets			Company shipment records	National datasets
China	X	X		Portugal		X
Chinese Taipei				Qatar	X	
Czechia				Russia		X
Denmark	X			Saudi Arabia	X	X
Djibouti	X			Singapore	X	X
Ecuador		X		South Africa		X
Egypt	X			South Korea	X	X
Finland	X			Spain	X	X
France	X	X		Sri Lanka	X	
Germany	X	X		Taiwan	X	
Ghana	X			Sweden		X
Greece	X			Switzerland		X
Hong Kong				Thailand	X	
India	X	X		Turkey	X	X
Indonesia	X			United Arab Emirates	X	
Iran	X			United Kingdom	X	X
Iraq	X			United States	X	X
Ireland		X		Uruguay		X
Italy	X			Vietnam	X	

As of October 2022, OEC World data was current up to the dates shown in the map below.



Further detail available from company shipment records in the OEC World database include:

- Sailing or shipping date, shipper name and address
- General description of the product(s) shipped
- More precise description for customs
- Weight and value of the consignment
- Identification of the consignee

In addition, OEC World generates trade data visuals, such as diagrams showing the magnitude of each country's trade. Some of these visuals for mercury compounds may be seen in Appendix 2.

IHS Global Trade Atlas/S&P Global

The Global Trade Atlas (GTA) is a web-based (<https://www.spglobal.com/marketintelligence/en/mi/products/maritime-global-trade-atlas.html>) search and analysis tool that provides users with on-demand access to a database of worldwide trade statistics. The GTA publishes monthly trade data from more than 95 countries, accounting for about 95 percent of global trade. Annual data is also available for more than 180 countries, covering all reported trade and more than 98 percent of estimated international trade. Additional data points include:

- transportation mode, ports and regions (available for most reporting countries)
- quantity, total value and unit value of traded commodities
- monthly trade data include port, regional regime, transport mode, re-export, state, customs district, province, US NAICS, etc.

Zauba

Zauba Corp. maintains a subscription website (<https://www.zauba.com/>) and advertises itself as India's leading provider of commercial information and insight, gathering data from "a number of official sources and third parties." It is especially useful for information on Indian imports and exports, and companies doing business with India. It provides information and analytics on companies buying and selling compounds, on exporters and distributors, on consignees, on monthly import timelines, etc.

The following table is an example of data returned from a search for the keywords "phenylmercuric" and "phenyl mercuric," highlighting the importance of paying attention to the spelling (or misspelling) and structure of any keywords or alternative names for the same substance, when doing a search. It is also interesting to see the commodity codes used for these products:

- HS code 291529 – Acids; saturated acyclic monocarboxylic acids; acetic acid and its salts
- HS code 382490 - Chemical products, preparations and residual products of the chemical or allied industries

Date	HS code	Description	Destination	Port of loading	Quantity (kg)	Value (INR)
Nov 22 2016	38249090	PMN 35% (PHENYL MERCURIC NEODECANOATE) BATCH NO. 119/2016-17	Spain	Nhava Sheva Sea	3,200	7,065,295
Nov 05 2016	29152990	PHENYL MERCURIC ACETATE (OTHER SALTS OF ACETIC ACID)	Switzerland	Bombay Air Cargo	527	926,140
Jun 23 2016	29152990	PHENYLMERCURIC ACETATE (CAS 62-38-4)	United States	Bombay Air Cargo	50	1,028,008
Jun 06 2016	38249090	PHENYLMERCURIC NEODECANOATE: BATCH NO.:PMN-05	United States	Bombay Air Cargo	30	47,236

Without a subscription to the database, more current data are not available.

Two of the organic mercury compounds mentioned above – phenyl mercuric neodecanoate and phenyl mercuric oleate – are typically used as catalysts in the curing of polyurethane elastomers. Parties to the Minamata Convention have agreed “to further consider adding the production of polyurethane using mercury-containing catalysts to part I of annex B at its fifth meeting.”²

2.4 Regional databases

Regional databases of commodity imports and exports are maintained by organizations such as the Southern Common Market (Mercosur), the North American Commission for Economic Cooperation (CEC), the European Union (EU), the Association of Southeast Asian Nations (ASEAN), etc.

MERCOSUR

The Southern Common Market (Mercosur) compiles data (<https://estadisticas.mercosur.int>) on foreign trade in goods – total value (US\$ FOB) and volume (net weight) of exports and imports – between the Mercosur Parties (Argentina, Brazil, Paraguay, Uruguay, Venezuela) and other countries. Details of individual shipments are not publicly available in the database, but a number of specific mercury compounds may be identified in the Mercosur database. The table below, for example, shows the USD value of imports of mercury compounds into Argentina from India in 2021, and zero exports of mercury compounds to India from Argentina in the same year.

Argentina reporting of trade with India of mercury compounds (USD, 2021)

Trade in Goods - NCM Items - US\$ FOB (01-01-2021 / 31-12-2021) - India				
Show <input type="text" value="10"/> entries		Search: <input type="text"/>		
NCM	Description	Exports	Imports	
<input type="text" value="All"/>	<input type="text" value="mercury"/>	<input type="text" value="All"/>	<input type="text" value="All"/>	
28332940	Mercury sulphate	0.00	4,589.20	
28521011	Oxides of mercury, inorganic	0.00	471.17	
28521014	Chloride mercury ii (cloruro de mercurio),another form	0.00	256,563.15	
28521019	Other inorganic mercury compounds	0.00	4,624.70	
28521021	Acetate of mercury	0.00	920.44	
28521029	Other organic mercury compounds	0.00	298.99	

Source: MERCOSUR database accessed 1 December 2022.

Note: Code 2833 29 40 is more commonly used for manganese sulphate.

² See document UNEP/MC/COP.4/Dec.3 (Distr.: General 6 July 2022), Conference of the Parties to the Minamata Convention on Mercury, Fourth meeting, 1-5 November 2021 (online) and 21-25 March 2022 (Bali, Indonesia).

EUROSTAT

The Eurostat database (<https://ec.europa.eu/eurostat>) includes general, economic, and industry information on the European Union (EU). The “Comext” part of the database covers external trade between the 27 European Union member states and other countries. It also relies on the Harmonized System commodity codes, which do not identify individual chemical compounds or toxic substances.

PRODCOM

The name Prodcom comes from the French “PRODUCTION COMMUNAUTAIRE” (Community Production), and compiles statistics on the production of manufactured goods in Europe. Prodcom is a database (<https://ec.europa.eu/eurostat/web/prodcom/data/database>) that records data on the physical production of manufactured products. Prodcom is also a product classification system used to classify physical production of manufactured goods.³ All EU member states, EFTA (European Free Trade Association) countries Norway and Iceland, and future EU accession countries are bound by the Prodcom reporting requirements and are required to report both volume and value (in EUR) of their industrial production of products that are on the Prodcom list. No further details about the producers are publicly available in the Prodcom database.

ASEAN

The Association of Southeast Asian Nations (ASEAN) maintains the International Merchandise Trade Statistics (IMTS) database (<https://data.aseanstats.org/trade-annually>). This database includes imports from and exports to nearly 100 other countries as reported by the ASEAN member countries: Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.

The IMTS database shows the annual value (in USD) of goods traded by HS code, as shown in the two images below. The first image shows total trade of 2852 10 among ASEAN partners, between ASEAN and non-ASEAN partners, between ASEAN and the rest of the world, as well as trade reported by Indonesia and Thailand with the same partners.

ASEAN, Indonesia, Thailand trade: mercury compounds, chemically defined (USD, 2019-2020)

Trade in Goods (IMTS), Annually, HS 2-digit up to 8-Digit (AHTN), in US\$									
1	2	3	4	5	6	7	8	9	10
			YEAR * FLOW *						
			▼ 2019			▼ 2020			
REPORTER *	PARTNER *	COMMODITY *		Export	Import		Export	Import	
▼ ASEAN	▼ ASEAN [00]	[285210] Inorganic or organic c...	1 350 279	1 258 341	91 939	767 826	658 259	109 566	
	▼ Extra-ASEAN [88]	[285210] Inorganic or organic c...	588 017	931	587 087	2 325 762	840 413	1 485 349	
	▼ WORLD [99]	[285210] Inorganic or organic c...	1 938 297	1 259 272	679 025	3 093 588	1 498 672	1 594 916	
▼ Indonesia	▼ ASEAN [00]	[285210] Inorganic or organic c...	293		293	2 303	323	1 980	
	▼ Extra-ASEAN [88]	[285210] Inorganic or organic c...	214 217		214 217	138 870		138 870	
	▼ WORLD [99]	[285210] Inorganic or organic c...	214 510		214 510	141 173	323	140 850	
▼ Thailand	▼ ASEAN [00]	[285210] Inorganic or organic c...	1 241 017	1 241 017		647 316	645 474	1 842	
	▼ Extra-ASEAN [88]	[285210] Inorganic or organic c...	67 468	8	67 460	80 783		80 783	
	▼ WORLD [99]	[285210] Inorganic or organic c...	1 308 485	1 241 025	67 460	728 099	645 474	82 625	

³ Prodcom code 20135270 is used as an equivalent to HS code 2852 10 – compounds, inorganic or organic, of mercury, chemically defined (excluding amalgams). Prodcom code 20135275 is used in place of HS code 2852 90 – compounds, inorganic or organic, of mercury, not chemically defined (excluding amalgams).

The second image, below, shows total trade of HS code 2852 90 among ASEAN partners, between ASEAN and the rest of the world, and between ASEAN countries and Pakistan. It also shows trade with the same partners as reported by Indonesia and Thailand.

ASEAN, Indonesia, Thailand trade: mercury compounds, not chemically defined (USD, 2019-2020)

Trade in Goods (IMTS), Annually, HS 2-digit up to 8-Digit									
1	2	3	4	5	6	7	8	9	10
			YEAR * FLOW *						
			▼ 2019			▼ 2020			
REPORTER *	PARTNER *	COMMODITY *	Export	Import	Export	Import	Export	Import	
▼ ASEAN	▼ ASEAN [00]	[285290] Inorganic or organic c...	524 406	458 534	65 871	540 901	404 445	136 456	
	▼ WORLD [99]	[285290] Inorganic or organic c...	1 585 801	1 097 064	488 737	1 497 066	713 646	783 420	
	▼ Pakistan [PK]	[285290] Inorganic or organic c...				3 000	3 000		
▼ Indonesia	▼ ASEAN [00]	[285290] Inorganic or organic c...	5	5					
	▼ WORLD [99]	[285290] Inorganic or organic c...	32 790	5	32 785	51 793		51 793	
▼ Thailand	▼ ASEAN [00]	[285290] Inorganic or organic c...	479 131	446 235	32 896	383 258	350 688	32 570	
	▼ WORLD [99]	[285290] Inorganic or organic c...	1 156 770	1 071 339	85 431	768 407	632 819	135 588	
	▼ Pakistan [PK]	[285290] Inorganic or organic c...				3 000	3 000		

2.5 National trade databases

Comprehensive databases of commodity imports and exports are maintained by most national customs authorities. For reasons of commercial confidentiality, the identities and commercial activities of companies involved in international trade are not identified without a properly justified request.

U.S. International Trade Commission DataWeb

The USITC database, based on the Harmonized System commodity codes developed by the World Trade Organization, covers trade between the U.S. and other countries. DataWeb (<https://dataweb.usitc.gov/>) provides U.S. international trade statistics and U.S. tariff data. All trade data are compiled from official data retrieved from the U.S. Bureau of the Census (an agency within the U.S. Department of Commerce). As such, it includes the quantity and value of all U.S. exports, as well as the quantity, value and origin of all U.S. imports. It also identifies all country trading partners but does not provide the names of the companies involved.

The USITC database was originally developed for assessing tariffs, so it is not adapted to tracking the trade of individual mercury compounds. The most relevant data are imports and exports of all mercury compounds grouped together, which are combined under HS code 2852 (inorganic or organic compounds of mercury, excluding amalgam). For tariff purposes, the Harmonized Tariff Schedule (2022 Revision 7) also identifies certain groups of mercury compounds as shown below.

Heading/ subheading	Statistical suffix	Commodity
2852		Inorganic or organic compounds of mercury, whether or not chemically defined, excluding amalgams:
2852.10		Chemically defined:
2852.10.10	00	Mercuric oxide, mercuric cyanide, mercuric oxycyanide and mercuric potassium cyanide
2852.10.90	00	Other
2852.90		Other:
2852.90.05	00	Albuminates, tannates and phosphides of mercury
2852.90.90	00	Other
3815		Reaction initiators, reaction accelerators and catalytic preparations, not elsewhere specified or included:
3815.90		Other:
3815.90.20	00	Of mercury or of molybdenum
https://hts.usitc.gov/?query=mercury%20compounds		

The table below shows the results of a recent search of the USITC DataWeb for HS code 2852 export and import data. The trade data are searchable in a variety of ways: domestic exports, total exports, imports for consumption, and general imports. The trade quantities may be searched as first unit of quantity and/or second unit of quantity. Finally, the trade value may be searched as FAS (export) value, customs (import) value, landed duty-paid (import) value, dutiable (import) value, or CIF (import) value.

U.S. exports and imports of HS 2852 mercury compounds (USD and kg, 2019-2021)

FAS Value for All Countries Total Exports Annual Data Show Details				
(In Actual Dollars)				
TOTAL		Year 2019	Year 2020	Year 2021
TOTAL		2,347,598	2,363,598	1,475,715
Total:		2,347,598	2,363,598	1,475,715

General Customs Value for All Countries General Imports Annual Data Show Details				
(In Actual Dollars)				
TOTAL		Year 2019	Year 2020	Year 2021
TOTAL		1,759,563	917,894	1,207,547
Total:		1,759,563	917,894	1,207,547

First Unit of Quantity for All Countries Total Exports Annual Data Show Details				
(In Actual)				
TOTAL	Quantity Description	Year 2019	Year 2020	Year 2021
TOTAL	kilograms	209,845	100,270	149,247
Total:		209,845	100,270	149,247

General First Unit of Quantity for All Countries General Imports Annual Data Show Details				
(In Actual Units of Quantity)				
TOTAL	Quantity Description	Year 2019	Year 2020	Year 2021
TOTAL	kilograms	106,911	55,352	103,139
Total:		106,911	55,352	103,139

U.S. Census Bureau “Foreign Trade”

The U.S. Census Bureau is responsible for issuing regulations governing the reporting of all export shipments from the United States. “Foreign Trade” is the official source for U.S. export and import statistics (<https://usatrade.census.gov/index.php?do=login>). It includes the quantity, value and destination country for all U.S. exports, as well as the quantity, value and country of origin of all U.S. imports. It does not provide the names of the trading companies involved. However, it does provide information on the specific states, districts and ports where imports and exports are recorded, as indicated in the following table.

USA TRADE ONLINE - AVAILABLE DATA			
<p>U.S. Census Bureau does not disclose or publish any data that identifies an individual or business, therefore international trade data is not available at importer/exporter business level. For more information visit Census Bureau's Privacy and Confidentiality webpage.</p>			
<p>Harmonized System (HS) District-level Data Exports Imports</p>			
Commodity	Dimensions	Measures	Time Periods
2, 4, 6 & 10-digit HS	Measures Commodity Country Domestic/Foreign (exports only) Country Subcode (imports only) District Rate Provision (imports only) Time	Value (\$US) Quantity 1 Quantity 2 Unit Value Card Count CIF Value (imports only) Dutiable Value (imports only) Calculated Duty (imports only)	Monthly: 2002 - present Annual: 1992 - present
<p>HS Port-level Data Exports Imports</p>			
Commodity	Dimensions	Measures	Time Periods
2, 4 & 6-digit HS	Measures Port/District Commodity Country Time	Value (\$US) Air Value Air Shipping Weight Vessel Value Vessel Shipping Weight Containerized Vessel Value Containerized Vessel Shipping Weight	Monthly: 2003 - present Annual: 2003 - present

The following image is an example of the results of a Census Bureau database search for exports and imports of mercury compounds from and to Asia only via the district of Los Angeles, California, indicating as well the specific ports through which the shipments were processed.

Port-level Exports				Port-level Imports			
Current date: 11/18/2022 10:43 AM (Eastern Standard Time)				Current date: 11/18/2022 10:51 AM (Eastern Standard Time)			
Measures: Total Exports Value (\$US)				Measures: Customs Value (Gen) (\$US)			
Commodity	2652 Mercury Compounds, Inorganic/organic Exc Amalgams			Commodity	2652 Mercury Compounds, Inorganic/organic Exc Amalgams		
Country	Asia			Country	Asia		
Time	2019	2020	2021	Time	2019	2020	2021
Port				Port			
Los Angeles, CA (District)	18,247	406,368	24,720	Los Angeles, CA (District)			5,246
Capitan, CA (Port)				Capitan, CA (Port)			
El Segundo, CA (Port)				DHL-HUB, Riverside, CA (Port)			
Las Vegas, NV (Port)				El Segundo, CA (Port)			
Long Beach, CA (Port)				Las Vegas, NV (Port)			
Los Angeles International Airport, CA (Port)	5,394	3,749	8,994	Long Beach, CA (Port)			
Los Angeles, CA (Port)	12,653	402,619	15,726	Los Angeles International Airport, CA (Port)			5,246
				Los Angeles, CA (Port)			

Canada International Merchandise Trade Web Application

The Canadian International Merchandise Trade (CIMT) Web Application offers detailed trade data based on the Harmonized System (HS) classification of goods. The CIMT Web Application offers data at the international HS 6-digit commodity level, as well as subheadings based on the 8-digit and 10-digit commodity level for exports and imports, respectively. Export and import searches may be carried out with a combination of variables such as commodity value, volume, trading partner, province, year, month, etc. An example is shown below.

Recent exports from Canada to the world (HS 2852.10.00 — Inorganic/organic compounds of mercury, chemically defined, other than amalgams)

	Quantity (kg)	Value (dollars)
March 2018	17,350	395,978
September 2019	1	6,950
October 2019	13,650	407,812
April 2020	18	3,206
July 2020	112	3,075
August 2020	21	555
September 2020	16	441
October 2020	61	4,510
November 2020	11	307
December 2020	17	468
January 2021	4	122

Source: Statistics Canada. Canadian International Merchandise Trade Web Application; <https://www150.statcan.gc.ca/n1/pub/71-607-x/71-607-x2021004-eng.htm>;
Accessed: 2023 Feb 28

Trade Data Online

Canada's Trade Data Online (<https://ised-isde.canada.ca/site/trade-data-online/en>) provides the ability to generate customized reports on Canada and U.S. international trade in goods. This site contains data obtained from Statistics Canada and the U.S. Census Bureau. Trade Data is available on both product and industry-based versions. The product Trade Data is classified by Harmonized System (HS) codes while the industry data is based on NAICS classification codes. Possible downloads include:

- Customized import and export trade data reports by product or industry from over 200 countries.
- A list of companies that import goods into Canada, sorted by product, city or country of origin.
- Data, tools and reports providing information on Canada's international trade and investment activity.

An example of a report available from Canada's Trade Data is shown below.

Report date: 2023-02-28

Criteria

Title	Canadian trade balances
Products	Hs 280540 - mercury HS 850612 - Primary Cells and Batteries - Mercuric Oxide - External Volume <301 Cm3 HS 850630 - Primary Cells and Batteries - Mercuric Oxide
Origin	Canada
Destination	All countries (total)
Period	Latest 5 years
Units	Value in canadian dollars

[Change criteria](#)

Report

		2018	2019	2020	2021	2022
HS 280540 - Mercury						
All Countries (Total)	Total Exports	913,103	277,356	100,718	30,552	76,213
	Total Imports	604,094	50,530	62,774	1,503	--
	Trade Balance	309,009	226,826	37,944	29,049	76,213
HS 850612 - Primary Cells and Batteries - Mercuric Oxide - External Volume <301 Cm3						
All Countries (Total)	Total Exports	--	--	--	--	--
	Total Imports	--	--	--	--	--
	Trade Balance	--	--	--	--	--
HS 850630 - Primary Cells and Batteries - Mercuric Oxide						
All Countries (Total)	Total Exports	9,719	--	280	80,888	41,039
	Total Imports	73,462	52,052	79,577	21,936	123,730
	Trade Balance	-63,743	-52,052	-79,297	58,952	-82,691
Sub-total	Total Exports	922,822	277,356	100,998	111,440	117,252
	Total Imports	677,556	102,582	142,351	23,439	123,730
	Trade Balance	245,266	174,774	-41,353	88,001	-6,478

Data Source: Statistics Canada

Canadian Importers Database

The Canadian Importers Database identifies companies formally importing goods into Canada, by product, by city, and by country of origin. The database includes the names of the companies as well as their locations (city, province and postal code). Companies include both customs brokers and their clients. The database also includes non-resident importers, i.e., companies that have addresses outside of Canada. An example of available data is shown below, leaving off the names of the companies identified.

285210 - Inorganic/organic compounds of mercury, chemically defined, o/t amalgams - Canadian Importers Database (CID)

[List by city](#) | [List by country](#) | [Help](#)

► Search for a product [Return to search results](#)

By countries

Market concentration & Major Canadian importers

Market concentration		
Number of importers	Value of imports (\$CDN)	Cumulative % of imports
4	61,061	78.95%
All	77,344	100.00%

Display companies with addresses in:

📄 [Export list to excel](#)

Filter items Showing 1 to 4 of 4 entries | Show entries

Major Canadian importers 2 in 2021

Company name (alphabetical order) <input type="button" value="↑↓"/>	City <input type="button" value="↑↓"/>	Province <input type="button" value="↑↓"/>	Postal code <input type="text" value="3"/> <input type="button" value="↑↓"/>
---	--	--	--

Source: Innovation, Science and Economic Development Canada, based on 2021 data collected by the Canada Border Services Agency (CBSA)

Canada Export Control List

The Export of Substances on the Export Control List Regulations (<https://pollution-waste.canada.ca/environmental-protection-registry/regulations/view?id=115>) apply to exports of substances listed on Schedule 3 of the Canadian Environmental Protection Act, 1999 (CEPA), which is also known as the Export Control List. These regulations ensure that Canada complies with its export obligations under the Minamata Convention on Mercury and other multilateral environmental agreements. Substances listed in the Export Control List, Part 2 (“Substances subject to notification or consent”), require the consent of and/or notification to the importing country. Included in Part 2 are “mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds.”

The Export Control List Regulations set out the content of the notice of proposed export, and the period and manner in which it must be provided, as required under subsection 101(1) of CEPA. The regulations also set out the requirements for obtaining an export permit, and the information to be provided in the notice of proposed export, which includes the:

- identity of the exporter and the substance exported;
- country of destination;
- expected date of export;
- estimated quantity of the substance to be exported;
- purpose of the export;
- exception under which the export is allowed, if applicable.

Pursuant to section 103 of the Canadian Environmental Protection Act, 1999, annual reports must be published naming the substance, exporter and destination of all substances exported under the Export Control List Regulations.

Mexico SIAVI database

SIAVI, the Mexican online commodity tariff database (<http://www.2006-2012.economia.gob.mx/trade-and-investment/foreign-trade/siavi>), is an online tool that provides information on regulations and tariffs, as well as annual and monthly trade data on the value and volume of Mexican imports and exports. The SIAVI database reflects the raw trade data received from the General Customs Administration. Data in the Mexican SIAVI trade database and in the Secretariat of Economy's World Trade Atlas are classified under the Harmonized System (HS).

Argentina INDEC database

The Instituto Nacional de Estadística y Censos (INDEC), or the National Institute of Statistics and Censuses manages the trade database in Argentina (<https://comex.indec.gob.ar/#/>). Since Argentina is one of the countries that has been especially active in understanding and monitoring mercury trade, the INDEC database was consulted in order to identify the range of mercury compounds that may be separately identified there. They are listed in the table below.

Commodity code, or NCM	Description
2852 10 11	Oxides of mercury, inorganic
2852 10 12	Mercury I chloride (mercurous chloride)
2852 10 13	Mercury II chloride (mercuric chloride), f/ photo
2852 10 14	Mercury II chloride (mercuric chloride), other uses
2852 10 19	Other inorganic mercury compounds
2852 10 21	Mercury acetate
2852 10 22	Thimerosal
2852 10 23	Mercury stearate [mercury(2+);octadecanoate]
2852 10 24	Mercuric lactate [mercury(2+) lactate]
2852 10 25	Mercury salicylate
2852 10 29	Other organic mercury compounds
2852 90 00	Other mercury compounds

Based on discussions at previous Minamata COP sessions, it is likely that some other GRULAC countries are using similar commodity codes for the trade of some mercury compounds.

2.6 National and regional inventories

United States inventory of mercury supply, use, and trade

Among other provisions, the Frank R. Lautenberg Chemical Safety for the 21st Century Act (Lautenberg Act) requires that every three years the EPA must carry out and publish an inventory of mercury (and mercury compound) supply, use, and trade in the United States." To assist in the preparation of the inventory, there are detailed reporting requirements for those who manufacture mercury or mercury-added products. Reporters are required to identify specific mercury compounds, manufacturing processes, and how mercury compounds are used in manufacturing processes. EPA uses the information from the mercury inventory to assist in the United States' national reporting for the Minamata Convention.

In the U.S. Inventory of Mercury Supply, Use, and Trade in the United States (2020 Report), mercury compounds are reported to be used in the following industries, laboratories, medical and educational facilities:

- Administration of air and water resource and solid waste management programs (924110)
- All other basic organic chemical manufacturing (325119)
- Biological product (except diagnostic) manufacturing (325114)
- Colleges, universities, and professional schools (611310)
- Electron tube manufacturing (334411)
- Elementary and secondary schools (611110)
- General medical and surgical hospitals (622110)
- In-vitro diagnostic substance manufacturing (325413)
- Medical laboratories (621511)
- Medicinal and botanical manufacturing (325411)
- Other chemical and allied products merchant wholesalers (424690)
- Process, physical distribution, and logistics consulting services (541614)
- Research and development in biotechnology (541715)

The inventory also lists the various countries from which the U.S. imports mercury compounds, and those to which the U.S. exports mercury compounds, as in the table below.

Countries of origin and destination for U.S. imports and exports of mercury and mercury-added products (2018)

	Imported*			Exported*		
	Mercury Compounds	Elemental Mercury-Added Products	Mercury Compound-Added Products	Mercury Compounds	Elemental Mercury-Added Products	Mercury Compound-Added Products
Argentina				X	X	X
Armenia	X					
Aruba					X	
Australia				X	X	X
Austria					X	
Bahamas						X
Bahrain						X
Belarus						X
Belgium		X	X	X		X
Belize					X	
Bolivia				X	X	X
Brazil				X	X	X
Cambodia						X
Canada			X	X	X	X
Chile				X	X	X
China		X	X		X	X
Colombia				X	X	X
Costa Rica					X	X

In the United States in 2018, according to the inventory, three companies manufactured 209 lbs. of mercury compounds, identified in the table below. However, the quantity (and the mercury content) of each mercury compound manufactured, distributed and exported cannot be determined due to the combined listing of multiple compounds in the reports submitted.

Identity of mercury compounds made in the U.S. (2018)

CASRN	Mercury Compounds
54-64-8	Mercurate(1-), ethyl[2-(mercapto- κ .S)benzoato(2-). κ .O]-, sodium (1:1)
6283-24-5	Mercury, (acetato- κ .O)(4-aminophenyl)-
7774-29-0	Mercury iodide (HgI ₂)
13257-51-7	Acetic acid, 2,2,2-trifluoro-, mercury (2+) salt (2:1)
312623-78-2	Perchloric acid, mercury salt (1:1) tetrahydrate

According to the inventory, the various products manufactured in the U.S. in 2018 that use mercury compounds are shown below. For each product category, the **total amount of mercury** contained in the mercury compounds used, distributed, and exported is indicated.

Mercury compounds made in the U.S. and used/distributed/exported (2018)

Products Made in the United States – Mercury Compounds			
Product Category and Subcategory	Amount in Products (lbs)		
	Used	Distributed ^a	Exported
Batteries	119	0	0
Silver-Zinc			
Formulated Products	290	151	121
Preservative (Vaccine Usage)			
Other Formulated Products	1,496	85	1,767
In-Vitro Diagnostics			
Pharmaceuticals			
Preservative (Non-Vaccine Usage)			
Reagents (Catalysts, Buffers, and Fixatives)			
Testing Kits			
Lighting, Lamps, and Bulbs	1		1
Electrodeless Discharge			
Miscellaneous/Novelty	1		
Plasma Display (Fill Tubes at Seal Pump and Burst at RTV Operation)			
Total	1,907	236	1,889

^aThe range of 2018 data reported to the MER application and 2016 data reported to the IMERC Mercury-added Products Database is presented in the *Products Sold in the United States* section.

European Union mercury inventory

In accordance with Article 8(7) of Regulation (EU) 2017/852 on mercury ('Mercury Regulation'), the European Commission has made publicly available an inventory of existing manufacturing processes involving the use of mercury or mercury compounds ('processes') and of existing mercury-added products (MAPs) as well as any applicable marketing restrictions. The inventory is said to be an indicative "living" document to be regularly updated when additional information on existing processes and MAPs are made available to the Commission, or when new or amended provisions of European Union (EU) law affect existing MAPs and processes.

While the EU Mercury Inventory lists a range of uses for mercury compounds, as well as regulations controlling those uses, it provides no information or estimates of the quantities of mercury or mercury compounds that may be used in manufacturing processes or in MAPs in the EU. An excerpt from the April 2019 version of the inventory is presented below.

INDICATIVE NON-EXHAUSTIVE LIST OF EXISTING MERCURY-ADDED PRODUCTS	INDICATIVE NON-EXHAUSTIVE LIST OF RELEVANT EU INSTRUMENTS
<p>V. MEDICINAL PRODUCTS</p> <p>1) Vaccines for human or veterinary use in which mercury or mercury compounds, including thiomersal, are used as antimicrobial preservative in bulk antigen, bulk finished product before filling and finished product to prevent spoilage or other adverse effects caused by microbial contamination</p> <p>2) Homeopathic medicinal products for human or veterinary use containing mercury or mercury compounds used as active ingredient, intermediate solution or starting material</p> <p>3) Diuretics containing mercury or mercury compounds used as renal diuretic</p>	<ul style="list-style-type: none"> - <i>Directive 2001/82/EC</i> on the Community code relating to veterinary medicinal products - <i>Regulation (EU) 37/2010</i> on pharmacologically active substances and their classification regarding maximum residue limits in foodstuffs of animal origin (Annex, Table 1) - <i>Directive 2001/83/EC</i> on the Community code relating to medicinal products for human use - <i>Regulation (EC) 726/2004</i> on Community procedures for the authorisation and supervision of medicinal products for human and veterinary use - <i>Regulation (EU) 2019/6</i> on veterinary medicinal products (<i>applicable from 28 January 2022</i>)
<p>VI. DENTAL AMALGAM</p> <p>1) Capsules using mercury together with other metals to generate an alloy that hardens to produce a filling for dental restorations</p>	<ul style="list-style-type: none"> - <i>Regulation (EU) 2017/852</i> on mercury (Art. 10 and 19) - <i>Directive 93/42/EC</i> on medical devices
<p>VII. COSMETIC PRODUCTS</p> <p>1) Skin lightening soaps and creams using mercury and mercury compounds that inhibit the formation of melanin to achieve a lighter skin tone (lightening or bleaching of skin)</p> <p>2) Eye makeup, cleansing products and mascara using thiomersal as preservative</p>	<ul style="list-style-type: none"> - <i>Regulation (EU) 2017/852</i> on mercury (Art. 5 and Annex II) - <i>Regulation (EC) 1223/2009</i> on cosmetic products (Art. 14(1)(a) and Annexes II (221) and V (entries 16 and 17)) - <i>Regulation (EU) 649/2012</i> concerning the export and import of hazardous chemicals (Art. 15(2) and Annex V (Part 2)).

2.7 Industry contacts

Some useful information may be obtained via contacts with producers and traders, especially those who are part of a network developed over many years. For example, an EU company that once supplied an even larger range of mercury compounds continues to produce or supply mercury(I) iodide, mercury(I) nitrate dihydrate, mercury(I) sulfate, mercury(II) acetate, mercury(II) amidochloride, mercury(II) bromide, mercury(II) chloride, mercury(II) cyanide, mercury(II) iodide (red), mercury(II) nitrate monohydrate, mercury(II) oxide (red), mercury(II) oxide (yellow), mercury(II) salicylate, mercury(II) sulfate, and mercury(II) thiocyanate. Industry contacts may be willing to describe the main ongoing uses of these and other mercury compounds, estimate demand for certain compounds, and may be willing to provide information about other companies producing mercury compounds.

2.8 Reporting under the Minamata Convention

Minamata Initial Assessments (MIAs)

The purpose of the Minamata Initial Assessments was for Parties to develop inventories of mercury sources and uses; to review and analyze gaps in policy documents and legislation in order to propose amendments; and to develop action plans to monitor and control mercury uses with the objective of reducing and phasing out the use of mercury and mercury compounds. For this analysis, MIAs from five countries were examined for information on types and quantities of mercury compounds that might be traded or used by these countries. There was no useful information on this subject in two of these MIAs.

Two more MIAs reported that they had questioned local industry and found no significant use of mercury compounds:

“...the data assessment is still mainly based on feedbacks of operating enterprises and the majority of domestic manufacturers is not using mercury.”

“...there is no cosmetic company importing mercury. This is in line with survey information from enterprises. All of the cosmetic companies claim not to use mercury in manufacturing (... Enterprise feedbacks), especially in 100% foreign capital companies....”

The fifth MIA, however, considered that mercury compounds could be a problem:

“There are a lot of locally produced and imported cosmetics used for skin lightening....”

“No activity was confirmed as regards production of mercury-containing paints and cosmetics. As both of these product types may have substantial mercury concentrations, this could be a priority for future inventories.”

The same MIA provided the following image of “skin-lightening creams available in most cosmetic outlets.”



Overall, therefore, the MIAs cannot be expected to provide detailed information on sources, uses, quantities or storage of mercury compounds.

First Full National (“Article 21”) Reports of the Minamata Convention on Mercury 2021

The Minamata Convention required each Party to submit in 2021 its First Full National Report (FFNRs) to the Conference of the Parties, through the Secretariat, on the measures it has taken to implement the provisions of the Convention, and on the effectiveness of such measures and the possible challenges in meeting the objectives of the Convention. Reporting especially under Article 3, Paragraph 5(a), may reveal certain significant stocks of mercury compounds.

Most of the Parties to the Convention have submitted their FFNRs, also known as Article 21 reports, which are available at https://www.mercuryconvention.org/en/parties/documents?f%5B0%5D=document_type%3A8.

There are two key questions from the standard reporting format that could elicit information about stocks of mercury compounds:

Question 3.3. Has the party endeavored to identify individual stocks of mercury or **mercury compounds** exceeding 50 metric tons and sources of mercury supply generating stocks exceeding 10 metric tons per year that are located within its territory?

Question 10.1. Has the party taken measures to ensure that the interim storage of non-waste mercury and **mercury compounds** intended for a use allowed to a party under the Convention is undertaken in an environmentally sound manner?

In a review of the FFNRs for the European Union and six individual countries, the storage of elemental mercury only is mentioned in a number of cases. In other cases, it is unclear whether the data apply to mercury compounds, so the information currently available in FFNRs is not expected to be useful for the investigation of sources or stored quantities of global mercury compounds.

2.9 Published literature and other sources

An extensive search via Google Scholar of various combinations of the keywords “mercury, compounds, trade, imports, exports” etc. produced a long list of peer-reviewed and other papers, but no papers were found with useful information about production or commercial trade of mercury compounds.

Consultant reports prepared for various entities are more useful, and a number of relevant reports are included in the References section of this study. An indication of the sort of information available in these reports is provided in the following examples:

The 2018 Global Mercury Assessment (GMA 2018) and its Technical Background Report (AMAP/UN Environment 2019) focus primarily on mercury emissions and releases rather than trade issues. Thus they do not identify specific mercury compounds. However, they discuss the many uses of compounds as chemical intermediates and catalysts, as reagents for laboratory uses, as medical preparations, as preservatives in vaccines and cosmetics, as additives in paints and dyes, as disinfectants, and as pesticides, fungicides and biocides. These references also provide an estimate (in “other applications”) of the quantity of mercury used globally in compounds in 2015, and a comparison with 2005 estimates.

The report, Options for reducing mercury use in products and applications, and the fate of mercury already circulating in society (DG ENV 2008), examined 41 different mercury compounds, and estimated EU production of 15 of them. This information is now out of date, but the EU producers identified in the report may still be active.

The report, Mercury Compounds in the United States: Uses, Consumption, and International Trade (USEPA 2009a), examined the U.S. and EU uses and international trade of mercuric chloride, mercurous chloride, aminomercuric chloride, mercuric iodide, mercurous iodide, mercuric nitrate, mercurous nitrate, mercuric oxide, mercuric sulfate, mercuric sulfide and phenylmercuric acetate. The trade data in this report are now out of date. U.S. companies producing mercury compounds that were identified include Elf Atochem North America, GFS Chemicals, Johnson Matthey, R.S.A. Corporation and Troy Chemical Corp.

The report to Congress, Potential Export of Mercury Compounds from the United States for Conversion to Elemental Mercury (USEPA 2009b), apart from cinnabar, identified mercurous chloride (calomel) as the compound most likely to be converted to elemental mercury for purposes of resale or trade. The 11 mercury compounds targeted by this report, other than thimerosal, are listed in Section 3.1 below.

An example of another possibly useful source is a fee-based research program run by S&P Global (<https://www.spglobal.com/en/>) that may be used to better understand chemical use patterns in domestic and global applications for various industrial sectors.

2.10 Data inconsistencies

Along with the limited samples of trade data presented in this feasibility study, there are noted inconsistencies or asymmetries in this data that must be dealt with in any more detailed investigation. The table below, for example, shows some of the inconsistencies in the U.S. trade data on mercury compounds presented in different sections of this study.

Selected data on U.S. trade of mercury compounds

Feasibility study reference	U.S. imports	U.S. exports	Year	Data source and other comments
Section 2.5	0.918 million USD; 55 tonnes	2.364 million USD; 100 tonnes	2020	USITC DataWeb, FAS value for exports to all countries, general customs value for imports from all countries
Section 2.5	n/a	0.406 million USD	2020	USA Trade Online (U.S. Census Bureau); these data are only for trade between Los Angeles District ports and Asia
Section 2.6	n/a	0.9 tonne	2018	U.S. Mercury Inventory, the quantity shown here (equiv. 1,889 pounds) is the mercury content of the compounds exported to all countries
Section 5.3	0.84 million USD	0.79 million USD	2020	OEC World subscription database, exports to and imports from all countries

There are likely rational explanations for these inconsistencies, such as data from different calendar years, the different ways the data are collected and reported, etc. However, it is encouraging to note that the variations in the data are relatively limited, and for the purpose of a global inventory, would not fundamentally change our understanding of the current trade patterns.

3 Sources of mercury compounds

This section of the study covers the main sources of mercury compounds. These are mostly produced by chemical companies, but mercury compounds may also be generated as a by-product of certain industrial processes using mercury or removing trace mercury from non-ferrous ores.

3.1 Mercury compounds of interest

In addition to those mercury compounds identified in Article 3 of the Minamata Convention (mercury(I) chloride, mercury(II) oxide, mercury(II) sulphate, mercury(II) nitrate, and mercury(II) sulfide), based on online offerings and preliminary discussions with manufacturers, the following mercury compounds also appear to be produced in significant quantities:

- mercury(II) chloride
- mercury(II) iodide
- mercury(II) acetate
- phenyl mercury(II) acetate (phenylmercuric acetate)
- ammoniated mercury (mercuric amidochloride)
- mercury(II) thiocyanate

Other mercury compounds produced in significant quantities may come to light with further investigation.

3.2 Chemical companies producing mercury compounds

Companies manufacturing mercury compounds may be divided into two categories:

- 1) multinational companies such as Forchem and Sigma Aldrich mass-producing and marketing mercury compounds in a number of countries;
- 2) smaller companies such as Cfm Oskar Tropitzsch GmbH focusing on a more limited or specialized range of mercury compounds, and often producing them in only one country.

It is important to pay attention to both types of producers as the latter may supply a significant part of the market for a specific mercury compound used in a particular application.

Manufacturers and distributors of a wide range of mercury compounds are readily searchable on the internet, as well as on subscription databases. As an example, the image below is taken from a Japanese website, listing only a few of the many producers of mercuric thiocyanate. It is likely that if there are many manufacturers of any given compound, then there are probably significant global sales and uses of that compound.

PubChem (<https://pubchem.ncbi.nlm.nih.gov/>) also provides significant information about “chemical vendors.”

MERCURIC THIOCYANATE		More ▼
CAS:	592-85-8	
Sigma-Aldrich Co. LLC.		Inquiry
¥ 1170.00 500 g Name: Mercury(II)thiocyanate Remarks: Brand: Sigma-Aldrich Product Number: 83374 Purity: purump.a., ≥95.5%(complexometric) Tel: 800 558-9180		Product Catalog(394905)
Chem-Impex Internationa...		Inquiry
¥ 28.00 25G ¥ 73.00 100G ¥ 146.00 250G ¥ 549.00 1KG ¥ 2234.00 5KG Name: Mercury(II)thiocyanate,99%(Assay) Remarks: Brand: Chem-Impex Product Number: 00208 Purity: 99%(Assay) Tel: 630-766-2112		Product Catalog(0)
Alfa Aesar		Inquiry
¥ 269.00 250g Name: Mercury(II)thiocyanate Remarks: Brand: Alfa Aesar Product Number: 037106 Tel: 1 888 343-8025 Specialty/Bulk		Product Catalog(9856)
GFS Chemicals Inc		Inquiry
¥ 180.00 100 G Name: MERCURICTHIOCYANATE,REAG Remarks: Brand:gfschemicals Product Number:50021 Tel: 800-858-9682		Product Catalog(2333)
CLEARSYNTH LABS LTD.		Inquiry
Name: Mercury(II)thiocyanate Remarks: Brand:clearsynth Product Number:CS-DK-00281 Tel: +91-22-45045900		Product Catalog(9379)
Sigma-Aldrich Chemicals...		Inquiry
¥ 55640.00 100G Name: Mercury(II)thiocyanate Remarks: Brand:sigma aldrich Product Number:1.04484 Purity:foranalysisEMSURE?Reag.PhEur Tel: 1-800-309-6000		Product Catalog(7820)
Otto Chemie Pvt. Ltd.		Inquiry
Name: Mercurithiocyanate Remarks: Brand:ottokemi Product Number:M1737 Purity:,GR99%+ Tel: +91 9820041841		Product Catalog(5865)

3.3 Mercury compounds generated by industrial processes

Mercury compounds may be generated as a by-product of certain industrial processes using mercury or removing trace mercury from non-ferrous ores. In such cases, depending on relevant regulations and enforcement, the compounds may be disposed of as waste, or they may find a commercial use (especially as they would tend to be available at a low price) either as a compound or by recycling the compound to extract the elemental mercury. One such compound identified in USEPA (2009a) was mercury(I) chloride, or calomel.

4 Uses of mercury compounds

This section of the feasibility study addresses the more common uses of mercury compounds, and the likely uses associated with significant importing countries.

4.1 Overview of mercury compound uses

Information on the many uses of mercury compounds may be found in the documents listed as references to this study, such as the USEPA Mercury Inventory, as well as a number of free online resources⁴ including:

- PubChem (NIH)
- NIH ChemIDplus
- NIST Chemistry WebBook
- R&D Chemicals
- NCI Database Browser
- Chemfinder
- European Chemical Substances Information System (ESIS)

Drawn from these sources, the main categories and subcategories of mercury-added products, processes and functions using mercury compounds include:

- Batteries:
 - Button cell, silver
 - Button cell, zinc-air
 - Button cell, alkaline
 - Stacked button cell batteries
 - Manganese oxide
 - Silver oxide
 - Mercuric oxide, non-button cell
 - Button cell, mercuric oxide
 - Button cell, zinc carbon
- Formulated products (including cosmetics, pesticides, and laboratory chemicals):
 - Skin-lightening creams
 - Lotions
 - Soaps and sanitizers
 - Bath oils and salts
 - Topical antiseptics
 - Preservatives (e.g., for use in vaccines and eye-area cosmetics)
 - Pharmaceuticals (including prescription and over-the-counter drug products)
 - Cleaning products (not registered as pesticides under the Federal Insecticide, Fungicide, and Rodenticide Act)
 - Pesticides
 - Paints
 - Dyes
 - Reagents (e.g., catalysts, buffers, fixatives)
- Manufacturing processes:
 - Acetaldehyde production
 - Vinyl chloride monomer production
 - Polyurethane curing

⁴ Source: <https://pubchem.ncbi.nlm.nih.gov/compound/181518#section=Substances-by-Category>

- Process chemical functions and reactions:
 - Catalyst
 - Reactant
 - Reagent

Again based on the sources cited above, the table below lists the most common mercury compounds, highlighting those that appear to be traded internationally in significant quantities. These compounds typically contain 50-90% mercury by weight.

Hg compound	CAS number	Formula	Main applications
Aminomercury chloride; Ammoniated mercury; Mercuric amidochloride	10124-48-8	ClH_2HgN	Skin bleaching products; used to treat impetigo, psoriasis, minor skin infections, bacterial infections; used as an antiseptic
Mercury(II) acetate; Mercuric acetate; Mercury di(acetate)	1600-27-7	$\text{C}_4\text{H}_6\text{HgO}_4$	Used in the synthesis of organomercury compounds; catalyst in organic polymerization reactions; reagent in analytical chemistry
Mercury(II) bromide	7789-47-1	HgBr_2	Used as a reagent in the Koenigs–Knorr reaction; also used to test for the presence of arsenic
Mercury(I) chloride; Mercurous chloride; Calomel	10112-91-1	Hg_2Cl_2	Skin bleaching products, acousto-optical filters, sometimes still used in internal medicine (cathartic), used as a standard in electrochemistry (calomel electrodes), as a depolarizer in dry batteries, agricultural chemical, insecticide, fungicide Generated as an output of the Boliden-Norzinc flue gas cleaning process Relatively easy to process and recover elemental mercury from mercurous chloride
Mercury(II) chloride; Mercuric chloride; Corrosive sublimate	7487-94-7	HgCl_2	Used as an input to the Boliden-Norzinc flue gas cleaning process, added to skin bleaching products, pharmaceutical industry, chemical industry catalyst for the production of VCM, starting material for the production of other Hg compounds, depolarizer in dry batteries, reagent in analytical chemistry, non-human antiseptic (veterinary use), fungicide, germicide, insecticide, disinfectant, preservative, metallurgy, embalming fluid, photo fixative
Mercury(II) cyanide	592-04-1	$\text{Hg}(\text{CN})_2$	Pharmaceutical, germicidal soaps, photography and in making Cyanogen gas
Mercury iodide; Mercury protoiodide	7783-30-4	HgI	Disinfectant soaps, medicine (topical antibacterial), biocide
Mercury(I) iodide; Mercurous iodide	15385-57-6	Hg_2I_2	Topical antiseptic, bactericide, used as a topical antibacterial agent in medicine
Mercuric diiodide; Mercury(II) iodide (red)	7774-29-0	HgI_2	Skin bleaching products, pharmaceutical industry, lab analyses (Mayer's reagent, Nessler's reagent), nuclear particle detection instruments
Mercury(I) nitrate; Mercurous nitrate	10415-75-5	$\text{Hg}(\text{NO}_3)$	Lab analyses (CFM)

Hg compound	CAS number	Formula	Main applications
Mercury(II) nitrate; Mercuric nitrate	10045-94-0	Hg(NO ₃) ₂	Lab analyses (e.g., Millon's reagent – diluted mercury(II) nitrate typically used for the detection of tyrosine); used in synthesis of other mercury compounds
Mercury(II) oxide (yellow); Mercury(II) oxide (red); Mercuric oxide	21908-53-2	HgO	Skin bleaching products(?), (especially button) batteries, production of mercury-II salts, reagent in analytical chemistry, synthesis of other mercury compounds, polishing compounds, cosmetics, paint pigment, perfumes, disinfectant, pharmaceuticals, polishing compounds, fungicides
Mercury(II) sulfate; Mercuric sulfate	7783-35-9	HgSO ₄	Laboratory reagent: COD analysis, Kjeldahl method; pharmaceutical industry; battery electrolyte; gold and silver extraction; used as catalyst in the conversion of acetylene to acetaldehyde; wine industry
Mercury(I) sulfate; Mercurous sulfate	7783-36-0	Hg ₂ SO ₄	Used to make batteries; Used in standard cells as a depolarizer; chemical processing
Mercury(II) sulfide; Cinnabar; Vermilion	1344-48-5	HgS	Cinnabar is the primary source for elemental mercury extraction, pharmaceutical industry, red or black pigment in special paints, tattoo dyes
Mercury(II) thiocyanate; Mercuric thiocyanate	592-85-8	C ₂ HgN ₂ S ₂	Pharmaceutical industry, photography intensifier, used as a precursor to other chemical compounds, analytical reagent (e.g. used in the determination of chloride ions in water by UV-visible spectroscopy); catalyst for the addition of thiocyanic acid to alkynes. Used in Pharaoh's serpents (fireworks) because it burns readily in air to generate a cohesive coil of ash.
Phenylmercuric acetate (PMA); Phenylmercury(II) acetate	62-38-4	C ₈ H ₈ HgO ₂	Herbicide, fungicide, mildewcide, bactericide, disinfectant, and preservative (against mildew and bacteria) esp. for latex paints, inks, adhesives and caulking compounds; cosmetics; used in the pulp and paper industry for slime control; catalyst for polyurethane elastomers; used in the preparation of other phenylmercury compounds.

As indicated in the table above, many of the mercury compounds are used as chemical intermediates, as catalysts, or for laboratory analysis or pharmaceutical processes. These uses are further described below.

4.2 Mercury compounds as intermediates

A chemical “intermediate” is a substance or compound that plays a role in certain reactions necessary to convert a chemical raw material to another form or to a final product. The chemical intermediate may be “consumed” and/or generate wastes, and it may or may not remain in trace quantities in the final product.

Mercury (II) chloride, for example, is commonly used as an intermediate for the production of other mercury compounds like thimerosal and phenylmercuric chloride. Other intermediates, while far from a complete list, include mercury(II) chloride, mercury(II) sulfate, mercury(II) sulfide, mercury(II) thiocyanate and mercury(II) acetate.

4.3 Mercury compounds as catalysts

In some applications the catalyst is a mercury compound that enhances the chemical process but is not left in the final product, as in vinyl chloride monomer (VCM) production. In other applications the catalyst is added to a batch process – for example, in order to give the batch and/or the final product certain desirable characteristics. A common process using organic mercury compounds in this manner is the curing of polyurethane elastomers, which are cast (poured or injected into a mold) into sometimes complex shapes, or sprayed onto a surface as insulation, corrosion protection, etc. Both of these applications of mercury compounds remain relatively significant, although the quantity of compounds used in the latter is much lower.

One of the main difficulties in obtaining an overview of the use of mercury compounds as chemical intermediates and as catalysts is that specialty chemicals or fine chemicals are sometimes designed and patented for a specific process, if not for a single industry. The manner in which they are used may also be treated as confidential company information.

4.4 Mercury compounds in laboratories and pharmaceuticals

Laboratory analyses are typically governed by analytical standards. The European and U.S. pharmaceutical industries, for example, require that substances and preparations used to prepare pharmaceutical products meet these industry recognized global standards. Several dozen of the analytical methods in the *European Pharmacopoeia* involve the use of mercury compounds as reagents, and these uses of mercury may take a long time to phase out due to inertia and cost. In most countries they are assumed to be used in relatively closed systems that include strict hazardous waste collection and treatment schemes. Below is a non-exhaustive list of the varied uses of mercury compounds in laboratories and similar facilities:

<ul style="list-style-type: none">• Stone analysis kits• Antibody test kits• Antigens• Antiserums• Buffers• Acetic acid• Ammonium reagent• Calibration kits• Diluents• Conjugate kits• Enzyme immunoassay test kits• Enzyme tracers• Ethanol• Extraction enzymes	<ul style="list-style-type: none">• Phenobarbital reagent• Positive & negative control kits• Phenytoin reagent• Potassium hypochlorite• Lab stains• Substance abuse test kits• Sulfuric acid• Fixatives• Hematology reagents• Hormones• Thimerosal• Tracer kits• Urine test kits• Immunoelectrophoresis reagent
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4.5 Assessment of the available data and information

Information on the range of uses of mercury compounds is fairly comprehensive, and there are multiple sources for this information. One element that is lacking is better information on the extent to which many of these uses have been phased out.

5 Trade flows of mercury compounds

This section of the study deals with the global trade flows of mercury compounds, including the most important exporting and importing countries, as well as a mention of uncertainties in the trade data.

5.1 Challenges in identifying mercury compounds

A number of reports have investigated the trade of mercury compounds, and all of them come up against the challenges of inconsistent data, lack of separate data concerning specific compounds, multiple names for the same compound, and similar causes for confusion. To illustrate, below are two examples of multiple names for the same compound.

Ammoniated mercury (ClH_2HgN) may also be listed (including “Depositor-Supplied Synonyms”)⁵ as:

- Aminomercuric chloride
- Aminomercury chloride
- Ammoniated mercuric chloride
- Ammoniated mercury
- Hydrargyrum ammoniatum
- Hydrargyrum precipitatum album
- Mercuric amidochloride
- Mercuric ammonium chloride
- Mercuric chloride, ammoniated
- Mercury amide chloride
- Mercury ammoniated
- Mercury ammonium chloride
- Mercury(II) chloride ammonobasic
- Mercury, ammoniated
- Quecksilber(II)-amid-chlorid
- White mercuric precipitate
- Etc.

Similarly, common names for mercuric chloride (HgCl_2) include:

- Mercury bichloride
- Mercuric bichloride
- Bichloride of mercury
- Corrosive sublimate
- Mercury perchloride
- Mercury(II) chloride
- Mercury chloride
- Perchloride of mercury
- Sublimate
- Etc.

To reduce the confusion, each mercury compound has a CAS number and an EC number, as shown in Appendix 1.

⁵ See <https://pubchem.ncbi.nlm.nih.gov/compound/Ammoniated-mercury#section=Chemical-and-Physical-Properties>

5.2 Harmonized System codes

Basic trade data for mercury compounds and for products and mixtures containing these compounds may be found under the CN or HS codes shown in the following table, adapted from the EU Commission Delegated Regulation amending Regulation (EU) No 649/2012 of the European Parliament and of the Council as regards the listing of pesticides, industrial chemicals, persistent organic pollutants and mercury.

Mercury and mercury compounds	CN (HS) codes
Mercury compounds, including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds (except mercury compounds listed in Annex V of the Regulation)	code 2852 00 – inorganic or organic compounds of mercury, excluding amalgams code 2852 10 - Inorganic or organic compounds of mercury, excluding amalgams – chemically defined; code 2852 90 - Inorganic or organic compounds of mercury, excluding amalgams – other
Mercury compounds in insecticides, rodenticides, fungicides, disinfectants, herbicides, etc.	code 3808 50 - Insecticides, rodenticides, fungicides, disinfectants, herbicides and the like
Cosmetic soaps containing mercury	code 3401 11 00 - Soap and organic surface-active products ... for toilet use; code 3401 19 00 - Soap and organic surface-active products ... not for toilet use; code 3401 20 10 – soap in other forms (Flakes, wafers, granules or powders); code 3401 20 90 – soap in other forms (other); code 3401 30 00 - Organic surface-active products and preparations for washing the skin
Metallic mercury and mixtures of metallic mercury with other substances, including alloys of mercury, with a mercury concentration of at least 95% by weight	code 2805 40 - mercury
Reaction initiators, reaction accelerators and catalytic preparations of mercury or of molybdenum	code 3815.90.20 – mercury and mercury compounds
Minamata Convention listed compounds: — Mercury (I) chloride (Cl_2Hg_2) – calomel — Mercury (II) oxide (HgO) — Mercury sulphide (HgS) — Mercury (II) sulphate (HgSO_4) — Mercury (II) nitrate ($\text{Hg}(\text{NO}_3)_2$) — Mercury(II) acetate	code 2852 10 00 – mercury compounds, chemically defined
All mixtures of metallic mercury with other substances, including alloys of mercury with a mercury concentration of less than 95% by weight, and all mercury compounds not listed above, if the export of that mixture or compound is for the purpose of reclaiming metallic mercury, e.g.: — CAS 7487-94-7 - mercury (II) chloride (HgCl_2) — CAS 7783-36-0 - mercury(I) sulphate (Hg_2SO_4); — CAS 592-85-8 - mercury(II) thiocyanate ($\text{Hg}(\text{SCN})_2$) — CAS 15385-57-6 - mercury(I) iodide (Hg_2I_2)	code 2852 10 00 – mercury compounds, chemically defined
Mercury ores, slag, ash and residues — Cinnabar ore	code 2620 60 – slag, ash and residues, incl. manufacturing residues containing mercury code 2617 90 00 - Ores, slag and ash: Other ores and concentrates

Because of the groupings of compounds in the customs codes in the table above, global trade databases such as Comtrade cannot, in their present form, be relied upon to provide the desired level of precision with regard to imports and exports of specific mercury compounds. The most that can be expected is comprehensive global and national trends for groups of compounds.

5.3 Key exporting and importing countries

As discussed previously, basic comprehensive trade data for mercury compounds are available in the public databases. According to the OEC World algorithm used to treat the available data (see Appendix 2), the key countries involved in exporting and importing mercury compounds in 2020 are listed in the table below.

Major country exporters and importers of HS 2852: Inorganic or organic compounds of mercury, excluding amalgams, whether or not chemically defined (2020)

EXPORTERS		IMPORTERS	
Country	Trade value (million USD)	Country	Trade value (million USD)
Germany	3.27	Germany	2.33
Argentina	2.67	France	2.10
India	2.43	Singapore	0.95
Belgium	1.51	Chile	0.86
Singapore	0.90	United States	0.84
United States	0.79		

5.4 Assessment of the available data and information

As mentioned, data problems are common – not only with public data but also with the presentation or interpretation of (often the same) data by subscription services. Some years ago a Danish research team looked into both domestic and Eurostat trade data for mercury compounds (focusing on HS codes 2852 10 and 2852 90) and concluded that the data were largely unreliable. They wrote, “The reason is unknown, but may be erroneous reporting by importers. Less likely, but not to be ruled out fully, they may indicate unexpected trade in mercury with Denmark for uses exempted in the Danish mercury ban order, or illegal trade” (DME 2014).

Other possible sources of confusion in the data include the occasional difficulty of differentiating between commercial mercury compounds and wastes, multiple names for compounds, mistakes on shipping manifests, difficulties identifying the real origin and/or the ultimate destination of shipments, etc.

References

AMAP/UNEP 2013. Technical Background Report for the Global Mercury Assessment 2013. Arctic Monitoring and Assessment Programme, Oslo, Norway/UNEP Chemicals Branch, Geneva, Switzerland.

AMAP/UN Environment 2019. Technical Background Report for the Global Mercury Assessment 2018. Arctic Monitoring and Assessment Programme, Oslo, Norway/UN Environment Programme, Chemicals and Health Branch, Geneva, Switzerland. Preface viii + 426 pp including E-Annexes.

CEC 2017. Enhancing the Alignment of North American Trade Statistics on Elemental Mercury and Mercury-added Products, Commission for Environmental Cooperation, Montreal, Canada, 2017.

DG ENV 2008. Options for reducing mercury use in products and applications, and the fate of mercury already circulating in society, COWI AS and Concorde East/West Sprl for the European Commission, DG ENV, December 2008, Brussels.
http://ec.europa.eu/environment/chemicals/mercury/pdf/study_report2008.pdf

DME 2014. J Maag, J Kjølholt, SH Mikkelsen, CN Jeppesen, AJ Clausen and M Ostenfeldt, Survey of mercury and mercury compounds, Part of the LOUS-review, Environmental Project No. 1544, COWI A/S for the Danish Environmental Protection Agency, Denmark, 2014. ISBN no. 978-87-93026-98-8.

European Commission 2019. Inventory of Existing Mercury-Added Products and Manufacturing Processes Involving the Use of Mercury or Mercury Compounds: Explanatory Text, in accordance with Regulation (EU) 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury and repealing Regulation (EC) No 1102/2008, Revision 1, 29 April 2019.

GMA 2018. Global Mercury Assessment 2018. UN Environment, 2019.

IMERC 2018. IMERC Fact Sheet: Formulated Mercury-Added Products, Interstate Mercury Education and Reduction Clearinghouse, December 2018.

Minamata First Full National Reports ("Article 21" reports): https://www.mercuryconvention.org/en/parties/documents?f%5B0%5D=document_type%3A8

Minamata Initial Assessments (MIA): <https://www.mercuryconvention.org/en/parties/minamata-initial-assessments>

Minamata National Implementation Plans:
<https://www.mercuryconvention.org/en/parties/national-implementation-plans>

MoE Japan 2017. National Implementation Plan for Preventing Environmental Pollution of Mercury and Mercury Compounds - To Realize the Mercury Minimum Environment, Inter-Ministerial Coordination Council on the Minamata Convention on Mercury, Ministry of the Environment, Japan, October 2017.

Panjiva trade database: <https://panjiva.com/>

UN Comtrade database: <https://comtrade.un.org/data/>

UNEP 2006. Summary of Supply, Trade and Demand Information on Mercury, requested by UNEP Governing Council decision 23/9 IV, United Nations Environment Programme – Chemicals. Geneva, November 2006.

UNEP 2013. Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport. UNEP Chemicals Branch, Geneva, Switzerland.

UNEP-FAO Rotterdam Convention: <http://www.pic.int>

USEPA 2009a. Mercury Compounds in the United States: Uses, Consumption, and International Trade, Concorde East/West for U.S. EPA, Purchase Order EP09H000456, March 2009.

USEPA 2009b. Potential Export of Mercury Compounds from the United States for Conversion to Elemental Mercury, Report to Congress, United States Environmental Protection Agency, Office of Pollution Prevention and Toxic Substances, Washington, DC, October 14, 2009.

USEPA 2020. Inventory of Mercury Supply, Use, and Trade in the United States - 2020 Report (Reporting Year 2018), Office of Chemical Safety and Pollution Prevention, U.S. Environmental Protection Agency, Washington DC, 2020.

Also: "Updated Table 2 on page 12 of Mercury Inventory Report (March 30, 2020)"

USGS 2022. Mercury, U.S. Geological Survey, Mineral Commodity Summaries, January 2022.

USITC customs database (imports/exports): <https://dataweb.usitc.gov/>

Zauba trade database: <https://www.zauba.com/>

ZMWG 2022. Skin Lighteners Still Online Despite Mercury Findings, Zero Mercury Working Group (ZMWG), European Environmental Bureau (EEB), March 2022.

Appendix 1 – (Non-exhaustive) listing of mercury compounds

EINECS* list of mercury compounds

ID	Substance name	EC#	CAS#
1	(2',7'-dibromo-3',6'-dihydroxy-3-oxospiro[isobenzofuran-1(3H),9'-[9H]xanthen]-4'-yl)hydroxymercury	259-779-2	55728-51-3
2	(2-carboxy-m-tolyl)hydroxymercury, monosodium salt	258-195-5	52795-88-7
3	(2-carboxyphenyl)hydroxymercury	237-918-8	14066-61-6
4	(2-ethylhexanoato)phenylmercury	236-326-7	13302-00-6
5	(acetato-O)[3-(chloromethoxy)propyl-C,O]mercury	227-719-4	5954-14-3
6	(acetato-O)diamminephenylmercury	269-247-1	68201-97-8
7	(acetato-O)ethylmercury	203-688-2	109-62-6
8	(acetato-O)methylmercury	203-547-5	108-07-6
9	(bromodichloromethyl)phenylmercury	221-961-4	3294-58-4
10	(dihydroxyphenyl)phenylmercury	248-426-8	27360-58-3
11	(lactato-O1,O2)mercury	242-673-5	18918-06-4
12	(maleoyldioxy)bis[phenylmercury]	220-286-2	2701-61-3
13	(metaborato-O)phenylmercury	250-518-8	31224-71-2
14	(neodecanoato-O)phenylmercury	247-783-7	26545-49-3
15	(oleato)phenylmercury	203-218-6	104-60-9
16	(phenylmercurio)urea	218-909-8	2279-64-3
17	1-cyano-3-(methylmercurio)guanidine	207-935-5	502-39-6
18	2-(ethylmercuriothio)benzoic acid	205-719-5	148-61-8
19	2-chloromercuriophenol	201-962-6	90-03-9
20	2-ethoxyethylmercury acetate	204-678-0	124-08-3
21	2-ethoxyethylmercury chloride	204-670-7	124-01-6
22	2-hydroxy-5-(1,1,3,3-tetramethylbutyl)phenylmercury acetate	209-534-0	584-18-9
23	2-methoxyethylmercury acetate	205-790-2	151-38-2
24	2-methoxyethylmercury chloride	204-659-7	123-88-6
25	4-aminophenylmercury acetate	228-497-1	6283-24-5
26	4-chloromercuriobenzoic acid	200-442-6	59-85-8
27	6-methyl-3-nitrobenzoxamercurate	205-112-5	133-58-4
28	[(2-hydroxyethyl)amino]phenylmercury acetate	263-211-9	61792-06-1
29	[2,2',2''-nitrioltri(ethanol)-N,O,O',O'']phenylmercury lactate	245-581-3	23319-66-6
30	[2,5-dichloro-3,6-dihydroxy-2,5-cyclohexadiene-1,4-dionato(2-)-O1,O6]mercury	251-672-9	33770-60-4
31	EI	248-559-1	27605-30-7
32	[benzoato(2-)-C2,O1]mercury	227-228-5	5722-59-8
33	[mu-[(oxydiethylene but-2-enedioato)(2-)]diphenyldimercury	301-791-8	94070-92-5
34	[mu-[(oxydiethylene phthalato)(2-)]diphenylmercury	301-792-3	94070-93-6
35	[mu-[[4,4'-(oxydiethylene) bis(dodecenylsuccinato)(2-)]diphenyldimercury	299-418-6	93882-20-3
36	[mu-[metasilicato(2-)-O:O]]bis(2-methoxyethyl)dimercury	242-997-7	19367-79-4
37	[mu-[orthoborato(2-)-O:O']]diphenyldimercury	228-465-7	6273-99-0
38	[naphthoato(1-)-O]phenylmercury	250-736-3	31632-68-5
39	[salicylato(2-)-O1,O2]mercury	227-760-8	5970-32-1
40	Aminomercury chloride	233-335-8	10124-48-8
41	Amminephenylmercury(1+) acetate	245-006-6	22450-90-4

ID	Substance name	EC#	CAS#
42	Barium tetraiodomercurate	233-160-7	10048-99-4
43	Bis(5-oxo-DL-prolinato-N1,O2)mercury	304-523-8	94276-38-7
44	Bis(5-oxo-L-prolinato-N1,O2)mercury	305-388-8	94481-62-6
45	Bis(acetato-O)[i-(3',6'-dihydroxy-3-oxospiro[isobenzofuran-1(3H),9'-[9H]xanthene]-2',7'-diyl)]dimercury	222-673-1	3570-80-7
46	Bis(acetato-O)[mu-[1,3-dioxane-2,5-diylbis(methylene)-C:C',O,O']]dimercury	281-717-8	84029-43-6
47	Bis(lactato-O1,O2)mercury	242-667-2	18917-83-4
48	Bis(trichloromethyl)mercury	229-867-5	6795-81-9
49	Bis[(+)-lactato]mercury	251-657-7	33724-17-3
50	Bis[(trimethylsilyl)methyl]mercury	236-315-7	13294-23-0
51	Bromo(2-hydroxypropyl)mercury	242-613-8	18832-83-2
52	Bromoethylmercury	203-477-5	107-26-6
53	Bromomethylmercury	208-057-5	506-83-2
54	Bromophenylmercury	214-760-8	1192-89-8
55	Cadmium mercury sulfide	215-717-6	1345-09-1
56	Cadmium mercury telluride	249-914-3	29870-72-2
57	Chloro(hydroxyphenyl)mercury	215-308-2	1320-80-5
58	Chloro-2-thienylmercury	227-481-1	5857-39-6
59	Chloro-m-tolylmercury	227-722-0	5955-19-1
60	Chloro-o-tolylmercury	220-469-7	2777-37-9
61	Chloro[p-[(2-hydroxy-1-naphthyl)azo]phenyl]mercury	221-358-6	3076-91-3
62	Chloromethylmercury	204-064-2	115-09-3
63	Di(acetato-O)anilinemercury	264-306-8	63549-47-3
64	Di-o-tolylmercury	210-499-9	616-99-9
65	Di-p-tolylmercury	208-672-9	537-64-4
66	Diammonium tetrachloromercurate	251-524-3	33445-15-7
67	Dicopper tetraiodomercurate	237-634-4	13876-85-2
68	Diethylmercury	211-000-7	627-44-1
69	Dihydrogen [orthoborato(3-)-O]phenylmercurate(2-)	203-068-1	102-98-7
70	Diiodo(5-iodopyridin-2-amine-N1)mercury	298-602-3	93820-20-3
71	Diiodobis(5-iodopyridin-2-amine)mercury dihydroiodide	264-100-8	63325-16-6
72	Dimercury amidatenitrate	215-187-6	1310-88-9
73	Dimercury di(acetate)	211-161-3	631-60-7
74	Dimercury dichloride	233-307-5	10112-91-1
75	Dimercury dicyanide oxide	215-629-8	1335-31-5
76	Dimercury difluoride	237-747-9	13967-25-4
77	Dimercury diiodide	239-409-6	15385-57-6
78	Dimercury dinitrate	233-886-4	10415-75-5
79	Dimercury sulphate	231-993-0	7783-36-0
80	Dimercury(I) oxalate	220-966-9	2949-11-3
81	Dimethyl[i-[sulphato(2-)-O:O']]dimercury	223-288-1	3810-81-9
82	Dimethylmercury	209-805-3	593-74-8
83	Diphenyl[mu-[(tetrapropenyl)succinato(2-)-O:O']]dimercury	248-355-2	27236-65-3
84	Diphenylmercury	209-606-1	587-85-9
85	Dipotassium tetracyanomercuroate	209-735-3	591-89-9
86	Dipotassium tetraiodomercurate	231-990-4	7783-33-7

ID	Substance name	EC#	CAS#
87	Disodium tetra(cyano-C)mercurate(2-)	239-766-8	15682-88-9
88	Disuccinimidomercury	209-537-7	584-43-0
89	Ethylmercury	219-471-0	2440-42-8
90	Ethylmercury chloride	203-478-0	107-27-7
91	Hydrogen [3-[(á-carboxylato-o-anisoyl)amino]-2-hydroxypropyl]hydroxymercurate(1-)	247-796-8	26552-50-1
92	Hydrogen [metasilicato(2-)-O](2-methoxyethyl)mercurate(1-)	264-920-6	64491-92-5
93	Hydrogen mu-hydroxy[mu-[orthoborato(3-)-O:O']]diphenyldimercurate(1-)	304-637-8	94277-53-9
94	Hydrogen triiodomercurate(1-), compound with 3-methyl-3H-benzothiazol-2-imine (1:1)	276-613-4	72379-35-2
95	Iodo(iodomethyl)mercury	205-485-4	141-51-5
96	Iodomethylmercury	205-600-8	143-36-2
97	Lactatophenylmercury	204-560-9	122-64-5
98	Mercurate(1-), [dodecenylobutanedioato(2-)-O']phenyl-, hydrogen	304-575-1	94276-88-7
99	Mercurialis annua, ext.	290-062-7	90064-02-1
100	Mercurialis perennis, ext.	290-063-2	90064-03-2
101	Mercurobutol	207-869-7	498-73-7
102	Mercurous oxide	239-934-0	15829-53-5
103	Mercury	231-106-7	7439-97-6
104	Mercury acetate	209-766-2	592-63-2
105	Mercury bis(2-ethylhexanoate)	236-113-9	13170-76-8
106	Mercury bis(4-chlorobenzoate)	239-548-2	15516-76-4
107	Mercury bis(trifluoroacetate)	236-250-4	13257-51-7
108	Mercury chloride	231-430-9	7546-30-7
109	Mercury di(acetate)	216-491-1	1600-27-7
110	Mercury dibenzoate	209-499-1	583-15-3
111	Mercury dibromide	232-169-3	7789-47-1
112	Mercury dichloride	231-299-8	7487-94-7
113	Mercury dichromate	232-144-7	7789-10-8
114	Mercury dicyanide	209-741-6	592-04-1
115	Mercury difluoride	231-994-6	7783-39-3
116	Mercury difulminate	211-057-8	628-86-4
117	Mercury diiodate	231-989-9	7783-32-6
118	Mercury diiodide	231-873-8	7774-29-0
119	Mercury dinitrate	233-152-3	10045-94-0
120	Mercury dioleate	214-741-4	1191-80-6
121	Mercury diperchlorate	231-525-5	7616-83-3
122	Mercury dipotassium tetrathiocyanate	237-949-7	14099-12-8
123	Mercury disilver tetraiodide	232-045-9	7784-03-4
124	Mercury distearate	211-458-8	645-99-8
125	Mercury dithiocyanate	209-773-0	592-85-8
126	Mercury fluoride	248-538-7	27575-47-9
127	Mercury hydrogen cyclohexanebutyrate	263-665-8	62638-02-2
128	Mercury hydrogenarsenate	232-062-1	7784-37-4
129	Mercury iodide	231-988-3	7783-30-4
130	Mercury monoxide	244-654-7	21908-53-2

ID	Substance name	EC#	CAS#
131	Mercury selenide	243-910-5	20601-83-6
132	Mercury silver iodide	235-601-9	12344-40-0
133	Mercury succinate	209-656-4	589-65-1
134	Mercury sulphate	231-992-5	7783-35-9
135	Mercury telluride	235-108-9	12068-90-5
136	Mercury thallium dinitrate	301-543-9	94022-47-6
137	Mercury(1+) bromate	236-694-9	13465-33-3
138	Mercury(1+) ethyl sulphate	275-904-3	71720-55-3
139	Mercury(1+) trifluoroacetate	220-875-4	2923-15-1
140	Mercury(2+) (9Z,12Z)-octadeca-9,12-dienoate	231-814-6	7756-49-2
141	Mercury(2+) chloroacetate	247-925-8	26719-07-3
142	Mercury(2+) tetrakis(thiocyanato-N)cobaltate(2-)	248-602-4	27685-51-4
143	Mercury(II) oxalate	222-356-8	3444-13-1
144	Mercury(II) sulfide	215-696-3	1344-48-5
145	Mercury, compound with titanium (1:3)	234-306-2	11083-41-3
146	Mercury, reaction products with stibnite (Sb ₂ S ₃)	295-924-6	92200-97-0
147	Methyl(pentachlorophenolato)mercury	227-596-7	5902-76-1
148	Methylmercury benzoate	222-834-6	3626-13-9
149	Methylmercury hydroxide	214-667-2	1184-57-2
150	N-(ethylmercurio)toluene-4-sulphonanilide	208-231-0	517-16-8
151	Naphthenic acids, mercury salts	215-651-8	1336-96-5
152	P-tolylmercury chloride	208-716-7	539-43-5
153	Phenyl(quinolin-8-olato-N1,O8)mercury	238-316-8	14354-56-4
154	Phenyl(tribromomethyl)mercury	221-963-5	3294-60-8
155	Phenyl(trichloromethyl)mercury	221-960-9	3294-57-3
156	Phenylmercury acetate	200-532-5	62-38-4
157	Phenylmercury benzoate	202-331-8	94-43-9
158	Phenylmercury chloride	202-865-1	100-56-1
159	Phenylmercury dimethyldithiocarbamate	251-026-6	32407-99-1
160	Phenylmercury hydroxide	202-866-7	100-57-2
161	Phenylmercury nitrate	200-242-9	55-68-5
162	Phenylmercury propionate	203-094-3	103-27-5
163	Phenylmercury salicylate	248-828-3	28086-13-7
164	Phenylmercury stearate	203-217-0	104-59-6
165	Phosphoric acid, mercury salt	233-939-1	10451-12-4
166	Potassium triiodomercurate(1-)	244-913-4	22330-18-3
167	Residues, zinc refining flue dust wastewater, mercury-selenium	309-609-9	100403-63-2
168	Slimes and Sludges, alkali metal chloride electrolysis, mercury-free	293-673-7	91081-66-2
169	Slimes and Sludges, chlorine manuf. mercury cell brine treatment	274-638-5	70514-23-7
170	Slimes and Sludges, chlorine manuf. mercury cell brine treatment wastewater	294-413-5	91722-12-2
171	Slimes and Sludges, chlorine manuf. mercury cell process	293-676-3	91081-69-5
172	Slimes and Sludges, copper conc. roasting off gas scrubbing, lead-mercury-selenium-contg.	310-062-3	102110-61-2
173	Sodium 4-chloromercuriobenzoate	221-700-4	3198-04-7

ID	Substance name	EC#	CAS#
174	Sodium 4-hydroxymercuriobenzoate	205-340-5	138-85-2
175	Sodium [3-[[[(3-carboxylatopropionamido)carbonyl]amino]-2-methoxypropyl]hydroxymercurate(1-)]	231-532-3	7620-30-6
176	Trimercury biscitrate	242-096-9	18211-85-3
177	Trimercury dioxide sulphate	215-191-8	1312-03-4
178	Tris(ethylmercury) phosphate	218-790-2	2235-25-8

* EINECS = European Inventory of Existing Commercial Chemical Substances. This inventory includes chemical substances deemed to be on the European Community market between 1 January 1971 and 18 September 1981. The European List of Notified Chemical Substances (ELINCS) consists of all chemical substances notified within the European Community after 18 September 1981.

Appendix 2 – Text and data visualizations from OEC World

Global exports and imports of HS 2852 – Inorganic or organic compounds of mercury, excluding amalgams, whether or not chemically defined – and shares of those exports and imports as reported by many countries.

OVERVIEW

This page contains the latest trade data of Compounds, inorganic or organic, of mercury, excluding amalgams. In 2020, *Compounds, inorganic or organic, of mercury, excluding amalgams* were the world's 1212th most traded product, with a total trade of \$15.9M. Between 2019 and 2020 the exports of *Compounds, inorganic or organic, of mercury, excluding amalgams* decreased by -2.96%, from \$16.4M to \$15.9M. Trade in *Compounds, inorganic or organic, of mercury, excluding amalgams* represent 0.000094% of total world trade.

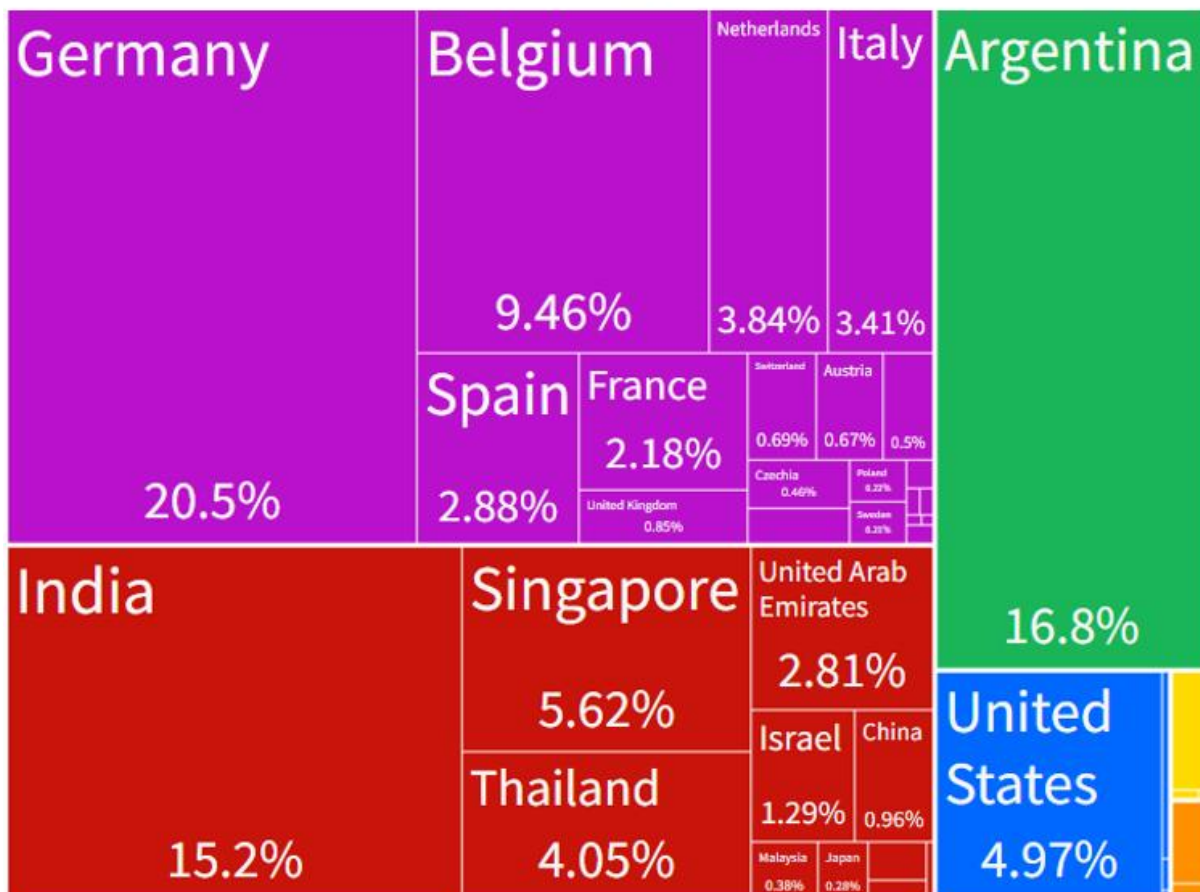
EXPORTS

In 2020 the top exporters of *Compounds, inorganic or organic, of mercury, excluding amalgams* were Germany (\$3.27M), Argentina (\$2.67M), India (\$2.43M), Belgium (\$1.51M), and Singapore (\$896k).

Exporters of Compounds, inorganic or organic, of mercury, excluding amalgams (2020)

[Click to Select a Country]

Total: \$15.9M



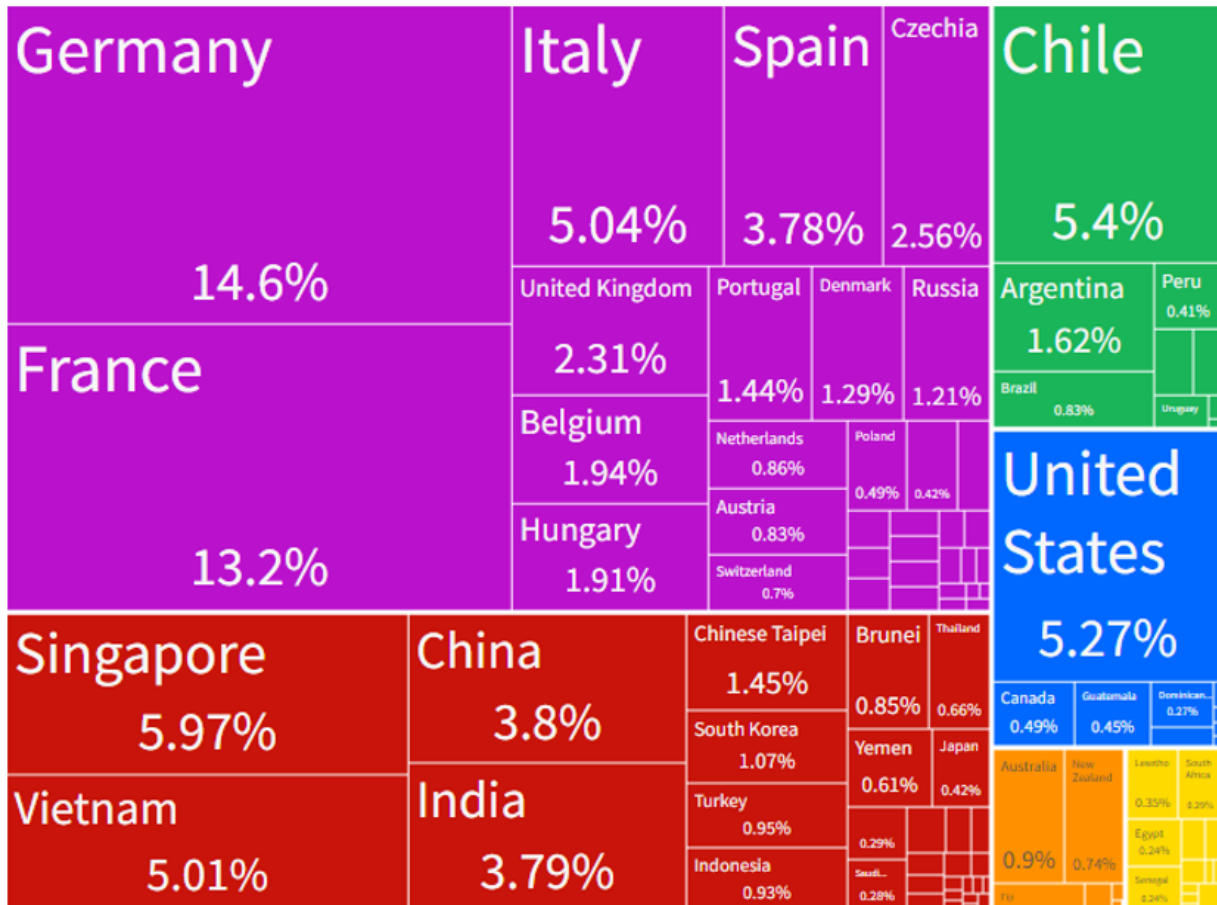
IMPORTS

In 2020 the top importers of *Compounds, inorganic or organic, of mercury, excluding amalgams* were Germany (\$2.33M), France (\$2.1M), Singapore (\$952k), Chile (\$861k), and United States (\$840k).

Importers of Compounds, inorganic or organic, of mercury, excluding amalgams (2020)

[Click to Select a Country]

Total: \$15.9M



Source: <https://oec.world/en/profile/hs/compounds-inorganic-or-organic-of-mercury-excluding-amalgams?redirect=true>

Appendix 3 – Pricing of subscription databases

This appendix presents typical pricing options for a number of subscription databases.

OEC World database pricing options

OEC World (https://oec.world/en/subscription)	
PRO	PREMIUM
<p>OEC pro USD \$75/week</p> <ul style="list-style-type: none"> ✓ Economic complexity rankings ✓ <u>50+ years of historical trade data</u> ✓ Rich visualizations for hundreds of countries, and thousands of products ✓ No advertisements ✓ Latest trade data including regions and provinces for 20+ countries ✓ Full API access ✓ Data Explorer ✓ Trend Explorer <p>Bulk download Company Shipment Records Premium customer service</p>	<p>OEC premium USD \$499/week</p> <ul style="list-style-type: none"> ✓ Economic complexity rankings ✓ <u>50+ years of historical trade data</u> ✓ Rich visualizations for hundreds of countries, and thousands of products ✓ No advertisements ✓ Latest trade data including regions and provinces for 20+ countries ✓ Full API access ✓ Data Explorer ✓ Trend Explorer ✓ Bulk download ✓ Company Shipment Records ✓ Premium customer service

Seair database pricing options

Seair (https://www.seair.co.in/subscription-plans.aspx)	
Business	Corporate
Recommended	
25000 INR	30000 INR
350 USD	400 USD
Data Search Free in all	Data Search Free in all
Downloads Credits 25000	Downloads Credits 50000
Validity 24 Months	Validity 30 Months

ImportGenius database pricing options

ImportGenius (<https://www.importgenius.com/pricing>)

Global Trade Data

Search global import/export records from US Customs at the Bill of Lading level.
Instant signup, no contracts.

RECOMMENDED PLAN

Starter	Plus	Premium
\$149 per month	\$199 per month	\$399 per month
Sign up	Sign up	Sign up
<ul style="list-style-type: none">✓ 3 months of U.S. Import Data ⓘ Access data on U.S. ocean freight imports for all companies.✓ 15 company searches per day ⓘ Search for consignees and shippers in our trade data. This plan is best if you simply need to monitor trade activity for a handful of companies.	<ul style="list-style-type: none">✓ 12 months of U.S. Import Data ⓘ Access data on U.S. ocean freight imports for all companies.✓ 25 searches per day ⓘ You can filter and view by the consignee, shipper, and 40+ other fields we record per shipment.✓ Complete U.S. Export Data U.S. ocean freight exports from January 1, 2014 to the present for all companies.	<ul style="list-style-type: none">✓ Over 13 years of U.S. Import Data since November 2006 ⓘ Access data on U.S. ocean freight imports for all companies.✓ 50 searches per day ⓘ You can filter and view by the consignee, shipper, and 40+ other fields we record per shipment.✓ Complete U.S. Export Data U.S. ocean freight exports from January 1, 2014 to the present for all companies.

For an additional fee starting at USD 99 per month, ImportGenius has complete trade data for Argentina, Bolivia, Chile, Colombia, Costa Rica, Ecuador, Mexico, India, Panama, Paraguay, Peru, Russia, Sri Lanka, Ukraine, Uruguay, Venezuela, and Vietnam.

Panjiva database pricing

Panjiva/ S&P Global (<https://panjiva.com>)

“Panjiva is an intelligence platform that’s bringing transparency to global trade through our robust global coverage, powerful machine-learning technologies, and dynamic data visualizations.”

S&P Global Market Intelligence
7th Floor One Ayala East Tower, EDSA corner Ayala Avenue
Makati City, 1226, Philippines
Email: support.panjiva@spglobal.com

Pricing is adapted to customer needs, and is available on request.

DESCARTES Datamyne (<https://www.datamyne.com>)

“Descartes Datamyne™ features the world’s largest searchable trade database, including 230 markets across 5 continents, gathered directly from official filings with customs agencies and trade ministries.”

Descartes Datamyne U.S. Headquarters
703 Waterford Way, Suite 200
Miami, FL 33126 USA
Phone: 833-262-2315
Email: servicedesk@descartes.com

Pricing is adapted to customer needs, and is available on request. Based on preliminary contacts with the Datamyne team, it may be difficult to subscribe for a period of less than 12 months.