

# Chemicals production and consumption statistics

Statistics Explained

*Data extracted in December 2024.  
Planned article update: December 2025.*

## Highlights

**" The production and consumption of hazardous chemicals continued its downward trend, reaching a new minimum in 2023. "**

**" In 2023**

- **The production of chemicals hazardous to human health in the EU was 167 million tonnes.**
- **The consumption of chemicals hazardous to health in the EU was also 167 million tonnes.**

**"**

This article presents an analysis of indicators that have been developed and compiled by [Eurostat](#) , covering the production and consumption of industrial chemicals in the [European Union \(EU\)](#) with a particular focus on substances being hazardous to human health or hazardous to the environment. The indicators represent the level of production and consumption in quantity terms but not the actual risks associated with the use of chemicals, i.e. production and consumption data do not describe the exposure to [hazardous chemicals](#) .

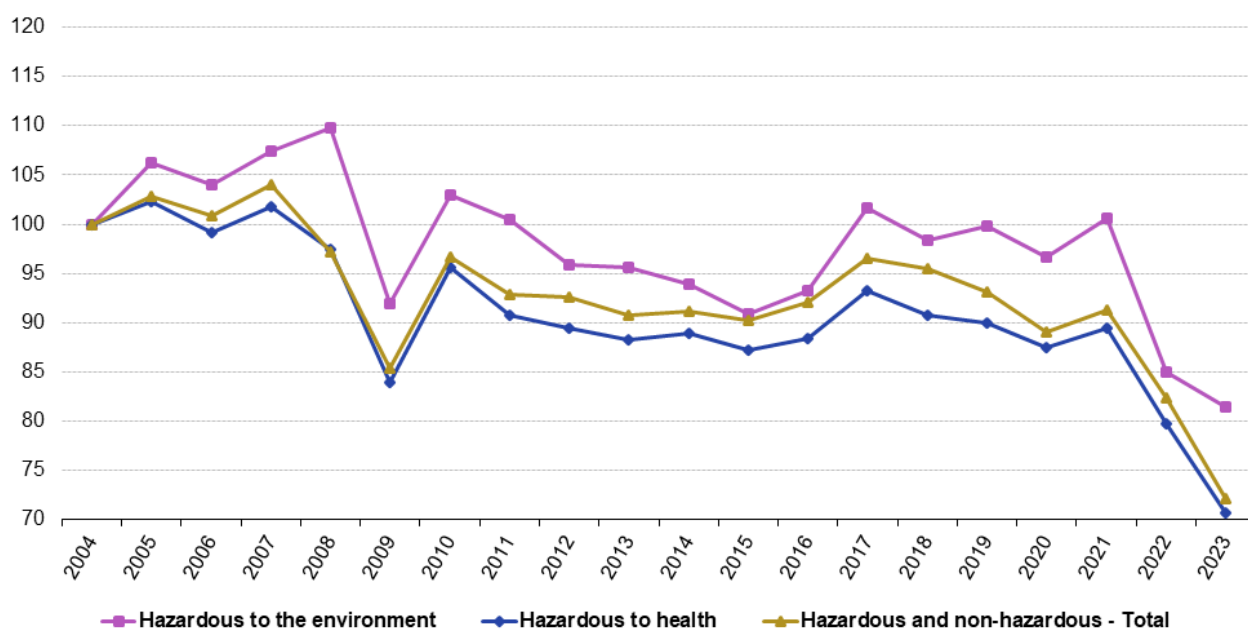
## Total production of chemicals

Figure 1 shows the development of chemicals production in the EU since 2004 (index 2004 = 100) for 3 groups: (a) total production of industrial chemicals, which have been evaluated (b) chemicals hazardous to the environment, and (c) substances hazardous to human health (toxic chemicals). It should be noted that a substance can be classified both as hazardous to health and hazardous to environment.

The total production of industrial chemicals in the EU increased from the year 2004 to 2007, rising overall by about 4% to peak at 314 million tonnes in 2007. During the financial and economic crisis, production fell in 2008 and reached its lowest level in 2009. The rebound in activity in 2010 was almost as much as the decrease reported in 2009. In 2011, the production of chemicals in the EU decreased again and then decreased only slightly during the period 2011-2015, which was still below the pre-crisis peak in 2007. In 2017, for the first time since 2010, there was a noticeable increase of more than 10 million tonnes. Starting in 2018 the total production decreased again. In 2023 the production of chemicals was significantly lower than in 2009. The production of industrial chemicals was largely concentrated in western Europe.

## Production of chemicals, EU, 2004–23

(2004 = 100)



Note: the y-axis is cut.

Source: Eurostat (online data codes: env\_chmhaz)

eurostat

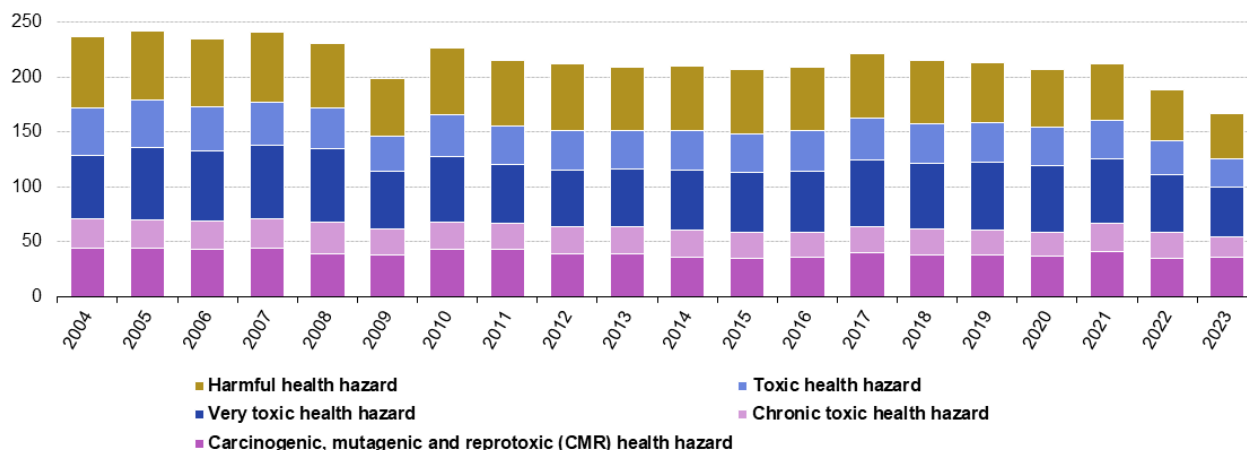
Figure 1: Production of chemicals, EU, 2004-2023 (Index 2004 = 100) Source: Eurostat (env\_chmhaz)

## Production of chemicals hazardous to health

Figure 2 presents the development of EU production of chemicals hazardous to human health shown as an index in Figure 1, analysed according to 5 hazard classes. The pattern of production for chemicals hazardous to health followed a trend similar to the one observed for chemicals hazardous to the environment. Production reached a peak in 2005 and another relative peak in 2007, after which there was a significant decline in production (that coincided with the financial and economic crisis), followed by a strong rebound in 2010. In 2011, the production of chemicals hazardous to health decreased again, and continued to decrease to a low in 2015. Following a new increase with a peak in 2017 the production registered a successive fall, reaching its lowest point in 2023.

## Production of chemicals hazardous to health, EU, 2004-23

(million tonnes)



Note: The different classes of chemicals are ranked according to their toxicity from the most dangerous (bottom class) up to the least dangerous (top class).

Source: Eurostat (online data code: env\_chmhaz)

eurostat

**Figure 2: Production of chemicals hazardous to health, by toxicity, EU, 2004-2023 (million tonnes) Source: Eurostat (env\_chmhaz)**

The EU production of chemicals hazardous to health (all 5 hazard classes together) reached a relative peak of 241 million tonnes in 2007. Production fell in 2008 and further in 2009. The rebound in activity in 2010 was almost as much as the decrease reported in 2009 but was followed by further reductions in 2011. Since then production of chemicals hazardous to health slightly decreased until 2015. As a result, the EU level of production of chemicals hazardous to health in 2015 was about 206 million tonnes. The subsequent increase resulted in a level of 221 million tonnes in 2017. After another decrease production of chemicals hazardous to health stood at 167 million tonnes in 2023, about 70 million tonnes less than in 2004.

The share of all chemicals hazardous to health in total EU chemicals production remained on a roughly constant level over the period under consideration shown in Figure 2. From about 78% in 2004, the share of all chemicals hazardous to health fell to the lowest value of 75% in 2018. In between, there was the highest share of chemicals hazardous to health in 2008.

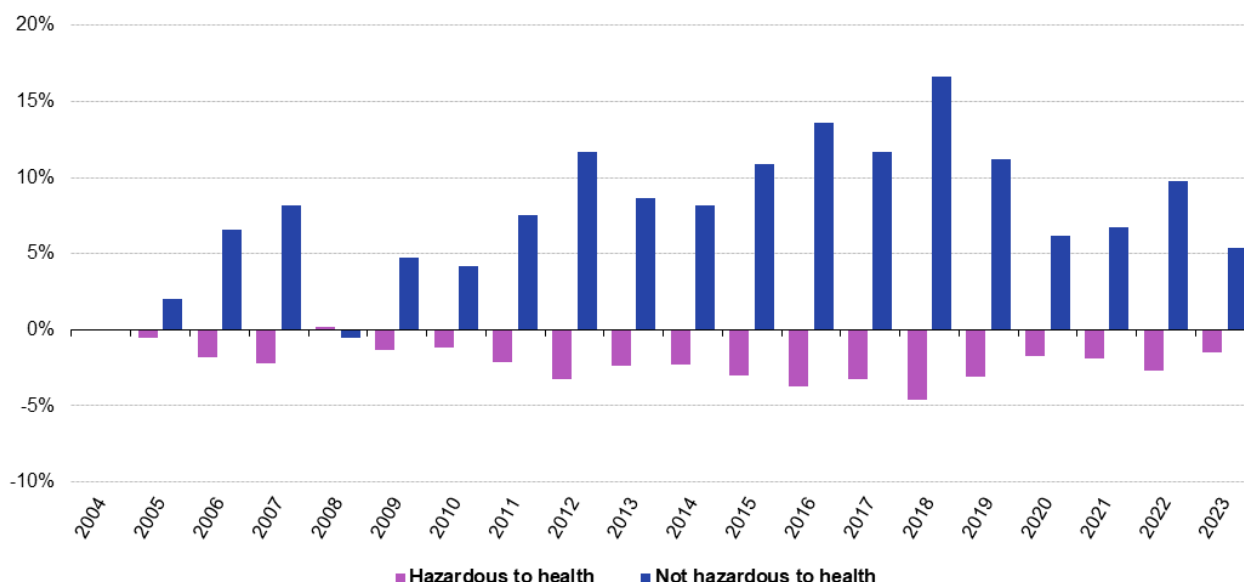
EU production of the most hazardous chemicals — **carcinogenic, mutagenic and reprotoxic (CMR) hazard** — hardly changed over the period from 2004 to 2007 and remained at a level between 42 million tonnes and 44 million tonnes. Production fell between 2007 and 2009 to stand at 38 million tonnes. There was a recovery in the level of production of CMRs in 2010 back to a level that was slightly lower to that recorded prior to the financial and economic crisis. From 2011, the level of production of CMR chemicals declined once more to reach about 35 million tonnes by 2015. After an increase in 2017, production decreased again until 2020 and reached another relative peak of 41 million tonnes in 2021, to go back to lowest values around 35 million tonnes in 2022 and 2023. The relative share of CMR chemicals in total EU chemical production fluctuated between 13% and 16% over the period under consideration.

## Effective changes in the production of chemicals hazardous to health

Figure 2 above shows the absolute tonnages produced for the 5 classes of chemicals hazardous to human health over time. It allows a description of time trends for these chemicals. A specific trend (e.g. a decrease of the chemicals hazardous to health) could result from specific measures taken to avoid such chemicals and to replace them by less hazardous ones. On the other hand, a decrease could also be the result of a general decrease in the total production of chemicals, independent of whether they are hazardous or not. This cannot be discerned from the data shown in Figure 2. The following Figure 3 shows changes in the production of chemicals hazardous to human health and of chemicals not hazardous to human health relative to the changes in the total production of chemicals.

These changes relative to the changes in total chemical production are normalised to the year 2004 and are called 'effective changes'. They are based on the same data as Figure 2. A positive effective change indicates a relative increase of the production of these chemicals compared with the total production of chemicals. A negative effective change indicates a relative decrease in the production of these chemicals. All these changes refer to the respective volumes of 2004.

### Effective changes in the production of chemicals hazardous to health, EU, 2004 – 2023 (% point)



Source: Eurostat (online data code: env\_chmhaz)

eurostat

**Figure 3: Effective changes relative to 2004 in the production of chemicals hazardous to health and of chemicals not hazardous to health, EU, 2004-2023 (percentage points) Source: Eurostat (env\_chmhaz)**

Relative to total chemical production, chemicals not hazardous to human health are produced in higher amounts, while chemicals hazardous to human health are produced in lower amounts. While there is some variation between years, the figures show a consistent trend (with the exception of the year 2008).

## Production of chemicals hazardous to the environment

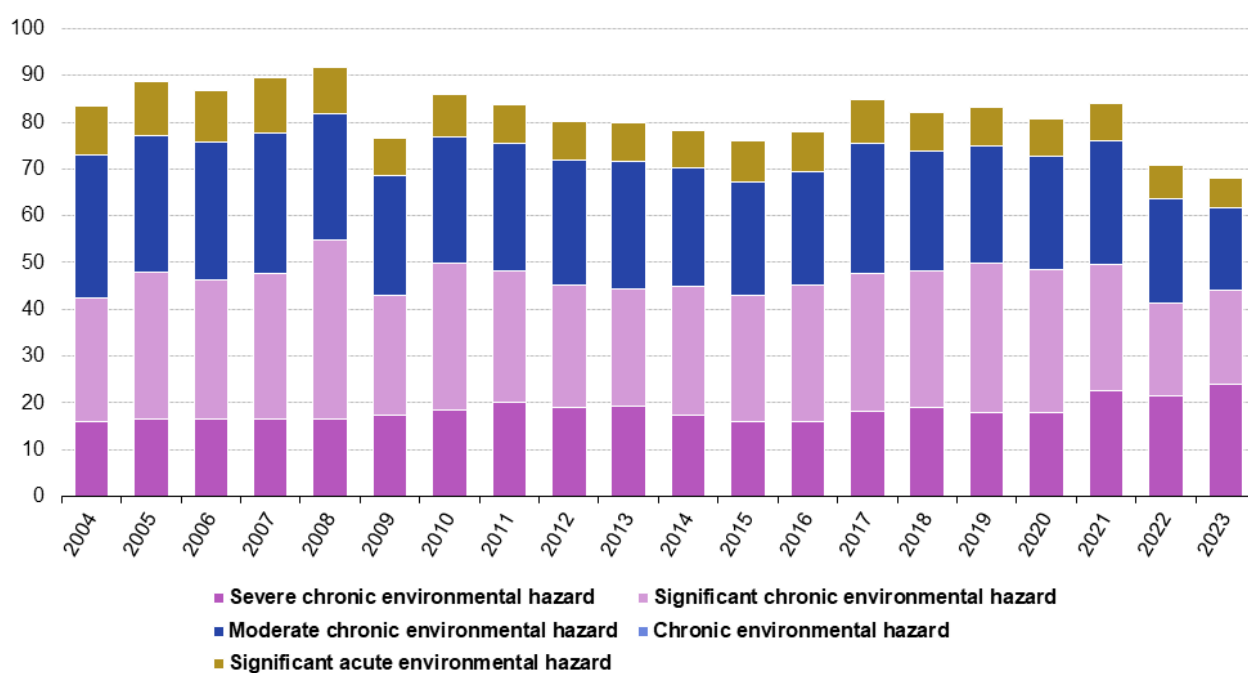
Figure 4 presents the development of the production of chemicals that are hazardous to the environment, shown as an index in Figure 1, analysed in more detail according to 5 classes of environmental hazard. The production volume of chemicals with chronic environmental hazard is negligible and not visible in Figure 4.

The aggregated production of these 5 classes in the EU increased slightly between 2004 and 2008 to reach a peak of 92 million tonnes. The production of chemicals hazardous to the environment fell by 15 million tonnes during the next year. As was the case for the overall production of chemicals, there was a strong re-bounce in the production of chemicals hazardous to the environment in 2010. During the period 2010-2015 the production of these 5 classes fell from 86 to 76 million tonnes.

Starting in 2016, production began to rise again, reaching a new peak in 2017 and remaining stable until 2021. In 2022 there was a significant decrease, with production falling by 13 million tonnes. In 2023 the production went further down marking an absolute minimum for the entire reporting period at 68 million tonnes.

## Production of chemicals hazardous to the environment, EU, 2004-23

(million tonnes)



Note: The different classes of chemicals are ranked according to their environmental effect from the most harmful (bottom class) up to the least harmful (top class).

Source: Eurostat (online data code: env\_chmhaz)

eurostat

**Figure 4: Production of chemicals hazardous to the environment, EU, 2004-2023 (million tonnes) Source: Eurostat (env\_chmhaz)**

In the EU, the share of chemicals hazardous to the environment in the total chemicals production was relatively unchanged over the period 2004-2023, fluctuating between 28% and 31%.

Overall, the production of the 5 different classes of chemicals that are hazardous to the environment declined (15.5 million tonnes) from 2004 to 2023. There was a wide degree of variation in the development of production for the 5 different hazard classes. The largest overall decrease in EU production between 2004 and 2023 was recorded for chemicals with significant chronic environmental hazard and moderate chronic environmental hazard (production volume reduced by about 6.3 million tonnes (24%) and 13 million tonnes (42%), respectively). By contrast, an increase of 7.9 million tonnes (49%) was recorded for chemicals with severe chronic environmental hazard.

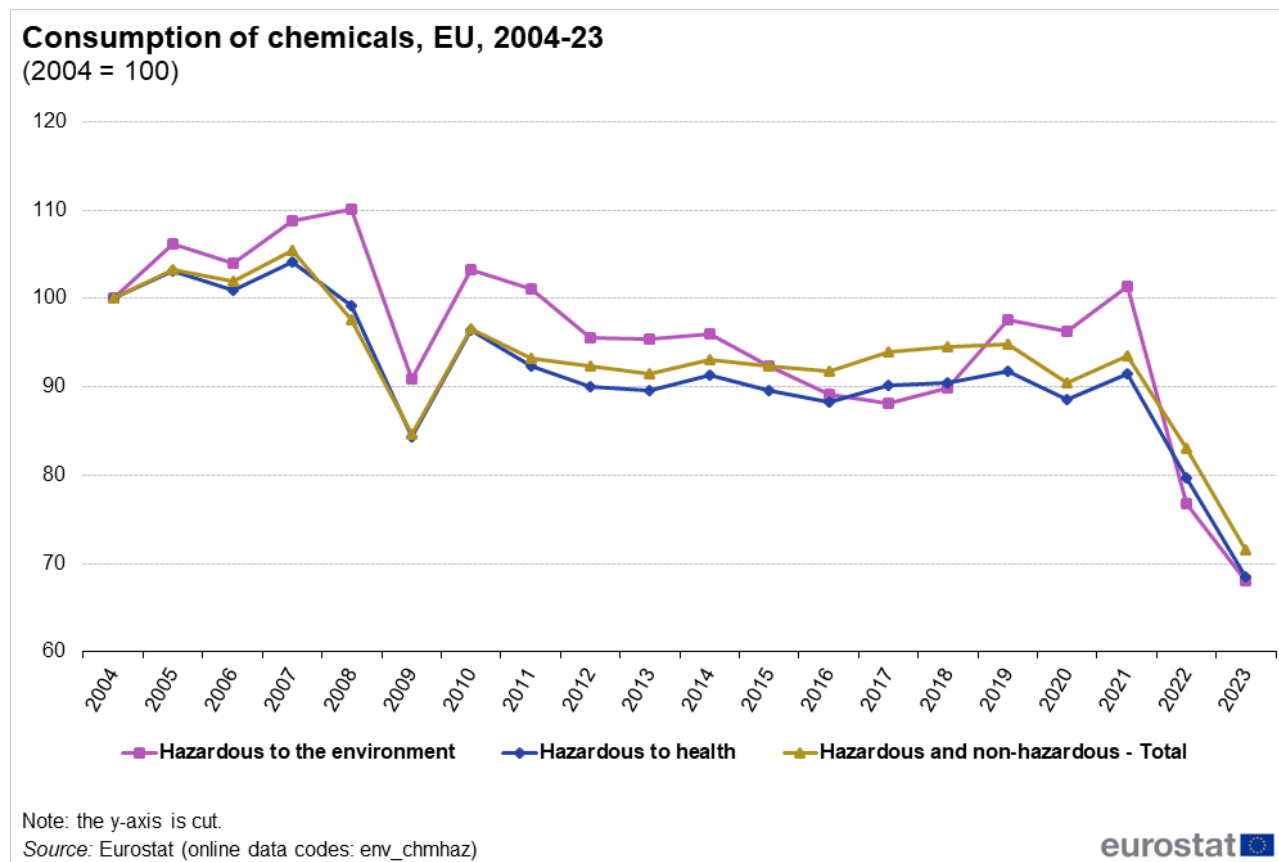
## Total consumption of chemicals

The consumption indicators build on the results of the production indicators. Consumption volumes result by adding the net import to the production volumes of the chemicals. While the production figures of the individual chemicals remain relatively constant over time, the import / export figures vary considerably.

Figure 5 shows the development of EU chemicals consumption since 2004, calculated as indices of the total consumption of industrial chemicals, of chemicals hazardous to the environment, and of chemicals hazardous to human health. The total consumption of industrial chemicals in the EU – similar to the total production in Figure 1 – increased between 2004 and 2007, peaking at 334 million tonnes in 2007. During the financial and economic crisis, consumption fell in 2008 and further in 2009. The rebound in activity in 2010 was almost as much as the decrease reported in 2009.

In 2011, the consumption of chemicals in the EU decreased again and remained relatively stable until 2016. Starting in 2017, consumption increased again. In 2020 (the year of the COVID-19 pandemic), consumption decreased to 287 million tonnes but recovered slightly to reach approximately the same level as before by the end

of 2021. Since then, there has been a significant decline in consumption: it fell to 263 million tonnes in 2022 and further decreased to an all-time low of the reporting period at 227 million tonnes in 2023.



**Figure 5: Consumption of chemicals, EU, 2004-2023 (Index 2004 = 100) Source: Eurostat (env\_chmhaz)**

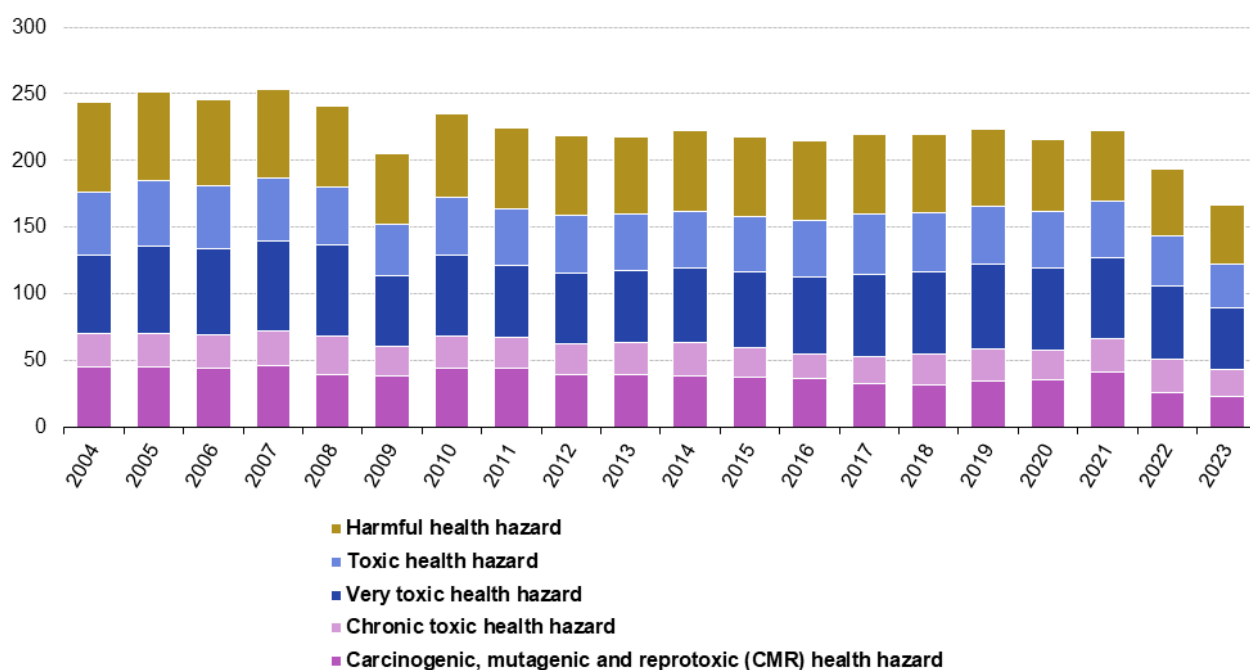
## Consumption of chemicals hazardous to health

Figure 6 shows the apparent consumption of chemicals hazardous to health, by toxicity, from 2004 to 2023. The differences between the consumption and production are relatively small. Net trade added between 2% and 6% (between 5 million tonnes and 13 million tonnes; excluding the years 2017 and 2023) to the sum of the production of the 5 classes of chemicals hazardous to health. A net import surplus occurred for each year except in 2017 and 2023. In 2017, net trade resulted in an export surplus of about 1 million tonnes (in 2023 the export surplus was almost negligible).

The apparent consumption indicator shows similar figures to the indicator on the production of chemicals hazardous to health, see Figure 2. In general, the production of chemicals within the EU is the most important contribution for the apparent consumption figures (compared with the export and import of chemicals).

## Consumption of chemicals hazardous to health, EU, 2004-23

(million tonnes)



Note: The different classes of chemicals are ranked according to their toxicity from the most dangerous (bottom class) up to the least dangerous (top class).

Source: Eurostat (online data code: env\_chmhaz)

eurostat

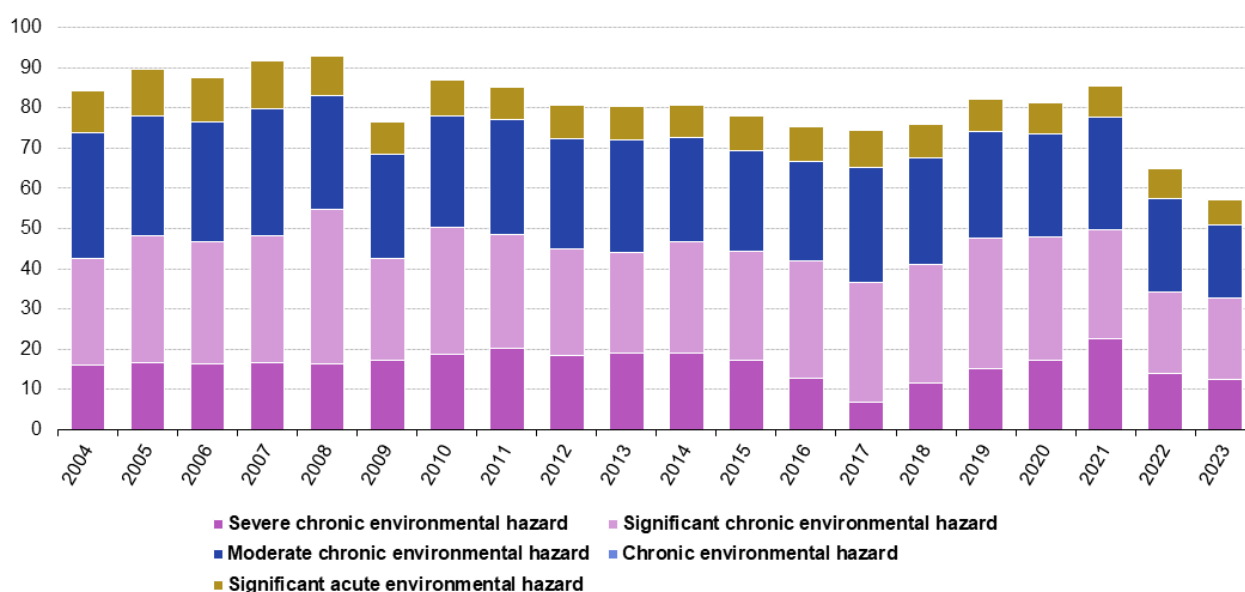
**Figure 6: Consumption of chemicals hazardous to health, by toxicity, EU, 2004-2023 (million tonnes) Source: Eurostat (env\_chmhaz)**

## Consumption of chemicals hazardous to the environment

Figure 7 shows the apparent consumption of chemicals hazardous to the environment, by toxicity, during 2004-2023. Over the period 2004 to 2015, differences between the consumption and the production of chemicals were between 0% and 3% and the consumption was always higher than the production; thus a net import surplus occurred. The apparent consumption indicator shows very similar values to the indicator on the production of chemicals hazardous to the environment, see Figure 4. Differences between consumption and production, however, occurred in the years 2017 and 2018 and also in 2022 and 2023. In these years, considerable net exports of chemicals hazardous to the environment occurred. Net exports in 2017 subtracted about 10 million tonnes or 12% from the sum of the production of the 5 classes of chemicals hazardous to the environment. In 2023 the net export was 11 million tonnes (16% from the sum of the production of the 5 classes of chemicals hazardous to the environment), see Figure 4 (hazardous to the environment).

## Consumption of chemicals hazardous to the environment, EU, 2004-23

(million tonnes)



Note: The different classes of chemicals are ranked according to their environmental impact from the most harmful (bottom class) up to the least harmful (top class).

Source: Eurostat (online data code: env\_chmhaz)

eurostat

**Figure 7: Consumption of chemicals hazardous to the environment, by toxicity, EU, 2004-2023 (million tonnes)** Source: Eurostat (env\_chmhaz)

## Source data for tables and graphs

- [Chemicals production and consumption statistics: tables and figures](#)

## Data sources

The production indicators presented in this article are derived from annual statistics on the production of manufactured goods ( [Prodcum](#) ). In addition, the consumption indicators integrate data on imports and exports from [COMEXT](#) (EUROSTAT's reference database for international trade). The evaluation of both (PRODCOM and COMEXT) is based on publicly available data. The data for building the indicators was extracted on 24 July 2023 (PRODCOM) and 27 September 2023 (COMEXT). The consumption is calculated according to the equation:

$$\text{Consumption} = \text{production} + \text{imports} - \text{exports}$$

Data for the EU aggregate are only available from reference year 2004 onward. The information presented on the production and consumption of chemicals hazardous to the environment and of chemicals hazardous to health has been compiled from detailed production statistics and import/export statistics. As well as the total figures, each of these aggregates is available with a division into 5 hazard classes: these classes of aquatic environmental impacts and toxicity to human health follow official classifications in EU legislation based on scientific expert judgement. It should be noted that the indicators do not describe the actual risks associated with the use of chemicals, but instead their level of production in quantity terms. Indeed, production and consumption are not synonymous with exposure, as some chemicals are handled in closed systems, or as intermediate goods in controlled supply chains. With the introduction of the CLP regulation (Regulation (EC) 1272/2008 on classification, labelling and packaging of substances and mixtures), the classification system for the indicators was updated according to the classification of substances under the CLP regulation.

For the indicator on chemicals hazardous to the environment, chemicals are divided into 5 classes based on their hazard on the aquatic environment, see Figure 4. An analysis of the production and consumption of chemicals hazardous to the environment can be used to monitor any developments in shifting from more harmful to less



harmful chemicals. The classification focuses on aquatic toxicity and seeks to take into account the inherent ecotoxicity of chemical substances. Special attention is given to bioaccumulation and persistency.

Chemicals hazardous to health are divided into 5 toxicity classes, see Figure 2. An analysis of the production and consumption of chemicals hazardous to human health can be used to monitor any developments in shifting production from more to less chemicals hazardous to health and thereby address an important objective of REACH: to reduce risks through the substitution of hazardous by less hazardous substances.

In 2009, in collaboration with the Directorates General of the [European Commission](#) responsible for enterprise and industry and for the environment, Eurostat published a [baseline study](#) providing a set of indicators to monitor the effectiveness of the REACH Regulation. In 2012, Eurostat released an [update of this study](#) as well as a [summary](#). In 2017, the 10 years update of the REACH Baseline Study has been released by the European Commission, DG Growth.

## Context

[The General Union Environment Action Programme to 2020 — also referred to as the 7th Environment Action Programme](#) (7th EAP) — guides the EU's environment policy up to 2020. It contains proposals for further actions that promote the implementation of REACH and aims to develop — by 2018 — a 'Union strategy for a non-toxic environment' that is conducive to innovation and the development of sustainable substitutes including non-chemical solutions, building on cross-cutting measures to be undertaken by 2015 to ensure:

- the safety of manufactured nanomaterials and materials with similar properties;
- the minimisation of exposure to endocrine disruptors;
- appropriate regulatory approaches to address combination effects of chemicals; and
- the minimisation of exposure to chemicals in products, including inter alia imported products, with a view to promoting non-toxic material cycles and reducing indoor exposure to harmful substances.

The Rio+20 United Nations Conference on Sustainable Development decided to launch a process to develop a set of [Sustainable Development Goals](#) (SDGs). In June 2014, an Open Working Group of the General Assembly issued a proposal including 17 goals and 169 targets, for adoption by the UN General Assembly on 25-27 September 2015.

Three targets in the proposal call for action in areas related to the production and consumption of chemicals. These are target 3.9: "By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination", under Goal 3 "Ensure healthy lives and promote well-being across all ages"; target 6.3 "By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and increasing recycling and safe reuse by [x] per cent globally" (where the 'x' is to be defined at a later stage), under Goal 6 "Ensure availability and sustainable management of water and sanitation for all"; and target 12.4 "By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment", under Goal 12 "Ensure sustainable consumption and production patterns".

The 2030 Agenda for Sustainable Development was agreed in 2015 and is a "plan of action for people, planet and prosperity", according to its preamble. It provides a window of opportunity to drive transformative changes in the chemicals and waste sector to move towards sustainable development. Within these processes, intense discussions and clarifications are taking place about the question of what contributions can be made by the chemical industry to support the Sustainable Development Goals. The strong limitations of non-sustainable chemistry are clearly visible now. The recent challenges require a new way of thinking about chemicals and a new way to handle them. A holistic approach is necessary to realise the benefits of chemicals for societies in reaching the SDGs – and to prevent the negative impacts of chemicals along their life cycle. This holistic approach is called "sustainable chemistry" (Blum et al. 2017; UNEP 2018). Such an approach should take into account the 3 dimensions of sustainable development, preventive measures, and the entire life cycle of a chemical (design, production, use and disposal).

## Explore further

### Other articles

- [SDG 12 - Responsible consumption and production](#)

### Database

- [Environment \(env\)](#)
- [Hazardous substances](#) , see:

Chemicals (env\_chem)

Production and consumption of chemicals by hazard class (env\_chmhaz)

### Thematic section

- [Environment](#) , see

Hazardous substances

### Publications

- [Environmental statistics and accounts in Europe — Statistical book 2010](#)
- [The REACH baseline study – 10 years up-date – November 2016](#)
- [The REACH baseline study — 5 years up-date — Comprehensive study report — 2012](#)
- [The REACH baseline study — 5 years up-date — Summary report — 2012](#)
- [The REACH baseline study — A methodology to set the baseline for REACH and monitor its implementation, June 2009](#)
- [The REACH baseline study — A tool to monitor the new EU policy on chemicals — Statistics in focus 48/2009](#)

### Selected datasets

- [Environment \(t\\_env\)](#)
- [Hazardous substances](#) , see:

Chemicals (t\_env\_chm)

Consumption of chemicals by hazardousness - EU aggregate (sdg\_12\_10)

### External links

- [European Chemicals Agency — ECHA](#)
- [European Commission — 7th Environment Action Programme](#)
- [European Commission — The Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs — REACH](#)
- [UNEP \(2018\): Analysis of Best Practices in Sustainable Chemistry](#)
- [Blum, C., Bunke, D., Hungsberg M, Roelofs E, Joas A, Joas R, et al \(2017\) The concept of sustainable chemistry: Key drivers for the transition towards sustainable development. Sustain. Chem. Pharm. 2017;5:94-104](#)

## Legislation

- [Regulation \(EC\) No 1272/2008](#) on classification, labelling and packaging of substances and mixtures; GHS is the abbreviation of the Global Harmonized System.
- [Summaries of EU legislation: Classification, packaging and labelling of chemical substances and mixtures](#)