

Menu

United States Environmental Protection Agency

Toxics Release Inventory (TRI) Program

[Share](#)[Contact Us](#)

Dioxin and Dioxin-Like Compounds Toxic Equivalency Information

Basic Information

Legal Authorities:

- 42 U.S.C. §11023
- 42 U.S.C. §11048

Federal Register Citation:

- 72 FR 26545

Code of Federal Regulations Citation

- 40 CFR Part 372

Docket Number

- EPA-HQ-TRI-2002-0001

Effective Date

- 07/09/2007

- Rule Summary
- Rule History
- Additional Resources

Rule Summary

EPA has finalized revisions to the reporting requirements for the dioxin and dioxin-like compounds category under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA). The final rule requires that, in addition to the total grams released for the entire category, facilities must report the quantity for each individual member of the category.

EPA will use this reported mass quantity data to calculate toxic equivalency (TEQ) values. TEQs are a weighted quantity measure based on the toxicity of each member of the dioxin and dioxin-like compounds category relative to the most toxic members of the category.

EPA will use TEQs to account for how dioxin and dioxin-like compounds vary in toxicity. TEQs will help the public to better understand the toxicity of releases and waste management at facilities that report under the Toxics Release Inventory Program. For example, a facility releasing 3 grams of some combination of dioxin and dioxin-like compounds may or may not be of greater interest than a facility releasing 1 gram of a different combination. However, a facility releasing 3 grams TEQ of dioxins is of greater environmental importance than one releasing 1 gram TEQ to the same environmental medium (e.g., air, land, water).

Rule History

Dioxin and Dioxin-Like Compounds

Dioxin and dioxin-like compounds are trace-level unintentional byproducts of some forms of combustion and several industrial chemical processes. They are not commercial chemical products.

Dioxins are transported primarily through the air and are deposited on surfaces; they have been detected in air, soil, sediments and food. Dioxins are primarily introduced to most rivers, streams and lakes through soil erosion and storm water runoff from urban areas. Industrial discharges can significantly elevate water concentrations near the point of discharge to rivers and streams. Major contributors of dioxin to the environment include:

- Incineration of municipal solid waste
- Incineration of medical waste
- Secondary copper smelting
- Forest fires
- Land application of sewage sludge
- Cement kilns

- Coal fired power plants
- Residential wood burning
- Chlorine bleaching of wood pulp

Backyard burning of household waste may also be an important source.

Reasons for Changes to Dioxin and Dioxin-Like Compounds Reporting

EPA made these revisions in response to requests from TRI facilities asking that EPA provide facilities with a way to provide important context for dioxin release data. In addition, EPA believes that the public will benefit from the additional context and comparability of data provided by TEQ reporting.

Usefulness of TEQs

TEQs are calculated values that allow us to compare the toxicity of different combinations of dioxins and dioxin-like compounds, and help explain the relative toxicity of the TRI chemical release information. For example, it is not possible to conclude that two facilities, each releasing 2 grams of dioxin and dioxin-like compounds are of equal environmental importance without considering other factors. It may be possible, however, to conclude that two facilities each releasing 2 grams TEQ are of equal importance if the releases from each facility are to the same environmental medium (e.g., air, land, water).

On the other hand, it is not possible on the basis of TEQ alone to establish whether the two sources are making equal strides in release or waste minimization. Instead, it is necessary to know the actual mass of each compound that is released. Together, the mass and TEQ give a full picture that can help guide waste minimization decisions.

How TEQs Are Calculated

In order to calculate a TEQ, a toxic equivalent factor (TEF) is assigned to each member of the dioxin and dioxin-like compounds category. The TEF is the ratio of the toxicity of one of the compounds in this category to the toxicity of the two most toxic compounds in the category, which are each assigned a TEF of 1: 2,3,7,8-tetrachlorodibenzo-p-dioxin (commonly referred to as dioxin) and 1,2,3,7,8-pentachlorodibenzo-p-dioxin. TEFs that have been established through international agreements currently range from 1 to 0.0001.

A TEQ is calculated by multiplying the actual grams weight of each dioxin and dioxin-like compound by its corresponding TEF (e.g., 10 grams X 0.1 TEF = 1 gram TEQ) and then summing the results. The number that results from this calculation is referred to as grams TEQ.

For example, consider the following 60g mixture:
10g of compound A, with a TEF of 1
20g of compound B, with a TEF of 0.5
30g of compound C, with a TEF of 0.2.

The TEQ of this mixture would be:
 $(10\text{g} \times 1) + (20\text{g} \times 0.5) + (30\text{g} \times 0.2) = 26\text{g TEQ}$

In other words, this mixture of 60g of various compounds would be as toxic as 26g of either of the two most toxic compounds.

Additional Resources

Final Rule (PDF) (11 pp, 220 K, About PDF)

Proposed Rule (PDF) (12 pp, 223 K, About PDF)

Contact Us to ask a question, provide feedback, or report a problem.

[TRI Program Home](#)

[TRI National Analysis Home](#)

[Learn About TRI](#)

[TRI Resources](#)

[Reporting for Facilities](#)

[TRI-MEweb](#)

[TRI Data & Tools](#)

[Pollution Prevention](#)

[Data Quality](#)

[Enforcement](#)

[Chemical List](#)

[Covered Industries](#)

[Laws & Regulatory Activities](#)

[What You Can Do](#)

[TRI Contacts](#)

[Site Map](#)

Discover.

Accessibility

EPA Administrator

Budget & Performance

Contracting

Grants

No FEAR Act Data

Privacy and Security

Connect.

Data.gov

Inspector General

Jobs

Newsroom

Open Government

Regulations.gov

Subscribe

USA.gov

White House

Ask.

Contact Us

Hotlines

FOIA Requests

Frequent Questions

Follow.

LAST UPDATED ON JULY 25, 2016