

Capacity Building Workshop on Air Emission Inventories
17-18 October 2005, Rovaniemi, Finland

...HOW TO FIND EMISSION FACTORS?

IPCC – EFDB
OECD/National PRTRs

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S Y K E

It is recommendable to use emission factors that reflect national circumstances.

Development of national emission factors can be costly, time consuming and require much expertise.



International databases

- IPCC, EMEP/Corinair
- National databases/handbooks
- OECD Resource centre

Selecting and Applying Emission Factors

(OECD Framework for Selecting and Applying PRTR Release Estimation Techniques to be published by end of 2005)

Internationally developed emission factors (from another country)

Consider possible differences in

- process technologies
- raw material and chemicals
- operating conditions/practices
- pollution control equipment

EFs often do not take into account

likely releases during

- start-up shut-down periods
- upsets and/or abnormal operation

The accuracy of activity data

affects the final results

- fuel/raw material consumption, production, flue gas flow...

Check that the operational conditions fit "controlled" or "uncontrolled" emission factors.

**OECD and National
Databases for
Release Estimation Techniques**



Resource Centre for PRTR Release Estimation Techniques (RETs)

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 - Non-Point Sources RET
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 - Links
 - News
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This site has been developed by the Task Force on PRTRs (Pollutant Release and Transfer Registers) of the OECD's Environment, Health and Safety Programme under the lead of Environment Canada.

Purpose of the Resource Center

The site provides a clearinghouse of guidance manuals/documents of release estimation techniques for the principal pollutant release and transfer registries developed by OECD member countries. The manuals and documents include descriptive information on the sources of pollution and the pollutants that are released, as well as information on emission factors, mass balance methods, engineering calculations, and monitoring information.

The Resource Centre will be updated on a regular basis to include additional and new documents available.

About the Resource Centre

The Task Force on PRTRs is interested in obtaining your feedback to improve the Resource Centre. You can provide your comments, suggestions, and identify document links that are no longer valid by using the Contact Us feature that is available at the bottom of this page.

OECD PRTR Resource Centre for RETs

<http://206.191.48.253/>

Possible to search

Point Sources from

Industry
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Chemical

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Links to Country-specific PRTR information and methodology



Industry Reporting

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Industry sector list of NPI emission estimation technique manuals

The following Emission Estimation Technique (EET) manuals are listed by industry sector. Some industry sectors may require one or more EET manuals. The NPI Guide should be used in conjunction with all manuals. More about the [NPI Guide](#).

There are nine NPI manuals used by many different sectors:

- [Combustion in boilers](#)
- [Combustion engines](#)
- [Explosives detonation and firing ranges](#)
- [Fuel and organic liquid storage](#)
- [Fugitive emissions](#)
- [Maritime operations](#)
- [Railway yard operations](#)
- [Sewage and wastewater treatment](#)
- [Surface coating \(e.g. painting\)](#)

AUSTRALIAN NPI
National Pollution Inventory

Select the first letter of the NPI industry sector you want (e.g. M for Maritime Operations).

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[Top](#)



National Pollutant Inventory

Emission Estimation Techniques Manual

for

Bread Manufacturing Version 1.1

First published in February 1999
Version 1.1 - 4 June 2003

3.4 Emission Factors

An emission factor is a tool that is used to estimate emissions to the environment. In this Manual, it relates the quantity of substances emitted from a source to some common activity associated with those emissions. Emission factors are obtained from US, European, and Australian sources and are usually expressed as the weight of a substance emitted, divided by the unit weight, volume, distance, or duration of the activity emitting the substance (eg. kilograms of ethanol emitted per tonne bread produced).

Emission factors are used to estimate a facility's emissions by the general equation:

$$E_{kpy,i} = [A * OpHrs] EF_i * [1 - (CE_i/100)] \quad (1)$$

where:

- $E_{kpy,i}$ = emission rate of pollutant i, kg/yr
- A = activity rate, t/hr
- OpHr = operating hours, hr/yr
- EF_i = uncontrolled emission factor of pollutant i, kg/t
- CE_i = overall control efficiency of pollutant i, %.

Emission factors developed from measurements for a specific process may sometimes be used to estimate emissions at other sites. Should a company have several processes of similar operation and size, and emissions were measured from one process source, an emission factor could be developed and applied to similar sources. As previously mentioned, it is advisable to have the emission factor reviewed and approved by State or Territory environment agencies prior to its use for NPI estimations.

3.4.1 Industry-wide Emission Factors

The emission factors in Table 2 have been derived using the fermentation reaction that occurs as bread rises. These calculations may be found in Appendix I.

Table 2. Available Emission Factors for Ethanol from Bread Manufacturing

Substance Emitted	Emission Factors (kg/tonne of bread produced)	Emission Factor Rating Code ³
Ethanol ¹	8.3E-01	U
Total VOCs ²	8.32E-01	U

Notes

1. Reference 2 - Goodman Fielder
2. References 3 and 4 (Tilly and USEPA respectively)
3. Emission factor rating codes are discussed in Section 4.4.
4. Scientific notation is used; e.g. 7.38E-02 represents 7.38×10^{-2} or 0.0738.



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Toxics Release Inventory (TRI) Program

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TRI Guidance Documents

EPA provides extensive industry-specific, chemical-specific and general guidance for the regulated community, many of which are listed below. If you have additional questions, call the EPCRA Call Center (703-412-9810 from all government locations and the Washington metropolitan local calling area; 1-800-424-9346 from all non-government locations outside the Washington metropolitan local calling area; 1-800-553-7672 TTY) between 9 am - 6 pm, Monday through Friday, Eastern Time.

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*USEPA TRI
Toxic Release Inventory*

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General

- [How Are the Toxics Release Inventory Data Used?](#)
A new report that contains case studies of government business, academic and citizen uses. (PDF, 790 KB).
- [EPCRA Section 313 Release Reporting Requirements "blue brochure" \(February 2001 Revision; PDF, 614 KB\).](#)
- [Title III List of Lists \(November 1998 Revision; PDF, 587 KB\).](#)
The Title III List of Lists presents a list of chemicals regulated under four of the EPA's programs for chemical emergency preparedness, accident prevention, and community right-to-know. It is intended to help facilities and state and local governments in compliance with the Emergency Planning and Community Right-to-Know Act and the accident prevention provisions of the Clean Air Act, as well as to support chemical emergency preparedness and prevention initiatives.

Questions & Answers Document

- [Revised 1998 EPCRA Section 313 Questions and Answers \(December 1998; PDF, 4.3 MB\)](#)
- [Addendum to 1998 Q&A Document](#) (Dec 2004; PDF, 609KB)
- [EPCRA Section 313 Questions and Answers Addendum for Federal Facilities - Revised 1999 Version \(May 2000; PDF, 315 KB\)](#)



Technology Transfer Network Clearinghouse for Inventories & Emissions Factors

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- Recent Additions
- Emissions Factors / AP 42
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Air CHIEF CD-ROM, Version 12 (June 2005)



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About Air CHIEF

As a part of its commitment to protecting global air quality, the U. S. Environmental Protection Agency is working to provide current emissions data in convenient, easy-to-access formats to federal, state, and local regulatory agencies, businesses, and the general public. An important tool in this effort is the Air ClearingHouse For Inventories And Emissions Factors (*Air CHIEF*) in CD-ROM format.

The *Air CHIEF* CD-ROM gives the public and private sector users access to air emission data specific to estimating the types and quantities of pollutants that may be emitted from a wide variety of sources. Updated annually, *Air CHIEF* offers on one disc literally thousands of pages contained in some of EPA's most widely used and requested documents. Included are the US EPA's most popular emission estimation tools.

Air CHIEF Version 12

This version of *Air CHIEF* contains many features, such as linking between related documents, web links directly to the CHIEF web site for easy access to the most recent updates, and enhanced full-CD searching. Included on *Air CHIEF* version 12 are the:

- [Compilation of Air Pollutant Emission Factors \(AP-42\)](#), Fifth Edition, Volume 1: Stationary Point and Area Sources including the newest additions to AP-42, Chapter 15, Ordnance Detonation and draft section 12.5.1 on Steel Minimills.
- [EIIIP Preferred and Alternative for Estimating Air Emissions from \(source\)](#)
- [AP-42 Background Files](#)
- [Factor Information RETrieval \(FIRE\) Version 6.25](#) Data
- [2002 North American Industrial Classification System \(NAICS\) matched to 1987 Standard Industrial Classification codes \(SIC\)](#)
- [Final Consolidated Emissions Reporting Rule \(CERR\)](#)
- [2002 Inventory Documentation for the National Emissions Inventory for Criteria and Toxic Pollutants](#)
- [The latest National Air Pollutant Emission Trends data](#)
- [National Air Pollutant Emission Trends Procedures 1985-1999 \(PDF 6M\)](#)

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- Recent Additions
- Emissions Factors / AP 42
- Emissions Factors Software and Tools
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Emissions Factors & AP 42

An **emissions factor** is a representative value that attempts to relate the quantity of a pollutant released to the atmosphere with an activity associated with the release of that pollutant. These factors are usually expressed as the weight of pollutant divided by a unit weight, volume, distance, or duration of the activity emitting the pollutant (e.g., kilograms of particulate emitted per megagram of coal burned). Such factors facilitate estimation of emissions from various sources of air pollution. In most cases, these factors are simply averages of all available data of acceptable quality, and are generally assumed to be representative of long-term averages for all facilities in the source category (i.e., a population average).

The general equation for emissions estimation is:

$$E = A \times EF \times (1-ER/100)$$

where:

- E = emissions;
- A = activity rate;
- EF = emission factor, and
- ER = overall emission reduction efficiency, %

For information about emissions factors from highway vehicles and nonroad mobile sources, visit the [Office of Transportation and Air Quality](#) web site.

**AP 42, Fifth Edition
Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point
and Area Sources**

For current information on AP 42 updates and the activities of the Emissions Factors and Policy Applications Group, you can subscribe to the [CHIEF Listserv](#).

[AP 42 FAQs](#) Answers to frequently asked questions about AP 42

[Drafts](#) Draft Sections Under Review

[Supplements](#) AP 42 historical listing of supplements

[Older Editions of](#) **This information is available for historical purposes only.** For the most recent emissions factors, supported by

USEPA TOXIC RELEASE INVENTORY PROGRAMME (TRI)

http://www.epa.gov/tri/guide_docs/index.htm

Guidance Documents By Category

- General guidance
- Questions & Answers
- The Assistance Library
- **Industry Specific**
- **Chemical Specific**
- Waste Management
- Software Development

AP 42, Volume I, Fifth Edition

Introduction Introduction to AP 42, Vol I, Fifth Ed -- Jan 1995 (PDF 40K)

<http://www.epa.gov/ttn/chief/software/airchief/>

Chapter 1 External Combustion Sources

Chapter 2 Solid Waste Disposal

Chapter 3 Stationary Internal Combustion Sources

Chapter 4 Evaporation Loss Sources

Chapter 5 Petroleum Industry

Chapter 6 Organic Chemical Process Industry

Chapter 7 Liquid Storage Tanks

Chapter 8 Inorganic Chemical Industry

Chapter 9 Food and Agricultural Industries

Chapter 10 Wood Products Industry

Chapter 11 Mineral Products Industry

Chapter 12 Metallurgical Industry

Chapter 13 Miscellaneous Sources

Chapter 14 Greenhouse Gas Biogenic Sources

Chapter 15 Ordnance Detonation

IPCC EFDB

**Intergovernmental Panel on Climate Change
Emission Factor Database**

IPCC EFDB is a library

of emission factors and other parameters
with background documentation or technical references
so that users can select EFs
that would best approximate the local conditions

<http://www.ipcc-nggip.iges.or.jp/EFDB/main.php>

EFDB is also a communication platform for distribution and commenting on new research and measurement data. Contact the Technical Support Unit (TSU)
ipcc-efdb@iges.or.jp

To select an emission factor from the EFDB

you need to information about

- the source and its mix of technology,
- operating and environmental conditions
- abatement and control technologies under which the emission factor was measured or modeled
- access to the original technical reference to evaluate the robustness and applicability of the information

EFDB contains IPCC default data and from CORINAIR94.

New data inputs are evaluated by the EFDB Editorial Board.

EFDB Web application

<http://www.ipcc-nggip.iges.or.jp/EFDB/main.php>

IPCC NGGIP Logged user: Not logged in

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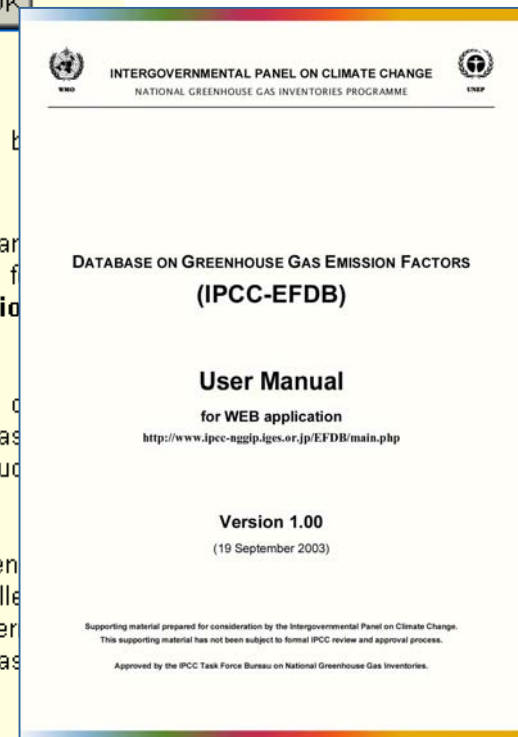
Main Page

Language: English OK

Welcome to EFDB!

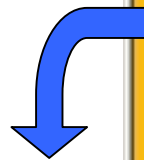
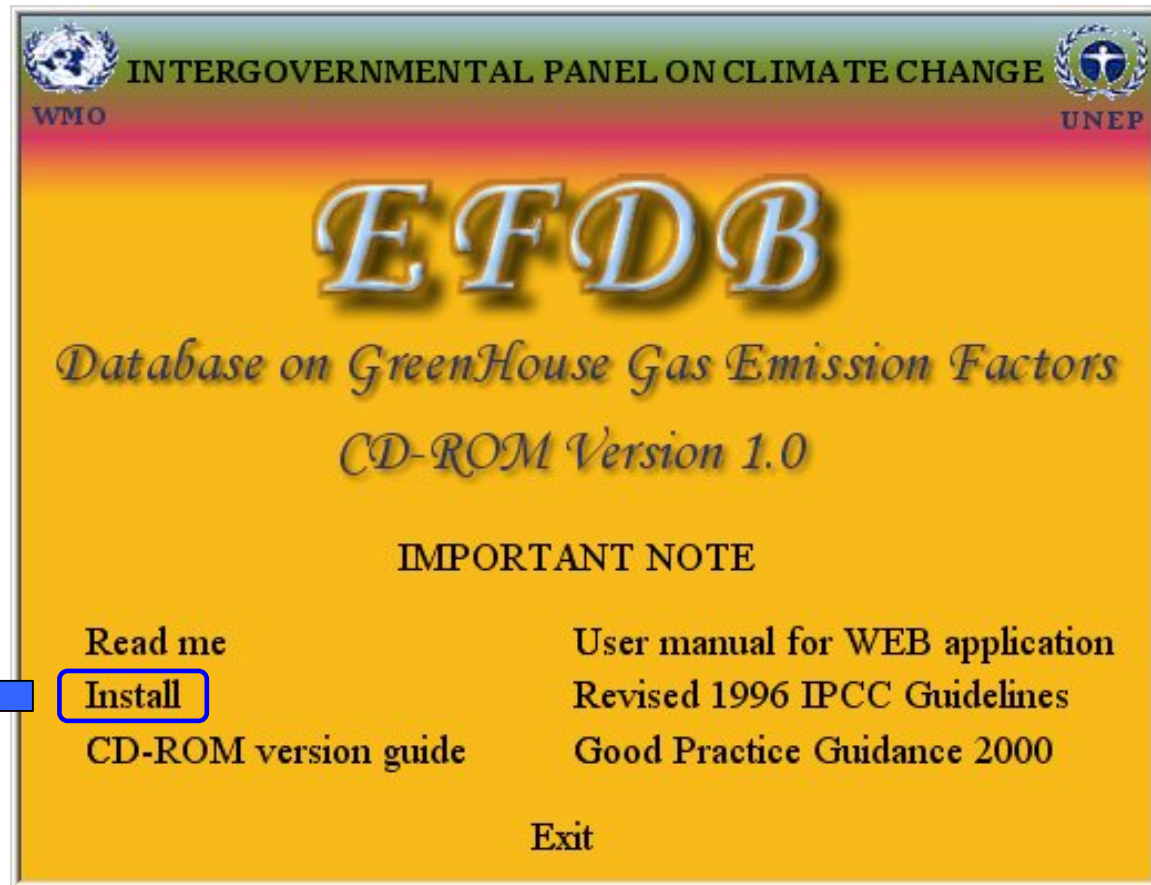
All users are kindly invited to pay attention to this note. Guidance for users (as of 26 October 2002) can be downloaded (click [here](#)). The EFDB User Manual will be made available in due course.

- **Nature of EFDB:** EFDB is meant to be a recognised library, where users can find emission factors and other parameters with background documentation or technical references that can be used for estimating greenhouse gas emissions and removals. **The responsibility of using this information appropriately will always remain with the users themselves.**
- **Request for data input:** Users are encouraged to provide the EFDB with any relevant proposals of emission factors or other related parameters. If you wish to submit your data for the first time, please contact the [Technical Support Unit](#) to obtain your login name and password. Acceptance of such proposals will be subject to decisions by the EFDB Editorial Board using well-defined criteria.
- **Terminology:** EFDB is a database on various parameters to be used in calculation of anthropogenic emissions by sources and removals by sinks of greenhouse gases. It covers not only the so-called "emission factors" but also the other relevant parameters. For convenience sake, however, the term "Emission Factor" or its abbreviation "EF" is sometimes used to represent parameters in this database generally.
- **Software requirements:** It is highly recommended to use Microsoft Internet Explorer version 5.0 or higher for best performance. Alternatively Netscape Navigator version 6.0 or higher can be used. It is also recommended to have Microsoft Office 97 or higher for generating Word and Excel outputs.



EFDB Local CDROM application

Can be operated locally on a stand alone PC, allows off-line search for Efs.



Thank you