



EIFER

EUROPÄISCHES INSTITUT FÜR ENERGIEFORSCHUNG
INSTITUT EUROPEEN DE RECHERCHE SUR L'ENERGIE
EUROPEAN INSTITUTE FOR ENERGY RESEARCH

Expert Meeting to Further Develop the Standardized Toolkit for Identification and Quantification of Dioxin and Furan Releases

Toolkit Category 3 – Update 2009

Geneva, 01 December 2009

U. Karl





- Reminder Toolkit Workshop 2008
- Upcoming information in 2009
- New synthesis reports in 2009
- Conclusions

- Review of existing emission factors
- Review of proposed source categories
- Further information on non-conventional fuels
- Emission factors for „simple“ technologies

- Data collection form:
 - Pasquale Spezzano, ENEA, Italy
 - Emmanuel Fiani, ADEME, France
 - Yasuhiro Hirai, Japan

Results for power boilers using coal, heavy fuel oil, orimulsion, natural gas biomass

- Several new publications in 2008

- Regular survey of publications via Science Direct by Pat Costner
→ new information on Category 3 sources is scarce
- Upcoming new synthesis reports:
 - EMEP/CORINAIR Emission Inventory Guidebook 2009
 - BIPRO Report “INFORMATION EXCHANGE ON REDUCTION OF DIOXIN EMISSIONS FROM DOMESTIC SOURCES”
 - CITEPA: National Inventory Report for France

Chemosphere

Dioxin-like compound compositional profiles of furnace bottom ashes from household combustion in Poland and their possible associations with contamination status of agricultural soil and pine needles

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Table 1
Toxic equivalency of dioxin-like compounds in furnace bottom ash from household combustion (ng TEQ kg⁻¹).

	Coal 1 ash (ng TEQ kg ⁻¹)	Coal 2 ash (ng TEQ kg ⁻¹)	Coal 3 ash (ng TEQ kg ⁻¹)	Coke ash (ng TEQ kg ⁻¹)	Wood ash (ng TEQ kg ⁻¹)	Waste ash (ng TEQ kg ⁻¹)
dI-PCBs	0.052	0.070	0.085	0.084	0.15	0.12
PCDDs	0.00	0.00	0.11	0.19	0.83	0.28
PCDFs	0.00	0.00	0.27	0.40	1.1	0.15
PCDDs/ Fs	0.00	0.000	0.39	0.59	1.9	0.43
Σ TEQ	0.052	0.070	0.47	0.67	2.0	0.55

**New edition published
in 2009**

**Includes emission
factors for
PCDD/PCDF, PCB and
HCB**

**Mainly refers to Toolkit,
EMEP Guidebook 2006
edition and Kakareka
(PCB)**

EMEP/EEA air pollutant emission inventory
guidebook 2009

Technical guidance to prepare national emission inventories

ISBN 1725-2237

Information Exchange on Reduction of Dioxin Emissions from Domestic Sources

Reporting under the
Regulation (EC) No
850/2004 of the
European Parliament
and of the Council on
persistent organic
pollutants & amending
Directive 79/117/EEC



INFORMATION EXCHANGE ON REDUCTION OF DIOXIN EMISSIONS
FROM DOMESTIC SOURCES

REFERENCE: 07200702007M51007/MAR/04

FINAL REPORT

09 April 2009

Report prepared for the European Commission by

BIPRO

Beratungsgesellschaft für integrierte Problemlösungen

In cooperation with:

FORCE Technology – BIO Intelligence Services

Mr. Stefano Caserini (Engineering Faculty of the Politecnico di Milano)

Scope:

Literature search on dioxin emissions from domestic sources

90 literature sources have been identified in a worldwide search for primary measurement data and emission factors (EFs) for domestic heating and cooking appliances, charcoal grills, open burning of waste, candle burning and mobile domestic sources. Investigations included air emissions and releases into residues and focused on appliances <50 kW.

There are not many recent primary measurement studies which could be identified besides the ones already included into the UNEP Toolkit and the UNECE Guidebook. Means from studies identified largely confirm the EFs presented in the UNEP Toolkit.

Emission Factors Used in MS Reports

Wood		1A4bi Residential µg TEQ/TJ	Fireplace µg TEQ/TJ	Domestic stoves µg TEQ/TJ	Small boiler (<50 kWth) µg TEQ/TJ
UNEP Toolkit	Clean wood			100	
UNEP Toolkit	Contaminated wood/biomass			1,500	
UNECE Guidebook	Wood	700	800	800	500
CZ		397**			
DE				40	40
DK	Wood	419			
	Straw	500			
EE	Wood, waste wood, peat	100			
FI	Wood	21			
FI	Peat	17.5			
FR		20-100			

National Inventories of Air Emissions in France: Organisation and Methodology

Provides an almost complete set of emission factors from French and European sources; Toolkit rarely cited



Table 35: Emission factors for heat and power generation plants in industry fuelled with fossil fuels

Classification	Emission Factors - $\mu\text{g TEQ/TJ}$ of Fossil Fuel Burned		
	Air	Water	Residue
1. Fossil fuel/waste co-fired power boilers	35	ND	ND
2. Coal fired power boilers	10	ND	14
3. Heavy fuel fired power boilers	2.5	ND	ND
4. Shale oil fired power plants	1.5	ND	*
5. Light fuel oil/natural gas fired power boilers	0.5	ND	ND

* Releases with residues can be calculated on a mass basis (see Section 6.3.1.5)

Combustible – code NAPFUE	Chaudières ng PCDD-F / GJ	Turbines à gaz ng PCDD-F / GJ	Moteurs fixes ng PCDD-F / GJ
102 – 103	3,85	(a)	(a)
105	6,25	(a)	(a)
110	2,50	(a)	(a)
203	2,50	2,50	2,50

(a) cas inexistant

Proposal of HCB and PCB emission factors per type of fuel

Code NAPFUEc	Désignation	µg PCB / GJ	Référence
101	Charbon à coke	55	[346]
102	Charbon vapeur	55	[346]
103	Charbon sous-bitumineux	72	[346]
104	Aggloméré de houille	45	[346]
105	Lignite	141 (<50 MW) 106 (>50 MW)	[40]
111	Bois et assimilé	31	[350]
116	Déchets de bois	50	[350]
1170	Autres déchets agricoles	Pas de donnée disponible	
203	Fioul lourd HTS / BTS / TBTS	15	[40]
204	Fioul domestique	8,8	[347]
301	Gaz naturel	A priori nul ou négligeable	

- New data available on additional pollutants (HCB, PCB) and fuels
- Few relevant publications in the scientific literature in 2009
- New synthesis reports available
- Questions on „simple“ technologies remain open



Thank You