

060406**Preservation of wood***Process description*

Small quantities of dioxins can be formed at the production of chlorine compounds that are applied inter alia as preservative or pesticide. Part of these dioxins remain behind in the products and are thus spread into the environment only at their application. Despite a ban on the application of some of these products, emissions can still take place through evaporation or washing away of the pesticides used in the past. The most important fields of application are (or were) the use of pentachlorophenol as a wood preservative, particularly in the past.

Abatement technologies:

Not applicable

Plant data/European situation

Production and use of PCP and its derivatives is common practice in several European countries while in some states these compounds have been banned. Only few information exist on the amount of PCP that can be found in treated construction wood. PCP may also be imported with wooden goods and textiles or leather products.

Activity data

Activity data (shown in 060406—Table 4) were reported by the national dioxin inventory of the United Kingdom only. The British value is based on the assumption that about 0.1 % of the possible dioxin content in PCP would volatilise.

Three other countries (Belgium, Switzerland and The Netherlands) give annual emissions values (060406—Table 4); but note that the Belgian and Swiss values are founded on Dutch findings. While the Belgian estimation is identical with the Dutch value the Swiss

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annual emission of 15.2 g I-TEQ/a was recalculated with a factor (cf. volume 2) to give an annual emission of 2.7 g I-TEQ/a. The Dutch annual emissions estimate refers to results of indoor measurements of PCDD/F evaporation.

The annual emissions of the four states mentioned above were taken as the basis for calculating annual emissions per capita (060406—Table 4). The mean of these values was taken for the re-calculation of annual dioxin emissions in all 17 countries (060406—Table 5).

Emission factors

The only emission factors available for wood combustion as reported by the national dioxin inventory of the United Kingdom are shown 060406—Table 3. All other countries did not provide any emission factors. As no activity rate was given for the minimum value the maximum emission factor was used for the emission estimation.

Since only the British inventory reports an emission factor for wood preservation no default emission factors was selected to be used for the emission estimation.

Emission estimation

The total annual PCDD/F emissions were calculated on the basis of the specific emissions per capita. For all 17 countries considered the following result was obtained (060406—Table 1):

	TOTAL
Re-evaluation	381.4

060406—Table 1 Summary of re-evaluated typical PCDD/F air emissions [g I-TEQ/a] for preservation of wood

Conclusions/recommendations

Preservation of wood is of certain relevance for the total emission of PCDD/F in Europe. However, only the British inventory provides any data on emission factors and activity rates concerning this dioxin source. The annual dioxin emissions from preserved wood as reported in the Dutch inventory differ distinctly from the British results. Unfortunately no activity rates and no emission factors are presented in the Dutch inventory thus making it impossible to assess the possible reason for the different values.

Since the activity rates are based on assumed emissions per capita all calculations are associated with substantial uncertainties in this chapter. A study on the amount of preserved wood applied covering at least all EC member states would be very helpful. Likewise, considerable uncertainties exist with regard to the applied emission factors. Additional studies on this subject are recommended in those countries where preservation of wood with PCP (or other halogenated substances) containing wood preserving agents is still legal.

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	Flue gas conc. [ng I-TEQ/m ³]			Emission factors [µg/t]			Remark
	typ	min	max	typ	min	max	
Uk				1323	700	2500	EF min refers to PCP salt, but no activity rate is given for it. Hence, EF max is used for the estimation

060406—Table 2 PCDD/F air emission factors for preservation of wood from the British dioxin inventory

	Activity [t/a]	Emission g I-TEQ/a	Remark
B	nd	25.00	considered as similar to NL; this value was not included in the total emission value of the Belgian basic document
CH	nd	2.70	based on data from NL inventory = 15.2 g I-TEQ/a for 1990; recalculated for CH with secondary information (see VOL 1, page CH 30 and references cited there)
NL	nd	25.00	emission estimated from indoor meas. of PCDD/F evaporation and assumptions about reservoir PCDD/F content
Uk	0.25	0.33	based on assumption that 0.1 % of PCDD/F content in PCP may volatilise

060406—Table 3 Activity rates and annual emissions related to preservation of wood

Specific emission	µg I-TEQ/cap*a
B	2.5
CH	0.38
NL	1.6
UK	0.006
	1.0 (chosen value)

060406—Table 4 Specific emission per capita related to preservation of wood

Re-estimation from per capita emission estimate	
	g I-TEQ/a
A	7.9
B	10.1
CH	7.1
D	81.3
Dk	5.3
E	39.6
F	57.7
Gr	10.3
I	56.8
Irl	3.5
L	0.4
N	4.3
NL	15.4
P	9.9
S	8.7
Sf	5.1
Uk	58.0
Total	381.4

060406—Table 5 Re-estimation of annual emissions related to preservation of wood (reference period: 1993-1995)

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References to 060406

see national inventories for further information