



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

# Department of Environmental Protection

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## Assessment & Control of Dioxin in Massachusetts

(republished in new format, November 2017)

The Department of Environmental Protection has revised the toxicity equivalence factors (TEFs) used with the dioxin air quality guideline as originally established in 1985 (1)(2) and updated in 1989 (3). The recommended changes in the TEFs shown in Attachment 1 are intended to incorporate current information on the toxicities of the chemicals comprising the polychlorinated dibenzodioxins (PCDDs) and dibenzofurans (PCDFs). The revisions do not change the level of public health protection. The Department will continue to review resource recovery facilities and municipal incinerators against the guideline. The revisions are viewed as conservative and protective of public health with an adequate margin of safety.

### Summary of the Air Quality Guideline

The Massachusetts dioxin air guideline is expressed, on a toxic equivalence basis, as "total polychlorinated dibenzodioxins and polychlorinated dibenzofurans" and shall not exceed a toxic equivalent concentration of 0.045 picograms per cubic meter (pg/m<sup>3</sup>). The guideline is an annual average and remains the same with the new revisions to the TEFs.

Toxic equivalency factors are used to evaluate the toxicity of complex environmental mixtures containing PCDDs and PCDFs. TEFs are used to mathematically convert the concentration of PCDDs and PCDFs to an equivalent concentration of 2,3,7,8-tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD).

The TEFs used in establishing the 1989 dioxin air guideline were selected from a study conducted by the Swiss Government in 1982. The changes represented by the revised TEFs are based on the large body of toxicity data which has become available since 1982. The Attachment 2 prepared by the Office of Research and Standards summarizes this information.

**This information is available in alternate format. Contact Michelle Waters-Ekanem, Director of Diversity/Civil Rights at 617-292-5751.**

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The dioxin air guideline is set at a level at which no non- cancer health effects would be expected as a result of lifetime exposure. The guideline concentration is associated with an individual's excess lifetime cancer risk as low as zero and possibly as high as 5.9 in one million.

The revised TEFs were reviewed at the June meeting of the DEP/DPH Advisory Committee on Health Effects. The comments of committee members were incorporated into the recommended TEFs.

(Signed by the Commissioner October 31, 1991)

*Daniel S. Greenbaum*

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Daniel S. Greenbaum  
Commissioner  
Department of Environmental Protection, 1991

## **References**

Assessment and Control of Dioxin Emissions in Massachusetts, S. Russell Sylva, Commissioner DEQE, October 23, 1985.

Derivation of Ambient Air Quality Guidelines for Dioxins, Carol Rowan West and Michael J. Murphy, DEQE Office of Research and Standards, August 4, 1986.

Revision of the September 20, 1985 Dioxin Air Guideline, Michael J. Murphy, Office of Research and Standards, February 7, 1989.

## Attachment 1. Summary - Toxicity Equivalency Factors

Compound	EPA/89	Old DEP	New DEP
<b>Mono-, Di- and TriCDDs</b>	0	0.01(Tri only)	0.001
<b>2,3,7,8-TCDD</b>	1	1	1
<b>Other TCDDs</b>	0	0.01	0.01
<b>2,3,7,8-PeCDD</b>	0.5	0.1	0.5
<b>Other PeCDDs</b>	0	0.1	0.05
<b>2,3,7,8-HxCDD</b>	0.1	0.1	0.1
<b>Other HxCDDs</b>	0	0.1	0.01
<b>2,3,7,8-HpCDD</b>	0.01	0.01	0.1
<b>Other HpCDDs</b>	0	0.01	0.01
<b>OCDD</b>	0.001	None Assigned	0.001
<b>Mono-, Di- and TriCDFs</b>	0	0.01(Tri only)	0.001
<b>2,3,7,8-TCDF</b>	0.1	0.1	0.1
<b>Other TCDFs</b>	0	0.1	0.01
<b>1,2,3,7,8-PeCDF</b>	0.05		
<b>2,3,4,7,8-PeCDF</b>	0.5		
<b>2,3,7,8-PeCDFs</b>	0	0.1	0.5 *
<b>Other PeCDFs</b>	0	0.1	0.05

<b>Compound</b>	<b>EPA/89</b>	<b>Old DEP</b>	<b>New DEP</b>
<b>2,3,7,8-HxCDFs</b>	0.1	0.1	0.1
<b>Other HxCDFs</b>	0	0.1	0.01
<b>2,3,7,8-HpCDFs</b>	0.01	0.01	0.1
<b>Other HpCDFs</b>	0	0.01	0.01
<b>OCDF</b>	0.001	None Assigned	0.001
<b>* includes 1,2,3,7,8-PeCDF and 2,3,4,7,8-PeCDF</b>			