

Institut universitaire romand
de Santé au Travail



OEL for PAH: Rational and Applicability

T. Vu Duc

PAH in the work environment: processes & industrial branches

Blast furnace and coke oven

Coal tars & derived products

Coal gasification & works

Aluminium production

Carbon blacks

Soots

Iron and steel founding

Bitumen

Mineral oils

Shale-oil

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Steel industry

Carbon electrode production

Tar distillation

Aluminium smelter

Creosote impregnation

Engine exhausts

Chimney sweeping

Iron foundry

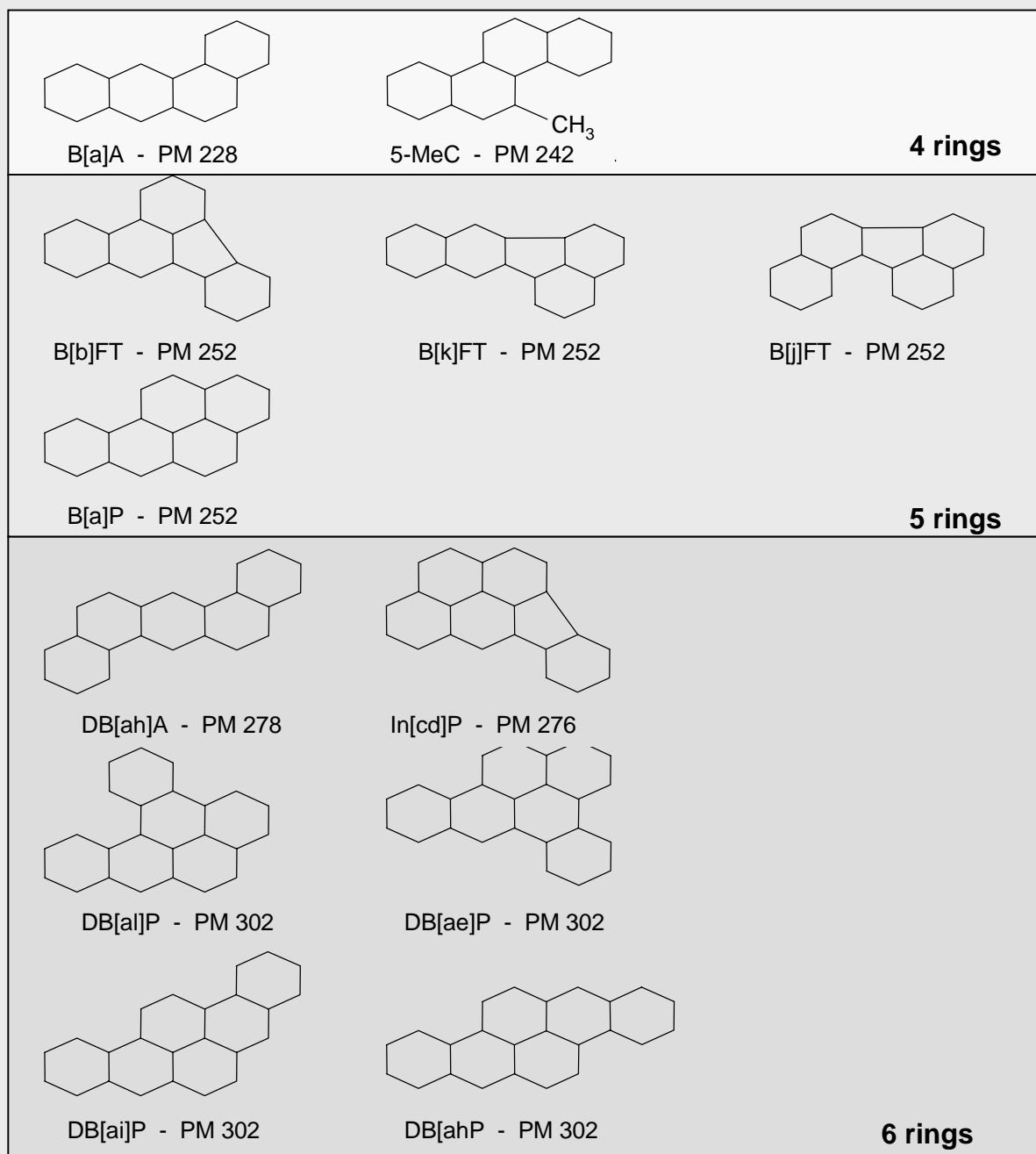
Road paving

Car repair

Petrochemical plant

Waste incineration

High Molecular Weight PAH



IARC classification of mixtures and pure substances

Group 1	Group 2A	Group 2B
Coal tar pitch	BaA	BjFT
Coal tar	BaP	Carbon black extr
Coke prod.	Creosote	DBahACR
Mineral oil	DBahA	5-MeC
Schale oil		4-NitroF
Soot		1-NitroP
Tobacco smoke		1,6-DinitroP

Various ACGIH TLVs for PAH containing materials

	TWA	Nota	Based on critical effects
Asphalt (petroleum) fumes	5 mg/m ³	A4	irritation, lung, burns
* Intended for change 1999	0.5 mg/m ³ *	A4	
CTPV BSF	0.2 mg/m ³	A1	cancer
Particulate PAH			
Oil mist, 15 PAH listed as carc	5 µg/m ³ *	A1	lung ; cancer
Carbon black	3.5 mg/m ³	A4	lung
Naphthalene	52 mg/m ³ ;	A4	irritation, ocular, blood
	STEL : 79 mg/m ³		
Chrysene	no	A3	skin
BaA	no	A2	cancer
BbFT	no	A2	cancer
BaP	no	A2	cancer

PEL for PAH as BaP in various countries

	BaP $\mu\text{g}/\text{m}^3$	
CH	2	
D	5 tar pitch	2 other places
NL	2	
S	5	
SF	10	
F	0.15	
Russia	0.15	

Concept TEF « Toxic Equivalency Factor »

- Equitoxicity
- Use of existing data and scientific judgment:

The toxicity of a PAH congener is quantitatively expressed in terms of equivalent of concentration that is necessary to yield a similar biological effect.

TEF for low MW PAH

PAH	TEF (Nisbet & LaGoy) PEF (Collins)
Naph	0.001
AcNThy	0.001
AcNTh	0.001
F	0.001
PH	0.001
A	0.01
FT	0.001
P	0.001
Cyclopenta[c,d]P	No
BaA	0.1
C	0.01
BbFT	0.1
BkFT	0.1

TEF for High Molecular Weigh PAH

	Noms	PM	FET
HAP	Benzo[a]anthracene	228	0.1
	5-Methyl chrysene	242	1.0
	Benzo[b]fluoranthene	252	0.1
	Benzo[k]fluoranthene	252	0.1
	Benzo[j]fluoranthene	252	0.1
	Benzo[a]pyrene	252	1.0
	Indeno[1,2,3-cd]pyrene	276	0.1
	Dibenzo[a,h]anthracene	278	1.0
	Dibenzo[a,l]pyrene	302	10.0
	Dibenzo[a,e]pyrene	302	1.0
	Dibenzo[a,i]pyrene	302	10.0
	Dibenzp[a,h]pyrene	302	10.0
HANP	Dibenzo[a,h]acridine	279	0.1
	Dibenzo[a,j]acridine	279	0.1
	7H-Dibenzo[c,g]carbazole	267	1.0

Ref: J.F. Collins et al. Regulatory Tox & Pharmacol. 28, 45-54 (1998)

Proposed guide OEL for PAH using TEF

An indicative OEL value for atmospheric PAH applying the concept of TEF is derived as the sum of BaP equivalent concentration from all individual congeners.

This total BaP equivalent would be more protective for the exposed workers