

OCCUPATIONAL EXPOSURE AS A FIREFIGHTER

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Table S1.14 Levels of carbon monoxide, polycyclic aromatic hydrocarbons, particulate matter, and volatile and semi-volatile organic compounds measured at vehicle fires

Sample type	Type of fire (n, no. of firefighters)	Sampling period	No. of fires (sampling duration)	Units	Mean (range)	Location	Reference
<i>Carbon monoxide (CO)</i>							
Ambient air	Vehicle fire – training burn Structure fire – garage including 3 vehicles	August 2016 to February 2017	3 events	mg/m ³	(ND–4.6) (ND–3.44)	South Florida, USA	Caban-Martinez et al. (2018)
<i>Polycyclic aromatic hydrocarbons) PAHs</i>							
Personal air	Vehicle fire – suppression training exercises (n = 19)	NR	(10 min)	µg/m ³	<i>Engine fire</i> Naphthalene: (930–2400) <i>Cabin fire</i> Naphthalene: (170–1200)	Ohio, USA	Fent & Evans (2011)
<i>Particulate matter (PM)</i>							
Personal air	Vehicle fire – suppression training (n = 19)	NR	6 events (15 min)	mg/m ³	<i>Engine fire</i> Respirable PM: 0.36 (0.22–0.53) 76 ^a <i>Cabin fire</i> Respirable PM: 2.7 (0.13–5.9) 170 ^a	Ohio, USA	Evans & Fent (2015)
				10 ³ × number/cm ³	<i>Engine fire</i> 54 (53–56) 2950 ^a <i>Cabin fire</i> 204 (89–324) 12 100 ^a		
Personal air	Vehicle fire – experimental fire	NR	1 (30 min)	number/cm ³	1.96 × 10 ⁴	Ohio, USA	Baxter et al. (2010)
<i>Volatile and semi-volatile organic compounds (VOCs and sVOCs)</i>							
Ambient air	Vehicle fire – training burns Vehicle fire Structure fire – garage including vehicles	August 2016 to February 2017	3 events	ppm	Total VOCs: (1.5–10) Total VOCs: 1.5 Total VOCs: (5–10)	South Florida, USA	Caban-Martinez et al. (2018)
Personal air	Vehicle fire – suppression training (n = 19)	NR	3 (10 min)	mg/m ³	<i>Engine fire</i> Acetone (0.40 ^b –3.8 ^d) Acetonitrile (0.12 ^c –0.70 ^d) Acrolein (0.35 ^c –1.4 ^d) Acrylonitrile (< 0.026 ^c –0.77 ^d)	Ohio, USA	Fent & Evans (2011)

Table S1.14 (continued)

Sample type	Type of fire (<i>n</i> , no. of firefighters)	Sampling period	No. of fires (sampling duration)	Units	Mean (range)	Location	Reference
Personal air (cont.)					Benzene (1.6 ^c –11 ^d) 1,3-Butadiene (0.40 ^c –4.8 ^d) Chloromethane (0.17 ^c –1.2 ^d) Dichlorodifluoromethane (2.4 ^c –48 ^d) Ethylbenzene (0.15 ^b –2.2 ^c) Naphthalene (0.93 ^c –2.4 ^b) Propene (0.91 ^c –11 ^d) Styrene (0.83 ^b –3.3 ^c) Toluene (1.4 ^b –9.3 ^c) 1,2,4-Trimethylbenzene (0.070 ^b –4.2 ^c) <i>m,p,o</i> -Xylenes (0.35 ^b –9.1 ^c) <i>Cabin fire</i> Acetone (0.30 ^d –12 ^b) Acetonitrile (0.034 ^d –14 ^b) Acrolein (0.048 ^c –15 ^b) Acrylonitrile (0.066 ^d –27 ^b) Benzene (0.38 ^d –60 ^b) 1,3-Butadiene (0.049 ^d –6.8 ^b) Chloromethane (0.046 ^d –11 ^b) Dichlorodifluoromethane (0.0059 ^d – < 0.087 ^b) Ethylbenzene (0.12 ^d –1.4 ^b) Naphthalene (0.17 ^d –10 ^b) Propene (0.16 ^d –18 ^b) Styrene (0.45 ^d –314 ^b) Toluene (0.95 ^d –10 ^b) 1,2,4-Trimethylbenzene (0.10 ^d –0.70 ^c) <i>m,p,o</i> -Xylenes (0.45 ^d –2.7 ^c)		Fent & Evans (2011) (cont.)

CO, carbon monoxide; ND, not detected; NR, not reported; PAH, polycyclic aromatic hydrocarbon; PM, particulate matter; ppm, parts per million; sVOC, semi-volatile organic compound; VOC, volatile organic compound.

^a Maximum peak value.

^b Start-up.

^c Knockdown.

^d Overhaul.

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