

**Table 3-16b. Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by major industry division, MSHA and OSHA samples, 1979-1999**

Industry Division		OSHA PEL: see note										OSHA PEL = 0.1 mg/m <sup>3</sup>				OSHA PEL: see note						
		1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
<b>Construction SIC 15-17</b>	GM (mg/m <sup>3</sup> )	0.100	0.133	0.044	0.045	0.074	0.089	0.156	0.048	0.084	0.058	0.015	0.079	0.068	0.037	0.054	0.057	0.037	0.145	0.050	0.111	0.072
	No. of samples	24	71	26	36	56	44	57	33	42	35	15	36	43	65	29	21	31	56	103	138	165
	% > PEL	50.0	59.2	38.5	27.8	41.1	45.5	59.6	36.4	47.6	45.7	13.3	33.3	32.6	23.1	34.5	38.1	25.8	50.0	34.0	51.4	47.3
	% > REL	58.3	67.6	50.0	44.4	64.3	52.3	64.9	39.4	64.3	51.4	20.0	52.8	39.5	35.4	55.2	61.9	29.0	62.5	47.6	63.0	58.2
<b>Manufacturing SIC 20-39</b>	GM (mg/m <sup>3</sup> )	0.045	0.041	0.048	0.044	0.037	0.040	0.045	0.037	0.031	0.035	0.020	0.032	0.035	0.025	0.027	0.030	0.031	0.029	0.034	0.050	0.056
	No. of samples	745	1,394	1,269	1,298	1,065	852	1,075	715	744	644	527	641	595	606	422	346	299	277	400	606	653
	% > PEL	30.3	30.8	33.2	30.5	26.9	31.9	34.3	27.3	26.5	30.7	16.1	20.1	22.2	13.5	18.2	24.3	24.7	23.8	26.0	37.8	38.3
	% > REL	49.1	47.5	50.9	48.7	42.4	46.8	50.3	39.9	38.4	42.9	28.1	39.2	42.0	32.2	30.1	39.0	36.8	30.7	36.0	52.1	56.4
<b>Metal/ Nonmetal Mining SIC 10, 14</b>	GM (mg/m <sup>3</sup> )	0.017	0.015	0.014	0.012	0.012	0.011	0.012	0.012	0.009	0.016	0.014	0.011	0.009	0.010	0.008	0.007	0.007	0.008	0.008	0.011	0.011
	No. of samples	9,038	6,001	6,299	2,553	6,048	7,118	6,002	6,625	6,069	7,062	8,307	10,512	12,495	12,244	10,382	15,940	12,594	16,253	7,893	4,615	4,974
	% > PEL	11.7	11.1	11.7	11.1	10.5	10.2	10.2	10.3	7.7	17.7	14.7	11.1	9.4	9.2	7.3	5.6	5.5	6.2	6.4	6.7	8.0
	% > REL	17.3	17.7	17.8	16.8	16.5	15.4	15.4	16.5	11.5	26.6	22.1	16.7	14.2	14.7	11.3	8.6	8.4	9.2	10.2	12.7	15.9
<b>Other SIC 1-9, 13, 40-99</b>	GM (mg/m <sup>3</sup> )	0.029	0.026	0.027	0.033	0.016	0.015	0.060	0.026	0.092	0.032	0.028	0.041	0.015	0.015	0.011	0.030	0.024	0.018	0.036	0.065	0.022
	No. of samples	36	36	15	15	30	46	26	39	71	62	56	31	48	40	22	33	26	41	29	26	49
	% > PEL	13.9	16.7	13.3	20.0	10.0	13.0	38.5	28.2	52.1	30.6	28.6	38.7	6.3	7.5	4.5	15.2	26.9	12.2	20.7	30.8	20.4
	% > REL	36.1	22.2	26.7	26.7	20.0	21.7	61.5	35.9	60.6	40.3	33.9	41.9	22.9	12.5	9.1	27.3	26.9	19.5	27.6	57.7	24.5

SIC - Standard Industrial Classification      PEL - permissible exposure limit      REL - recommended exposure limit      GM - geometric mean      mg/m<sup>3</sup> - milligrams per cubic meter  
 NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(10 mg/m<sup>3</sup>) / (% quartz + 2)], for respirable dust containing at least 1 percent quartz. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.1 mg/m<sup>3</sup> for respirable quartz. For metal/nonmetal mining, the MSHA PEL is [(10 mg/m<sup>3</sup>) / (% quartz+2)] for respirable dust containing at least 1 percent quartz. The NIOSH REL is 0.05 mg/m<sup>3</sup>. See appendices for source description, methods, and agents.

SOURCE: Mine Safety and Health Administration (MSHA) metal/nonmetal mine data. Occupational Safety and Health Administration (OSHA) Integrated Management Information System.