

Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by major industry division, MSHA and OSHA samples, 1979–2003

OSHA PEL (mg/m ³)	Year	Construction (SIC 15–17)				Manufacturing (SIC 20–39)				Metal/Nonmetal Mining (SIC 10, 14)				Other (SIC 1–9, 13, 40–99)			
		GM (mg/m ³)	No. of Samples	PEL	% > PEL	GM (mg/m ³)	No. of Samples	PEL	% > PEL	GM (mg/m ³)	No. of Samples	PEL*	% > PEL	GM (mg/m ³)	No. of Samples	PEL	% > PEL
	1979	0.118	27	55.6	63.0	0.045	763	30.0	49.0	0.017	9,038	11.7	17.3	0.029	36	13.9	36.1
	1980	0.133	71	59.2	67.6	0.041	1,394	30.8	47.5	0.015	6,001	11.2	17.7	0.026	36	16.7	22.2
	1981	0.044	26	38.5	50.0	0.048	1,269	33.2	50.9	0.014	6,299	11.7	17.8	0.027	15	13.3	26.7
	1982	0.045	36	27.8	44.4	0.044	1,298	30.5	48.7	0.013	2,553	11.1	16.8	0.033	15	20.0	26.7
See note	1983	0.074	56	41.1	64.3	0.037	1,067	26.9	42.4	0.012	6,048	10.5	16.5	0.016	30	10.0	20.0
	1984	0.089	43	44.2	51.2	0.041	863	32.3	47.5	0.011	7,118	10.2	15.4	0.015	43	14.0	23.3
	1985	0.156	57	59.6	64.9	0.043	1,144	33.6	48.9	0.012	6,002	10.3	15.4	0.055	26	38.5	57.7
	1986	0.045	35	34.3	37.1	0.036	719	26.7	39.5	0.012	6,625	10.3	16.5	0.028	40	27.5	37.5
	1987	0.089	39	51.3	64.1	0.029	804	24.9	36.6	0.009	6,069	7.8	11.5	0.077	79	50.6	58.2
	1988	0.042	44	38.6	43.2	0.032	720	28.9	40.4	0.017	7,062	17.8	26.7	0.031	75	30.7	38.7
	1989	0.014	16	12.5	18.8	0.018	644	14.0	25.0	0.014	8,307	14.7	22.1	0.023	70	22.9	28.6
0.1	1990	0.073	41	31.7	48.8	0.033	808	21.9	40.1	0.011	10,512	11.1	16.7	0.036	43	27.9	37.2
	1991	0.069	44	31.8	40.9	0.033	757	21.3	39.8	0.010	12,495	9.4	14.2	0.014	51	3.9	21.6
	1992	0.037	65	23.1	35.4	0.027	720	14.4	33.1	0.010	12,244	9.2	14.7	0.015	43	7.0	11.6
	1993	0.055	30	33.3	56.7	0.028	525	18.1	31.6	0.008	10,382	7.3	11.3	0.011	34	2.9	8.8
	1994	0.057	21	38.1	61.9	0.028	439	23.5	35.8	0.007	15,940	5.6	8.6	0.017	55	9.1	12.7
	1995	0.035	36	25.0	27.8	0.029	410	23.9	36.3	0.007	12,594	5.5	8.4	0.032	43	27.9	30.2
	1996	0.126	67	49.3	62.7	0.023	435	18.6	26.0	0.008	16,251	6.2	9.2	0.017	48	10.4	16.7
See note	1997	0.047	109	33.0	46.8	0.029	536	22.9	34.7	0.008	7,855	6.4	10.2	0.031	38	15.8	23.7
	1998	0.109	143	51.7	62.9	0.046	678	36.0	50.1	0.011	4,488	6.6	12.7	0.068	28	32.1	60.7
	1999	0.076	171	48.5	59.1	0.053	665	36.2	54.7	0.012	4,883	8.0	15.9	0.022	52	21.2	25.0
	2000	0.058	131	40.5	48.1	0.028	422	19.0	31.3	0.010	8,406	5.7	10.8	0.049	24	33.3	33.3
	2001	0.030	136	25.7	36.0	0.029	346	21.7	31.5	0.010	6,133	6.8	13.6	0.029	35	11.4	22.9
	2002	0.046	133	24.1	41.4	0.038	290	26.6	38.3	0.010	7,463	5.6	11.7	0.024	40	17.5	30.0
	2003	0.052	96	35.4	43.8	0.041	328	30.5	41.2	0.010	8,932	6.1	11.7	0.021	34	14.7	23.5

SIC - Standard Industrial Classification PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean mg/m³ - milligrams per cubic meter

MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration

*For metal/nonmetal mining, the MSHA PEL is [(10 mg/m³) / (% quartz+2)] for respirable dust containing at least 1 percent quartz.

NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(10 mg/m³) / (% 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/m³ for respirable quartz. The NIOSH REL is 0.05 mg/m³. See appendices for source description, methods, and agents.

SOURCE: MSHA metal/nonmetal mine data. OSHA Integrated Management Information System.