

### Respirable cristobalite: Geometric mean exposures and percent exceeding designated occupational exposure limits, MSHA and OSHA samples, 1979–2003

OSHA PEL (mg/m <sup>3</sup> )	Year	Cristobalite, respirable - MSHA				Cristobalite, respirable - OSHA			
		GM (mg/m <sup>3</sup> )	No. of Samples	% > PEL	% > REL	GM (mg/m <sup>3</sup> )	No. of Samples	% > PEL	% > REL
See note	1979	0.056	12	58.3	50.0	0.030	34	14.7	14.7
	1980	0.050	53	54.7	43.4	0.020	193	0.0	0.0
	1981	0.032	21	42.9	28.6	0.022	101	3.0	3.0
	1982	0.060	5	100.0	60.0	0.022	84	4.8	4.8
	1983	0.039	34	44.1	23.5	0.027	26	7.7	7.7
	1984	0.036	26	23.1	15.4	0.020	68	1.5	1.5
	1985	0.025	23	26.1	13.0	0.025	116	9.5	8.6
	1986	0.026	10	10.0	10.0	0.021	78	2.6	2.6
	1987	0.032	14	14.3	14.3	0.020	72	1.4	1.4
	1988	0.028	22	31.8	22.7	0.019	82	1.2	1.2
0.05	1989	0.033	28	28.6	21.4	0.020	127	1.6	1.6
	1990	0.038	19	52.6	36.8	0.020	124	4.0	4.0
	1991	0.029	13	46.2	30.8	0.023	73	6.8	6.8
	1992	0.021	22	9.1	0.0	0.020	179	1.7	1.7
See note	1993	0.032	23	30.4	26.1	0.021	82	3.7	3.7
	1994	0.066	12	66.7	50.0	0.028	66	15.2	15.2
	1995	0.033	3	0.0	0.0	0.023	54	11.1	11.1
	1996	0.020	12	8.3	8.3	0.022	45	4.4	4.4
	1997	0.030	7	28.6	28.6	0.020	84	4.8	3.6
	1998	0.015	5	0.0	0.0	0.019	32	0.0	0.0
	1999	0.010	1	0.0	0.0	0.021	54	7.4	7.4
	2000	0.031	8	50.0	50.0	0.025	60	13.3	13.3
	2001	0.020	1	0.0	0.0	0.027	40	15.0	15.0
	2002	0.000	0	-	-	0.024	25	4.0	4.0
	2003	0.036	10	20.0	20.0	0.027	50	10.0	10.0

- indicates incalculable field. PEL - permissible exposure limit REL - recommended exposure limit GM - geometric mean

mg/m<sup>3</sup> - milligrams per cubic meter MSHA - Mine Safety and Health Administration OSHA - Occupational Safety and Health Administration

NOTE: Before March 1, 1989 and after March 22, 1993, the OSHA PEL is [(5 mg/m<sup>3</sup>) / (% cristobalite + 2)], for respirable dust containing at least 1 percent cristobalite. From March 1, 1989 to March 22, 1993, the OSHA PEL was 0.05 mg/m<sup>3</sup> for respirable cristobalite. For metal/nonmetal mining, the MSHA PEL is [(5 mg/m<sup>3</sup>) / (% cristobalite + 2)] for respirable dust containing at least 1 percent cristobalite. The NIOSH REL is 0.05 mg/m<sup>3</sup>. See appendices for source description and methods.

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