

Table 3-19 (page 1 of 2). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA metal/nonmetal mine district and state, MSHA samples, 1979-1999

MSHA Metal/Nonmetal Mine District	All years		1979 - 1988				1989 - 1992				1993 - 1999			
	No. of Samples	GM (mg/m ³)	No. of Samples	GM (mg/m ³)	% > PEL	% > REL	No. of Samples	GM (mg/m ³)	% > PEL	% > REL	No. of Samples	GM (mg/m ³)	% > PEL	% > REL
Northeast	26,788	0.011	8,979	0.015	12.4	17.4	6,060	0.011	9.9	16.1	11,749	0.009	6.5	10.9
Connecticut	718	0.013	285	0.027	26.3	38.2	156	0.013	13.5	23.1	277	0.006	2.5	5.1
Delaware	91	0.005	17	0.006	0.0	0.0	33	0.005	0.0	3.0	41	0.004	4.9	0.0
District of Columbia	0	-	0	-	-	-	0	-	-	-	0	-	-	-
Maine	623	0.012	199	0.025	16.6	24.6	169	0.009	3.0	7.7	255	0.009	4.3	9.8
Maryland	1,440	0.008	518	0.009	4.2	8.1	314	0.007	2.9	7.0	608	0.007	2.6	6.3
Massachusetts	1,280	0.013	476	0.025	17.4	28.6	250	0.010	9.6	16.0	554	0.008	3.6	7.0
New Hampshire	497	0.014	131	0.028	15.3	33.6	133	0.010	7.5	16.5	233	0.012	7.7	12.9
New Jersey	2,524	0.012	992	0.020	17.5	27.5	623	0.012	12.4	20.1	909	0.007	4.2	8.0
New York	6,153	0.010	1,875	0.014	11.4	17.0	1,649	0.009	6.2	11.8	2,629	0.008	5.6	9.7
Pennsylvania	6,344	0.012	2,324	0.014	9.3	15.2	1,212	0.014	13.8	20.5	2,808	0.010	8.1	12.5
Rhode Island	201	0.018	57	0.030	22.8	36.8	35	0.014	8.6	25.7	109	0.015	16.5	25.7
Vermont	1,435	0.016	372	0.019	22.0	31.5	334	0.013	19.2	26.3	729	0.016	19.5	29.8
Virginia	4,009	0.008	1,126	0.011	6.6	12.0	808	0.009	8.5	13.2	2,075	0.007	4.2	7.4
West Virginia	1,473	0.013	607	0.018	17.5	24.4	344	0.015	13.7	19.8	522	0.009	6.9	10.5
Southeast	37,427	0.008	13,902	0.010	7.5	12.4	9,250	0.008	8.2	12.8	14,275	0.007	4.9	8.2
Alabama	3,246	0.007	1,034	0.007	4.2	6.6	876	0.007	8.0	11.9	1,336	0.007	6.3	9.6
Florida	2,998	0.005	830	0.006	3.7	7.1	827	0.005	2.2	5.0	1,341	0.004	1.3	2.3
Georgia	6,163	0.010	2,464	0.014	11.0	19.6	1,567	0.010	10.6	15.3	2,132	0.007	5.3	7.7
Kentucky	2,424	0.008	943	0.009	7.5	10.4	480	0.008	9.4	11.0	1,001	0.006	3.7	5.7
Mississippi	1,690	0.008	273	0.007	4.4	6.6	476	0.007	5.5	8.2	941	0.009	7.0	11.8
North Carolina	8,090	0.008	3,347	0.010	6.4	11.4	2,166	0.008	6.7	11.1	2,577	0.006	3.8	6.9
Puerto Rico	1,237	0.005	586	0.004	0.9	0.2	29	0.007	3.4	10.3	622	0.005	3.1	3.1
South Carolina	4,011	0.009	1,054	0.016	17.3	27.6	1,130	0.009	9.7	16.1	1,827	0.007	3.6	7.7
Tennessee	7,490	0.009	3,327	0.009	6.3	9.9	1,698	0.010	10.5	16.3	2,465	0.009	7.8	13.8
Virgin Islands	78	0.006	44	0.004	0.0	0.0	1	0.010	0.0	0.0	33	0.011	3.0	9.1
North Central	35,491	0.009	12,515	0.011	9.3	13.8	8,549	0.011	10.8	15.8	14,427	0.008	5.2	8.9
Illinois	6,542	0.011	2,796	0.014	16.3	21.0	1,387	0.011	13.0	19.3	2,359	0.007	4.7	8.3
Indiana	4,021	0.007	1,174	0.007	2.9	3.3	917	0.007	4.5	6.0	1,930	0.006	3.0	5.0
Iowa	2,118	0.006	675	0.007	4.9	5.0	570	0.006	5.3	4.9	873	0.005	1.5	1.8
Michigan	5,112	0.011	1,397	0.012	8.4	15.3	1,459	0.013	14.3	19.9	2,256	0.009	6.8	11.3
Minnesota	6,982	0.010	3,402	0.010	5.7	10.6	1,475	0.012	10.5	17.0	2,105	0.008	5.4	8.7
Ohio	6,034	0.010	1,361	0.013	13.2	19.2	1,710	0.010	9.0	14.4	2,963	0.008	6.7	11.8
Wisconsin	4,682	0.010	1,710	0.011	8.8	13.3	1,031	0.013	14.9	20.5	1,941	0.008	5.6	9.9

See footnotes at end of table.

Table 3-19 (page 2 of 2). Respirable quartz: Geometric mean exposures and percent exceeding designated occupational exposure limits by MSHA metal/nonmetal mine district and state, MSHA samples, 1979-1999

MSHA Metal/Nonmetal Mine District	All years		1979 - 1988				1989 - 1992				1993 - 1999			
	No. of Samples	GM (mg/m ³)	No. of Samples	GM (mg/m ³)	% > PEL	% > REL	No. of Samples	GM (mg/m ³)	% > PEL	% > REL	No. of Samples	GM (mg/m ³)	% > PEL	% > REL
South Central	31,305	0.009	7,465	0.013	13.0	17.6	9,403	0.009	9.5	13.7	14,437	0.007	5.5	7.9
Arkansas	2,396	0.015	544	0.038	31.6	45.8	660	0.017	16.7	28.5	1,192	0.009	7.9	13.8
Louisiana	2,421	0.006	279	0.007	7.2	11.8	716	0.005	4.2	6.3	1,426	0.006	4.3	7.6
Missouri	7,486	0.010	2,347	0.013	13.0	16.4	2,008	0.011	11.6	15.1	3,131	0.007	5.0	7.5
New Mexico	3,729	0.013	1,013	0.014	14.4	19.7	1,059	0.015	13.1	21.1	1,657	0.011	11.9	16.0
Oklahoma	4,890	0.009	1,570	0.011	9.9	13.2	1,340	0.011	10.9	16.6	1,980	0.007	4.3	7.7
Texas	10,383	0.007	1,712	0.011	10.0	14.1	3,620	0.007	6.4	8.4	5,051	0.006	4.0	4.4
Rocky Mountain	31,645	0.015	15,364	0.017	14.5	22.2	5,927	0.017	16.7	26.2	10,354	0.012	10.5	16.6
Arizona	5,176	0.017	2,380	0.023	18.0	27.1	717	0.019	18.8	29.0	2,079	0.011	9.8	15.3
Colorado	6,090	0.015	3,459	0.014	12.5	19.9	1,168	0.019	17.4	27.6	1,463	0.017	12.5	23.3
Kansas	2,713	0.011	1,280	0.013	12.3	14.1	542	0.011	9.8	12.5	891	0.009	7.2	8.3
Montana	2,930	0.014	1,370	0.012	10.4	15.3	667	0.023	22.5	33.7	893	0.013	11.8	19.6
Nebraska	780	0.006	53	0.006	5.7	5.7	254	0.006	2.8	4.7	473	0.005	1.9	2.5
Nevada	3,649	0.020	1,224	0.025	24.4	33.7	1,032	0.021	20.4	31.8	1,393	0.017	15.9	25.8
North Dakota	527	0.010	194	0.014	12.9	18.6	72	0.009	1.4	11.1	261	0.008	2.3	7.7
South Dakota	2,536	0.015	1,597	0.018	13.2	23.0	281	0.013	9.3	16.0	658	0.010	8.1	12.8
Utah	4,183	0.015	2,083	0.014	12.6	20.0	889	0.020	18.1	30.4	1,211	0.013	9.7	18.3
Wyoming	3,061	0.014	1,724	0.020	15.1	26.4	305	0.013	13.8	21.0	1,032	0.008	12.5	11.0
Western	16,368	0.011	4,590	0.016	13.5	20.7	4,369	0.013	12.1	19.1	7,409	0.008	6.0	9.2
Alaska	326	0.016	88	0.024	21.6	28.4	33	0.053	24.2	39.4	205	0.011	8.3	15.6
California	7,453	0.013	2,326	0.018	15.2	23.3	2,425	0.014	12.0	21.0	2,702	0.009	7.9	11.7
Hawaii	265	0.004	11	0.005	0.0	0.0	57	0.005	3.5	1.8	197	0.004	1.0	1.0
Idaho	2,609	0.015	912	0.022	15.9	26.1	534	0.017	17.0	27.2	1,163	0.010	7.6	14.3
Oregon	2,685	0.006	413	0.007	4.1	6.3	698	0.007	7.4	8.0	1,574	0.005	1.9	1.8
Washington	3,030	0.009	840	0.011	10.1	13.8	622	0.011	13.3	17.8	1,568	0.007	6.0	8.5
TOTAL	179,024	0.010	62,815	0.013	11.3	17.3	43,558	0.011	10.8	16.5	72,651	0.008	6.3	10.0

- indicates incalculable field

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

NOTE: For metal/nonmetal mining, the MSHA PEL is [(10 mg/m³) / (% quartz+2)] for respirable dust containing at least 1 percent quartz. The NIOSH REL is 0.05 mg/m³. See appendices for source description, methods, and agents.

SOURCE: Mine Safety and Health Administration (MSHA) metal/nonmetal mine data.