

**Respirable quartz: Number of samples, geometric mean exposures, and percent exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1993–2003 (page 1 of 2)**

<b>CIC</b>	<b>Industry</b>	<b>Number of Samples</b>	<b>GM (mg/m<sup>3</sup>)</b>	<b>% &gt; PEL</b>	<b>% &gt; REL</b>
892	Miscellaneous professional and related services	10	0.679	60.0	60.0
311	Farm machinery and equipment	32	0.059	50.0	59.4
271	Iron and steel foundries	1,625	0.049	33.9	50.0
060	Construction	1,073	0.059	37.9	49.7
331	Machinery, except electrical, n.e.c.	182	0.045	35.7	49.5
282	Fabricated structural metal products	126	0.073	37.3	47.6
530	Machinery, equipment, and supplies	19	0.051	21.1	47.4
360	Ship and boat building and repairing	13	0.098	46.2	46.2
751	Automotive repair and related services	24	0.068	41.7	45.8
262	Miscellaneous nonmetallic mineral and stone products	581	0.041	28.6	45.4
252	Structural clay products	245	0.038	29.8	45.3
261	Pottery and related products	157	0.043	26.1	45.2
041	Coal mining	103,326	0.040	21.1 <sup>†</sup>	‡
211	Other rubber products, and plastics footwear and belting	41	0.027	26.8	41.5
351	Motor vehicles and motor vehicle equipment	98	0.030	30.6	38.8
300	Miscellaneous fabricated metal products	207	0.039	28.0	36.2
502	Lumber and construction materials	42	0.035	19.0	33.3
312	Construction and material handling machines	29	0.034	20.7	31.0
250	Glass and glass products	73	0.018	17.8	28.8
191	Agricultural chemicals	21	0.023	14.3	28.6
280	Other primary metal industries	213	0.024	19.2	27.7
251	Cement, concrete, gypsum, and plaster products	550	0.022	17.8	26.7
231	Sawmills, planing mills, and millwork	19	0.025	26.3	26.3
760	Miscellaneous repair services	29	0.023	17.2	24.1
371	Scientific and controlling instruments	13	0.017	15.4	23.1
682	Miscellaneous retail stores	13	0.020	15.4	23.1
212	Miscellaneous plastics products	57	0.016	8.8	22.8
190	Paints, varnishes, and related products	27	0.016	14.8	22.2
372	Medical, dental, optical instruments and supplies	18	0.014	16.7	22.2

See footnotes at end of table.

**Respirable quartz: Number of samples, geometric mean exposures, and percent exceeding designated occupational exposure limits by industry, MSHA inspector and mine operator and OSHA samples, 1993–2003 (page 2 of 2)**

CIC	Industry	Number of Samples	GM (mg/m <sup>3</sup> )	% > PEL	% > REL
391	Miscellaneous manufacturing industries	74	0.020	10.8	21.6
471	Sanitary services	33	0.023	12.1	21.2
272	Primary aluminum industries	194	0.019	11.9	21.1
180	Plastics, synthetics, and resins	20	0.014	10.0	20.0
531	Scrap and waste materials	20	0.018	10.0	20.0
990	Industry not reported	71	0.011	11.3	19.7
241	Miscellaneous wood products	21	0.016	4.8	19.0
192	Industrial and miscellaneous chemicals	103	0.019	12.6	18.4
040	Metal mining	6,590	0.012	10.2	16.9
232	Wood buildings and mobile homes	12	0.016	16.7	16.7
411	Warehousing and storage	13	0.017	15.4	15.4
201	Miscellaneous petroleum and coal products	54	0.013	9.3	14.8
270	Blast furnaces, steelworks, rolling and finishing mill	32	0.016	9.4	12.5
291	Metal forgings and stampings	24	0.016	8.3	12.5
050	Nonmetallic mining and quarrying, except fuel	96,694	0.008	5.9	10.1
320	Metalworking machinery	35	0.010	5.7	8.6
580	Lumber and building material retailing	12	0.010	0.0	8.3
281	Cutlery, handtools, and general hardware	14	0.011	7.1	7.1
410	Trucking service	14	0.010	0.0	7.1
342	Electrical machinery, equipment, and supplies, n.e.c.	32	0.010	3.1	6.3
	All other industries*	324	0.016	10.8	16.4
<b>TOTAL</b>		<b>213,249</b>	<b>0.019</b>	<b>14.1</b>	<b>27.2</b>

CIC - Census Industry Code    PEL - permissible exposure limit    REL - recommended exposure limit    GM - geometric mean  
 mg/m<sup>3</sup> - milligrams per cubic meter    MRE - Mining Research Establishment    n.e.c. - not elsewhere classified

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

\* includes industries with no samples exceeding the REL or industries with less than 10 samples.

† Geometric mean reported in mg/m<sup>3</sup> MRE. Samples selected based on the respirable dust level and MSHA PEL (2 mg/m<sup>3</sup> MRE or adjusted PEL).

‡ The MSHA respirable coal mine quartz exposure data and the NIOSH REL for respirable quartz cannot be compared to each other because they are based on difference sampling criteria.

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 coal mining, the MSHA PEL is 2 mg/m<sup>3</sup> MRE for respirable dust containing less than or equal to 5 percent quartz. The PEL is adjusted using the formula [(10 mg/m<sup>3</sup> MRE) / (% quartz)] for respirable dust containing greater than 5 percent 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 industry codes.

SOURCE: MSHA metal/nonmetal and coal mine inspector and mine operator quartz data. OSHA Integrated Management Information System.