

Appendix B-1

Length and Width Distributions From Published Studies as Matched to Epidemiology Studies

Size Distribution References

| <i>Code</i> | <i>Full Reference</i> |
|-------------|---|
| D&H | Dement, JM and Harris, RL. 1979. NTIS PB80-149644. U.S. HEW Contract #78-2438. |
| H&G | Hwang, CY and Gibbs, GW. 1981. <i>Annals of Occupational Hygiene</i> , 24 (1): 23-41. |
| G&H | Gibbs, GW and Hwang, CY. 1980. In <i>Biological Effects of Mineral Fibres</i> (Edited by WAGNER, J. C), Vol. 1, pp 69-78. |
| Sebastien | Sebastien 1983. Analysis by analytical transmission electron microscopy of fibrous particles in Libby's air samples. Preliminary Results. |

Industry Descriptions

| Fiber Type | | Industry | |
|-------------------|-----------------|-----------------|-------------------|
| <i>Code</i> | <i>Desc.</i> | <i>Code</i> | <i>Desc.</i> |
| C | Chrysotile | T | Textiles |
| AM | Amosite | I | Insulation Mfg. |
| CR | Crocidolite | FP | Friction Products |
| LA | Libby Amphibole | CP | Cement Mfg. |
| TREM | Tremolite | M | Mining |
| ANTH | Anthophyllite | | |

Descriptions of sheets contained herein:

Decision Tree: Flow Chart for making decisions on matching TEM data sets to epidemiology studies

Study Selection Tool: Tool for matching TEM data sets to epidemiology studies based on mineral type and industry.

TEM Match: Summary of assigned TEM data sets to epidemiology studies.

D&H CT: Data sets from Dement and Harris (1979) for chrysotile textile production plants.

D&H CFP: Data sets from Dement and Harris (1979) for chrysotile friction product production plants.

D&H CCP: Data sets from Dement and Harris (1979) for chrysotile cement pipe production plants.

D&H AI: Data sets from Dement and Harris (1979) for amosite insulation manufacturing plants.

D&H TREM: Data sets from Dement and Harris (1979) for tremolite talc production at mines and mills.

D&H ANTH: Data sets from Dement and Harris (1979) for anthophyllite talc production at mines and mills.

G&H Raw Data: TEM data sets as reported in Gibbs and Hwang (1980) with calculated adjustment factors.

G&H Adjustments: TEM data reported in Gibbs and Hwang (1980) adjusted.

H&G CR: Data sets from Hwang and Gibbs (1981).

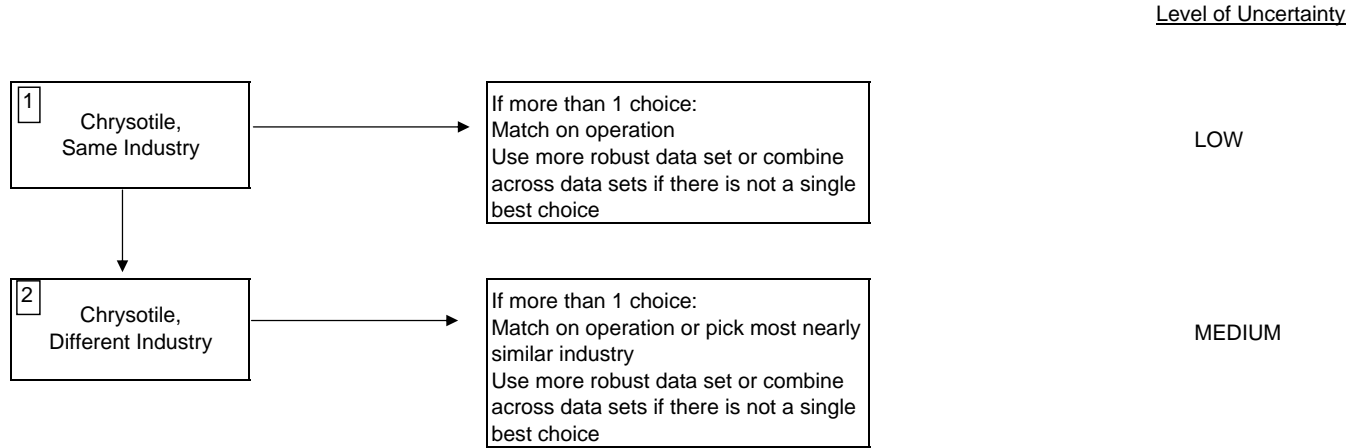
Sebastien_Libby: Data from Sebastien et al. (1983) for Libby, MT.

Lung Cancer Summary: Data sets chosen for application to epidemiology lung cancer data set.

Meso Summary: Data sets chosen for application to epidemiology mesothelioma data set.

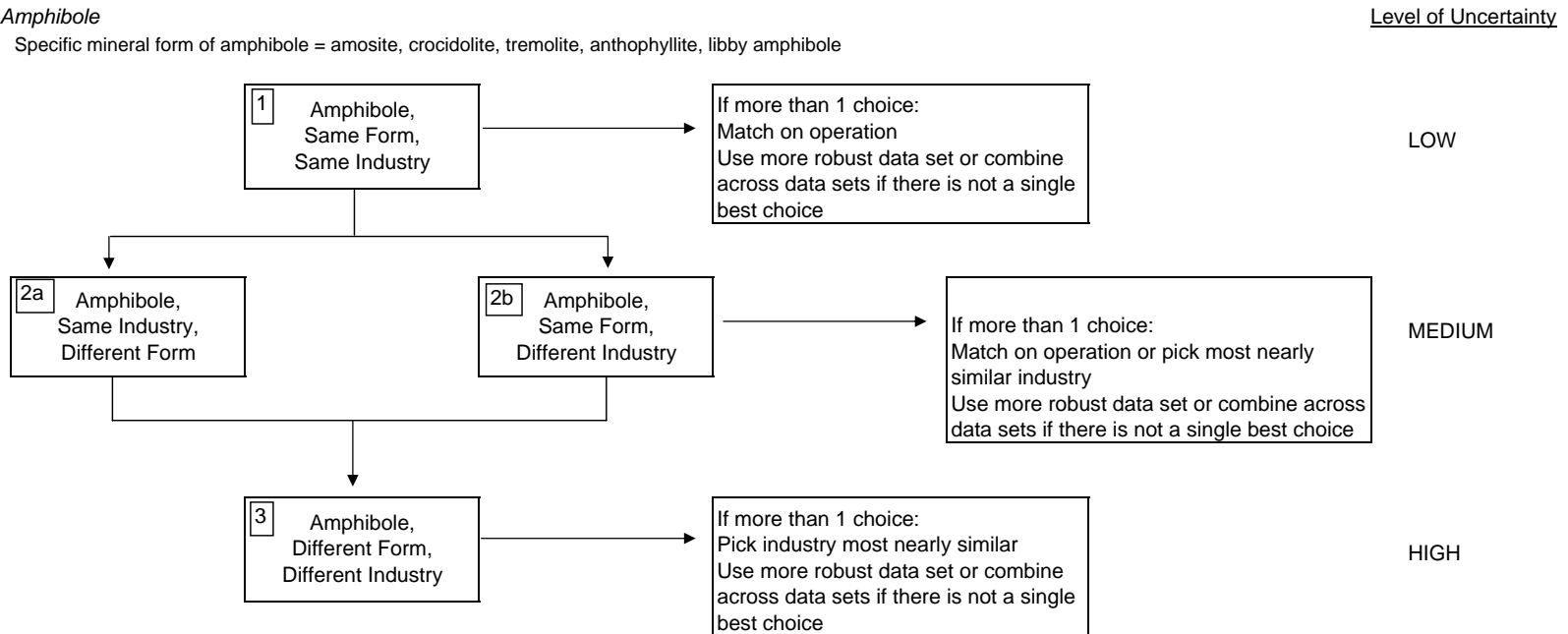
DECISION TREE FOR SELECTING TEM DATA SETS

Panel A: Chrysotile



Panel B: Amphibole

Form Specific mineral form of amphibole = amosite, crocidolite, tremolite, anthophyllite, libby amphibole



SPREADSHEET TOOL FOR SELECTING THE BEST TEM DATA MATCH TO AN EPIDEMIOLOGICAL WORKPLACE

Using the data filters:

- 1) In Column F, select the asbestos type (chrysotile or amphibole)
- 2) If amphibole, in column G, select the amphibole form
- 3) In column N, select the industry
- 4) If there is more than one set, select the set that is most relevant, or combine that data from all relevant sets

| Index | Reference | Notes | Data Source | | Mineral Type | Mineral Form | | Industry | Operation | Location |
|-------|------------------------|-------|-------------|--------------|--------------|-----------------|------------|---------------------|---|------------------------------|
| | | | | | | Primary | Secondary | | | |
| 1 | Gibbs and Hwang 1980 | 1 | Table 2 | Column 1 | Amphibole | Amosite | | Mining/milling | Mining | Transvaal, South Africa |
| 2 | Gibbs and Hwang 1980 | 1 | Table 2 | Column 2 | Amphibole | Amosite | | Mining/milling | Bagging | Transvaal, South Africa |
| 3 | Gibbs and Hwang 1980 | 1 | Table 2 | Column 3 | Amphibole | Crocidolite | | Mining/milling | Mining | Cape Province, South Africa |
| 4 | Gibbs and Hwang 1980 | 1 | Table 2 | Column 4 | Amphibole | Crocidolite | | Mining/milling | Bagging | Cape Province, South Africa |
| 5 | Gibbs and Hwang 1980 | 1 | Table 2 | Column 5 | Chrysotile | Chrysotile | | Mining/milling | Mining | Quebec, Canada |
| 6 | Gibbs and Hwang 1980 | 1 | Table 2 | Column 6 | Chrysotile | Chrysotile | | Mining/milling | Bagging | Quebec, Canada |
| 7 | Hwang and Gibbs 1981 | 2 | Table 3a | Left block | Amphibole | Crocidolite | | Mining/milling | Mining and milling (bagging, storage, crushing) | Cape Province, South Africa |
| 8 | Hwang and Gibbs 1981 | 2 | Table 3a | Center block | Amphibole | Crocidolite | | Cement pipe mfg | Preparation (Dumping/mixing) | South Africa (Cape asbestos) |
| 9 | Hwang and Gibbs 1981 | 2 | Table 3a | Right block | Amphibole | Crocidolite | Chrysotile | Cement pipe mfg | Finishing (cutting) | South Africa (Cape asbestos) |
| 10 | Hwang and Gibbs 1981 | 2 | Table 5 | Top block | Amphibole | Crocidolite | | Mining/milling | Mining | Cape Province, South Africa |
| 11 | Hwang and Gibbs 1981 | 2 | Table 5 | Middle block | Amphibole | Crocidolite | | Mining/milling | Bagging | Cape Province, South Africa |
| 12 | Hwang and Gibbs 1981 | 2 | Table 5 | Lower block | Amphibole | Crocidolite | | Cement pipe mfg | Dumping | South Africa (Cape asbestos) |
| 13 | Dement and Harris 1979 | 3 | Table C-1 | | Chrysotile | Chrysotile | | Textiles | Preparation | Unspecified location |
| 14 | Dement and Harris 1979 | 3 | Table C-2 | | Chrysotile | Chrysotile | | Textiles | Twisting | Unspecified location |
| 15 | Dement and Harris 1979 | 3 | Table C-3 | | Chrysotile | Chrysotile | | Textiles | Weaving | Unspecified location |
| 16 | Dement and Harris 1979 | 3 | Table C-4 | | Chrysotile | Chrysotile | | Friction Products | Mixing | Unspecified location |
| 17 | Dement and Harris 1979 | 3 | Table C-5 | | Chrysotile | Chrysotile | | Friction Products | Forming | Unspecified location |
| 18 | Dement and Harris 1979 | 3 | Table C-6 | | Chrysotile | Chrysotile | | Friction Products | Finishing | Unspecified location |
| 19 | Dement and Harris 1979 | 3 | Table C-7 | | Chrysotile | Chrysotile | | Cement pipe mfg | Mixing | Unspecified location |
| 20 | Dement and Harris 1979 | 3 | Table C-8 | | Chrysotile | Chrysotile | | Cement pipe mfg | Forming | Unspecified location |
| 21 | Dement and Harris 1979 | 3 | Table C-9 | | Chrysotile | Chrysotile | | Cement pipe mfg | Finishing | Unspecified location |
| 22 | Dement and Harris 1979 | 3 | Table C-10 | | Amphibole | Amosite | | Pipe insulation mfg | Mixing | Unspecified location |
| 23 | Dement and Harris 1979 | 3 | Table C-11 | | Amphibole | Amosite | | Pipe insulation mfg | Forming | Unspecified location |
| 24 | Dement and Harris 1979 | 3 | Table C-12 | | Amphibole | Amosite | | Pipe insulation mfg | Finishing | Unspecified location |
| 25 | Dement and Harris 1979 | 3 | Table C-13 | | Amphibole | Anthophyllite | | Talc Production | Mining/milling | Unspecified location |
| 26 | Dement and Harris 1979 | 3 | Table C-14 | | Amphibole | Anthophyllite | | Talc Production | Mining/milling | Unspecified location |
| 27 | Dement and Harris 1979 | 3 | Table C-15 | | Amphibole | Tremolite | | Talc Production | Mining/milling | Unspecified location |
| 28 | Sebastien 1983 | | Table II | | Amphibole | Libby Amphibole | | Mining/milling | Mining/milling | Libby, MT |

NOTES

- 1 AR ≥ 3:1
Length truncated at 20 um
No particles with D > 3
Min L = 0.5
Min D ≈ 0.01
- 2 AR ≥ 3:1
Small overestimate of fibers > 24 um
Bundles and aggregates counted as 1
- 3 AR ≥ 3:1
Samples collected by NIOSH during numerous field investigations between approximately 1971 and 1977.
All samples were personal breathing zone samples.
Midpoints of size intervals reported.
Midpoint of the largest interval was approximated by extrapolation based on a log-normal size distribution.

TEM DATA SETS MATCHED TO EPIDEMIOLOGY STUDIES

| Reference | Epidemiological Study | | | | Primary Asbestos Type | | | | Secondary Asbestos Type | | | | Notes |
|--|--|---|----------------------------|--------------------------------|-----------------------|--|-------------|-------------------------------------|--|-------------|-----|--|-------|
| | Industry | Activities of exposed cohort | Location | Source of Asbestos | Fiber Type | TEM Match | Uncertainty | Fiber Type | TEM Match | Uncertainty | | | |
| Berry & Newhouse 1983 | Friction Products | Coating, forming, machining | Britain, UK | NR | Chrysotile | D&H 1979 16,17,18 | Low | Crocidolite | H&G 1981 3,4,7,8,9, 10,11,12 | Medium | [1] | | |
| Hein et al. 2007 McDonald et al. 1983 | Textile Mfg. | Preparation, carding, spinning, spooling, twisting, winding, braiding, weaving, and finishing. | South Carolina, USA | Quebec and Rhodesia | Chrysotile | D&H 1979 13,14,15 | Low | Tremolite (amphibole contamination) | H&G 1981 27 | Medium | [1] | | |
| Henderson and Enterline 1979 | Mixed Industry | Amosite only (processes unknown) | United States | NR | Amosite | D&H 1979 22,23,24, 1,2 | Low | | | | | | |
| Henderson and Enterline 1979 | Mixed Industry | Chrysotile only (processes unknown) | United States | NR | Chrysotile | D&H 1979 G&H 1980 5,6,13,14, 15,16,17,18, 19,20,21 | Low | Tremolite (amphibole contamination) | D&H 1979 27 | Low | | | |
| Henderson and Enterline 1979 | Mixed Industry | Cement pipe mfg. (mixed asbestos types) | United States | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite | H&G 1981 8,9,12 | Low | [2] | | |
| Finkelstein 1984 | Asbestos Cement Mfg. | Mixing, forming, lathe | Ontario, Canada | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite | H&G 1981 8,9,12 | Low | | | |
| Hughes et al. 1987 | Asbestos Cement Mfg. | Flat shingle and corrugated sheet production | New Orleans, USA | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite & Amosite | H&G 1981 8,9,12, 1, 2, 22, 23, 24 | Medium | [2] | | |
| Hughes et al. 1987 | Asbestos Cement Mfg. | Asphalt roofing and flooring materials | New Orleans, USA | NR | Chrysotile | D&H 1979 19,20,21 | Low | Tremolite (amphibole contamination) | D&H 1979 27 | Medium | [1] | | |
| Hughes et al. 1987 | Asbestos Cement Mfg. | Pipe production | New Orleans, USA | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite | H&G 1981 8,9,12 | Low | | | |
| McDonald et al. 1993 | Mining and Milling | Mining and milling | Asbestos, Quebec | Asbestos, Quebec | Chrysotile | G&H 1980 5,6 | Low | Tremolite | D&H 1979 27 | Low | | | |
| McDonald et al. 1993 | Mining and Milling | Mining | Thetford, Quebec | Thetford, Quebec | Chrysotile | G&H 1980 5,6 | Low | Tremolite | D&H 1979 27 | Low | | | |
| McDonald et al. 1993 | Mining and Milling | Mining and milling | Asbestos, Quebec | Quebec | Chrysotile | G&H 1980 5,6 | Low | Tremolite | D&H 1979 27 | Low | | | |
| McDonald et al. 1982 | Textile Mfg. Friction Products Mfg. | Textile Operations: cleaning, opening, carding, spinning, winding, weaving, finishing; FP Operations: blending, extruding, rolling, and bricketting | Pennsylvania, USA | Canada and Rhodesia | Chrysotile | D&H 1979 13,14,15/ 16,17,18 | Low | Crocidolite & Amosite | H&G 1981 D&H 1979 10,11,12,3, 4,7,8,9,22, 23,24 | Medium | [1] | | |
| McDonald et al. 1984 | Friction Products Mfg. | Opening, preparation, mixing, grinding, finishing | Connecticut, USA | Canada | Chrysotile | D&H 1979 16,17,18 | Low | Anthophyllite | D&H 1979 25, 26 | Medium | [1] | | |
| Peto et al. 1985 | Textile Mfg. | Carding, spinning, weaving | Rochdale, England | Rhodesia, Canada, Zimbabwe | Chrysotile | D&H 1979 13,14,15 | Low | Crocidolite | H&G 1981 3,4,7,8,9, 10,11,12 | Medium | [1] | | |
| Piolatto et al. 1990 | Mining and Milling | Mining, milling, crushing, screening, and bagging | Balangero, Italy | Balangero, Italy | Chrysotile | G&H 1980 5,6 | Low | Tremolite (amphibole contamination) | D&H 1979 27 | Low | | | |
| Seidman et al. 1986 | Insulation Mfg. | Mill, textile work, pipe covering, and block making | Patterson, New Jersey, USA | Transvaal Region, South Africa | Amosite | D&H 1979 22,23,24 | Low | Chrysotile | D&H 1979 G&H 1980 5,6,13,14, 15,16,17,1 8, 19,20,21 | Medium | [1] | | |
| Albin et al. 1990 | Asbestos Cement Mfg. | Milling, mixing, machining, sawing, grinding | Southern Sweden | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite & Amosite | H&G 1981 8,9,12, 1, 2, 22, 23, 24 | Medium | [2] | | |
| McDonald et al. 2004 | Vermiculite Mining and Milling | Pooled (Mining and milling) | Libby, Montana, USA | Libby, MT | Libby Amphibole | Sebastien 1993 28 | Low | | | | | | |
| de Klerk et al. 1989 | Mining and Milling | Mining and milling | Wittenoom, Australia | Wittenoom, Australia | Crocidolite | G&H 1980 H&G 1981 3,4 7,10,11 | Low | | | | | | |
| Lacquet et al. 1980 | Asbestos Cement Mfg. | Milling, preparing, molding, sawing, drilling, and filing | Belgium | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite & Amosite | H&G 1981 8,9,12, 1, 2, 22, 23, 24 | Medium | [2] | | |
| Neuberger and Kundi 1990 | Asbestos Cement Mfg. | Preparing, mixing, finishing | Vocklabruck, Austria | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite | H&G 1981 8,9,12 | Low | | | |
| Yano et al. 2001 | Textile Mfg.; Friction Products Mfg.; Asbestos Cement Mfg. | Pooled within job categories | Chongqin, China | Sichuan, China | Chrysotile | D&H 1979 13-21 | Low | | | | | | |
| Tulchinsky et al. 1999 | Asbestos Cement Mfg. | Pipe production, flat and corrugated sheets | Israel | NR | Chrysotile | D&H 1979 19,20,21 | Low | Crocidolite | H&G 1981 8,9,12 | Low | | | |

NR = Not Reported

[1] Matched TEM study is based on Option 2b from the decision tree matching fiber type and amphibole form, but not industry.

[2] Multiple amphibole forms were used at this facility. Matched TEM study is based on Option 2a from the decision tree matching fiber type and industry, but not all amphibole forms.

RAW DATA TABLES AS PRESENTED IN DEMENT AND HARRIS 1979

| | | | | | | | | | | | | | | | | | | |
|---|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|------|--|
| Reference: | Dement and Harris 1979 Table C-1 | | | | | | | | | | | | | | | Total | 6917 | |
| Fiber Type: | Chrysolite | | | | | | | | | | | | | | | | | |
| Industry: | Textile Products | | | | | | | | | | | | | | | | | |
| Operation: | Fiber Preparation | | | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | | |
| 0.08 | 0 | 0 | 53 | 89 | 351 | 586 | 490 | 330 | 218 | 198 | 113 | 119 | 50 | 80 | 114 | 67 | | |
| 0.15 | 0 | 0 | 1 | 3 | 63 | 376 | 291 | 164 | 130 | 96 | 66 | 52 | 37 | 58 | 92 | 75 | | |
| 0.25 | 0 | 0 | 0 | 0 | 6 | 123 | 153 | 161 | 92 | 98 | 67 | 45 | 41 | 36 | 104 | 95 | | |
| 0.35 | 0 | 0 | 0 | 0 | 1 | 3 | 40 | 56 | 58 | 43 | 24 | 33 | 7 | 21 | 60 | 64 | | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 1 | 10 | 5 | 25 | 37 | 19 | 21 | 12 | 11 | 64 | 111 | | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 5 | 12 | 23 | 6 | 6 | 7 | 6 | 30 | 29 | | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 7 | 1 | 7 | 6 | 2 | 5 | 15 | 24 | | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 2 | 4 | 2 | 3 | 5 | 10 | 17 | | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 3 | 2 | 1 | 12 | | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 5 | 6 | 11 | 5 | 16 | 11 | 11 | | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 5 | 19 | 7 | 8 | 202 | 223 | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|------|--|
| Reference: | Dement and Harris 1979 Table C-2 | | | | | | | | | | | | | | | Total | 5817 | |
| Fiber Type: | Chrysolite | | | | | | | | | | | | | | | | | |
| Industry: | Textile Products | | | | | | | | | | | | | | | | | |
| Operation: | Twisting Operations | | | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | | |
| 0.08 | 0 | 0 | 67 | 146 | 574 | 877 | 524 | 336 | 170 | 171 | 88 | 71 | 41 | 62 | 87 | 88 | | |
| 0.15 | 0 | 0 | 0 | 4 | 46 | 224 | 188 | 123 | 87 | 75 | 47 | 72 | 24 | 27 | 67 | 89 | | |
| 0.25 | 0 | 0 | 0 | 0 | 8 | 51 | 81 | 64 | 95 | 47 | 27 | 40 | 17 | 22 | 58 | 75 | | |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 5 | 20 | 18 | 17 | 21 | 14 | 23 | 6 | 10 | 36 | 69 | | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 20 | 21 | 19 | 11 | 18 | 6 | 18 | 35 | 69 | | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 4 | 3 | 6 | 2 | 4 | 13 | 21 | | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 4 | 6 | 5 | 2 | 4 | 4 | 8 | 23 | | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 2 | 0 | 2 | 5 | 6 | | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 4 | | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 4 | 10 | 2 | 7 | 20 | 12 | | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 3 | 2 | 2 | 4 | 49 | 125 | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|--------------|------|--|
| Reference: | Dement and Harris 1979 Table C-3 | | | | | | | | | | | | | | | Total | 4856 | |
| Fiber Type: | Chrysolite | | | | | | | | | | | | | | | | | |
| Industry: | Textile Products | | | | | | | | | | | | | | | | | |
| Operation: | Weaving Operations | | | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | | |
| 0.08 | 0 | 0 | 34 | 101 | 479 | 696 | 362 | 294 | 167 | 193 | 120 | 113 | 47 | 62 | 79 | 71 | | |
| 0.15 | 0 | 0 | 0 | 2 | 38 | 193 | 92 | 76 | 50 | 99 | 45 | 35 | 15 | 46 | 88 | 76 | | |
| 0.25 | 0 | 0 | 0 | 0 | 1 | 33 | 40 | 45 | 18 | 24 | 27 | 30 | 6 | 47 | 69 | 56 | | |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 1 | 9 | 11 | 6 | 11 | 10 | 11 | 5 | 11 | 19 | 28 | | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 8 | 11 | 11 | 11 | 31 | 10 | 46 | 55 | 89 | | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 7 | 5 | 4 | 1 | 1 | 1 | 8 | 16 | | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 3 | 2 | 3 | 7 | 14 | | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 2 | 5 | 6 | | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 6 | 0 | 27 | 7 | 2 | | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 8 | 5 | 9 | 51 | 155 | | |

DATA NORMALIZED TO 100

| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
|--------------------|------------------------|---------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------|
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Textile Products | | | | | | | | | | | | | | | | |
| Operation: | Fiber Preparation | | | | | | | | | | | | | | | | |
| Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0 | 0.0076623 | 0.0128668 | 0.0507445 | 0.0847188 | 0.07084 | 0.047709 | 0.031517 | 0.028625 | 0.016337 | 0.017204 | 0.007229 | 0.011566 | 0.016481 | 0.009686 | |
| 0.1-0.2 | 0 | 0 | 0.0001446 | 0.0004337 | 0.009108 | 0.0543588 | 0.04207 | 0.02371 | 0.018794 | 0.013879 | 0.009542 | 0.007518 | 0.005349 | 0.008385 | 0.013301 | 0.010843 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0.0008674 | 0.0177823 | 0.022119 | 0.023276 | 0.013301 | 0.014168 | 0.009686 | 0.006506 | 0.005927 | 0.005205 | 0.015035 | 0.013734 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0.0001446 | 0.0004337 | 0.005783 | 0.008096 | 0.008385 | 0.006217 | 0.00347 | 0.004771 | 0.001012 | 0.003036 | 0.008674 | 0.009253 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0.0001446 | 0.001446 | 0.000723 | 0.003614 | 0.005349 | 0.002747 | 0.003036 | 0.001735 | 0.00159 | 0.009253 | 0.016047 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0.000578 | 0.000723 | 0.001735 | 0.003325 | 0.000867 | 0.000867 | 0.001012 | 0.000867 | 0.004337 | 0.004193 | | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000145 | 0.001012 | 0.000145 | 0.001012 | 0.000867 | 0.000289 | 0.000723 | 0.002169 | 0.00347 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000289 | 0.000867 | 0.000289 | 0.000578 | 0.000289 | 0.000434 | 0.000723 | 0.001446 | 0.002458 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000145 | 0 | 0 | 0.000578 | 0.000434 | 0.000289 | 0.000145 | 0.001735 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000145 | 0.000578 | 0.000723 | 0.000867 | 0.00159 | 0.000723 | 0.002313 | 0.00159 | 0.00159 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000145 | 0 | 0.000434 | 0.000723 | 0.002747 | 0.001012 | 0.001157 | 0.029203 | 0.032239 | |

| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
|--------------------|------------------------|---------|----------|-----------|-----------|-----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------|
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Textile Products | | | | | | | | | | | | | | | | |
| Operation: | Twisting Operations | | | | | | | | | | | | | | | | |
| Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0 | 0.011518 | 0.0250988 | 0.0986763 | 0.150765 | 0.090081 | 0.057762 | 0.029225 | 0.029397 | 0.015128 | 0.012206 | 0.007048 | 0.010658 | 0.014956 | 0.015128 | |
| 0.1-0.2 | 0 | 0 | 0 | 0.0006876 | 0.0079079 | 0.0385078 | 0.032319 | 0.021145 | 0.014956 | 0.012893 | 0.00808 | 0.012378 | 0.004126 | 0.004642 | 0.011518 | 0.0153 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0.0013753 | 0.0087674 | 0.013925 | 0.011002 | 0.016331 | 0.00808 | 0.004642 | 0.006876 | 0.002922 | 0.003782 | 0.009971 | 0.012893 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0.0008595 | 0.003438 | 0.003094 | 0.002922 | 0.00361 | 0.002407 | 0.003954 | 0.001031 | 0.001719 | 0.006189 | 0.011862 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0.0003438 | 0.001031 | 0.003438 | 0.00361 | 0.003266 | 0.001891 | 0.003094 | 0.001031 | 0.003094 | 0.006017 | 0.011862 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000172 | 0.000172 | 0.000688 | 0.000688 | 0.000516 | 0.001031 | 0.000344 | 0.000688 | 0.002235 | 0.00361 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000344 | 0 | 0.000688 | 0.001031 | 0.00086 | 0.000344 | 0.000688 | 0.000688 | 0.001375 | 0.003954 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000172 | 0.000172 | 0.000172 | 0 | 0.000172 | 0.000344 | 0 | 0.000344 | 0.00086 | 0.001031 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00086 | 0.000688 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000344 | 0 | 0.000516 | 0.000688 | 0.001719 | 0.000344 | 0.001203 | 0.003438 | 0.002063 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000344 | 0.000172 | 0.000516 | 0.000344 | 0.000344 | 0.000688 | 0.008424 | 0.021489 | |

| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
|--------------------|------------------------|---------|-----------|-----------|-----------|-----------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|------|
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Textile Products | | | | | | | | | | | | | | | | |
| Operation: | Weaving Operations | | | | | | | | | | | | | | | | |
| Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0 | 0.0070016 | 0.020799 | 0.0986409 | 0.1433278 | 0.074547 | 0.060544 | 0.03439 | 0.039745 | 0.024712 | 0.02327 | 0.009679 | 0.012768 | 0.016269 | 0.014621 | |
| 0.1-0.2 | 0 | 0 | 0 | 0.0004119 | 0.0078254 | 0.0397446 | 0.018946 | 0.015651 | 0.010297 | 0.020387 | 0.009267 | 0.007208 | 0.003089 | 0.009473 | 0.018122 | 0.015651 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0.0002059 | 0.0067957 | 0.008237 | 0.009267 | 0.003707 | 0.004942 | 0.00556 | 0.006178 | 0.001236 | 0.009679 | 0.014209 | 0.011532 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0.0002059 | 0.001853 | 0.002265 | 0.001236 | 0.002265 | 0.002059 | 0.002265 | 0.00103 | 0.002265 | 0.003913 | 0.005766 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0.0002059 | 0.000824 | 0.001647 | 0.002265 | 0.002265 | 0.0006384 | 0.002059 | 0.009473 | 0.011326 | 0.018328 | | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000412 | 0.000412 | 0.001442 | 0.00103 | 0.000824 | 0.000206 | 0.000206 | 0.000206 | 0.001647 | 0.003295 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000412 | 0.000412 | 0.000412 | 0.000618 | 0.000412 | 0.000618 | 0.001442 | 0.002883 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000206 | 0 | 0 | 0.000824 | 0.000206 | 0.000412 | 0.00103 | 0.01236 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.002265 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000206 | 0.000412 | 0.001236 | 0 | 0.00556 | 0.001442 | 0.000412 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000206 | 0.000412 | 0.001647 | 0.00103 | 0.001853 | 0.010502 | 0.031919 | |

BINS OF INTEREST BY OPERATION

| | | | | | |
|--------------------|-------------------------------|----------|----------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 13</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Textiles | | | | |
| Operation: | Fiber Preparation | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.6397 | 0.037299 | 0.027396 | 0.1422 | |
| 0.25<w<0.4 | 0.1008 | 0.0162 | 0.0161 | | |
| w < 0.4 | 0.7405 | 0.0535 | 0.0435 | | |
| w > 0.4 | 0.0526 | 0.0481 | 0.0617 | | |

BINS OF INTEREST ACROSS OPERATIONS

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-------------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index</i> |
| Fiber Type: | Chrysotile | | | | <i>13, 14, 15</i> |
| Industry: | Textile Products | | | | |
| Operation: | All Operations | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.6978 | 0.0368 | 0.0334 | 0.1166 | |
| 0.25<w<0.4 | 0.0687 | 0.0128 | 0.0153 | | |
| w < 0.4 | 0.7665 | 0.0495 | 0.0488 | | |
| w > 0.4 | 0.0467 | 0.0329 | 0.0556 | | |

NOTE: For the purposes of assigning bins with a width cutoff of 0.25 um, a factor of 0.50 was assumed.

| | | | | | |
|--------------------|-------------------------------|---------|----------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 14</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Textiles | | | | |
| Operation: | Twisting Operations | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.7341 | 0.03146 | 0.036875 | 0.0974 | |
| 0.25<w<0.4 | 0.0619 | 0.0112 | 0.0183 | | |
| w < 0.4 | 0.7959 | 0.0426 | 0.0552 | | |
| w > 0.4 | 0.0383 | 0.0232 | 0.0447 | | |

| | | | | | |
|--------------------|-------------------------------|----------|----------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 15</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Textiles | | | | |
| Operation: | Weaving Operations | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.7196 | 0.041495 | 0.036038 | 0.1103 | |
| 0.25<w<0.4 | 0.0433 | 0.0110 | 0.0115 | | |
| w < 0.4 | 0.7630 | 0.0525 | 0.0476 | | |
| w > 0.4 | 0.0492 | 0.0274 | 0.0603 | | |

RAW DATA TABLES AS PRESENTED IN DEMENT AND HARRIS 1979

| | | | | | | | | | | | | | | | | | |
|---|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|------|
| Reference: | Dement and Harris 1979 Table C-4 | | | | | | | | | | | | | | | Total | 6143 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Friction Products | | | | | | | | | | | | | | | | |
| Operation: | Mixing | | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | |
| 0.08 | 0 | 19 | 196 | 402 | 855 | 956 | 571 | 325 | 183 | 158 | 81 | 88 | 39 | 61 | 99 | 63 | |
| 0.15 | 0 | 0 | 0 | 0 | 81 | 233 | 178 | 158 | 78 | 75 | 52 | 36 | 13 | 41 | 39 | 95 | |
| 0.25 | 0 | 0 | 0 | 0 | 6 | 87 | 80 | 60 | 52 | 35 | 25 | 28 | 11 | 16 | 40 | 49 | |
| 0.35 | 0 | 0 | 0 | 0 | 1 | 9 | 11 | 21 | 23 | 18 | 14 | 15 | 5 | 11 | 23 | 37 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 2 | 11 | 12 | 13 | 10 | 18 | 17 | 8 | 10 | 14 | 34 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 5 | 3 | 2 | 1 | 0 | 6 | 7 | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 4 | 1 | 3 | 3 | 11 | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 5 | 2 | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 1 | 0 | 2 | 3 | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 18 | 37 | |

| | | | | | | | | | | | | | | | | | |
|---|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|------|
| Reference: | Dement and Harris 1979 Table C-5 | | | | | | | | | | | | | | | Total | 3767 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Friction Products | | | | | | | | | | | | | | | | |
| Operation: | Product Forming | | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | |
| 0.08 | 0 | 0 | 85 | 182 | 564 | 683 | 395 | 138 | 98 | 82 | 47 | 59 | 16 | 54 | 44 | 32 | |
| 0.15 | 0 | 0 | 0 | 8 | 57 | 174 | 113 | 63 | 46 | 48 | 34 | 40 | 12 | 29 | 48 | 34 | |
| 0.25 | 0 | 0 | 0 | 0 | 2 | 19 | 49 | 32 | 28 | 26 | 21 | 29 | 8 | 26 | 27 | 38 | |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 9 | 5 | 10 | 11 | 8 | 1 | 12 | 13 | 16 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 4 | 9 | 2 | 15 | 2 | 11 | 19 | 15 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 0 | 1 | 2 | 4 | 1 | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 1 | 5 | 6 | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 6 | 4 | 1 | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 9 | 31 | |

| | | | | | | | | | | | | | | | | | |
|---|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|------|
| Reference: | Dement and Harris 1979 Table C-6 | | | | | | | | | | | | | | | Total | 2700 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Friction Products | | | | | | | | | | | | | | | | |
| Operation: | Product Finishing | | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | |
| 0.08 | 0 | 2 | 34 | 86 | 299 | 371 | 224 | 113 | 71 | 128 | 47 | 31 | 12 | 39 | 36 | 21 | |
| 0.15 | 0 | 0 | 0 | 2 | 46 | 110 | 75 | 38 | 36 | 57 | 13 | 17 | 4 | 14 | 49 | 14 | |
| 0.25 | 0 | 0 | 0 | 0 | 1 | 22 | 27 | 24 | 24 | 38 | 11 | 13 | 4 | 10 | 29 | 20 | |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 12 | 12 | 18 | 8 | 7 | 4 | 3 | 19 | 6 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 17 | 9 | 18 | 9 | 20 | 6 | 11 | 35 | 29 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 3 | 2 | 3 | 1 | 2 | 6 | 7 | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 3 | 0 | 3 | 2 | 0 | 6 | 6 | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 0 | 1 | 3 | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 | 1 | 0 | 1 | 7 | 0 | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 0 | 17 | 124 | |

DATA NORMALIZED TO 100

| | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|--|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | | |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Friction Products | | | | | | | | | | | | | | | | |
| Operation: | Mixing | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0.003093 | 0.031906 | 0.06544 | 0.1391828 | 0.1556243 | 0.0929513 | 0.0529057 | 0.02979 | 0.02572 | 0.013186 | 0.014325 | 0.006349 | 0.00993 | 0.016116 | 0.010256 | |
| 0.1-0.2 | 0 | 0 | 0 | 0 | 0.0131857 | 0.0379294 | 0.0289761 | 0.0257203 | 0.012697 | 0.012209 | 0.008465 | 0.00586 | 0.002116 | 0.006674 | 0.006349 | 0.015465 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0.0009767 | 0.0141625 | 0.013023 | 0.0097672 | 0.008465 | 0.005698 | 0.00407 | 0.004558 | 0.001791 | 0.002605 | 0.006511 | 0.007977 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0.0001628 | 0.0014651 | 0.0017907 | 0.0034185 | 0.003744 | 0.00293 | 0.002279 | 0.002442 | 0.000814 | 0.001791 | 0.003744 | 0.006023 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0.0003256 | 0.0017907 | 0.0019534 | 0.002116 | 0.001628 | 0.00293 | 0.002767 | 0.001302 | 0.001628 | 0.002279 | 0.005535 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0001628 | 0.0001628 | 0.000326 | 0.000814 | 0.000488 | 0.000326 | 0.000163 | 0 | 0.000977 | 0.00114 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0001628 | 0.000163 | 0.000326 | 0.000163 | 0.000651 | 0.000163 | 0.000488 | 0.000488 | 0.001791 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000163 | 0.000163 | 0 | 0 | 0.000326 | 0 | 0.000814 | 0.000326 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000163 | 0 | 0.000488 | 0.000163 | 0 | 0.000326 | 0.000488 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000977 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000488 | 0 | 0 | 0.000326 | 0.00293 | 0.006023 | |

| | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|--|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | | |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Friction Products | | | | | | | | | | | | | | | | |
| Operation: | Product Forming | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0 | 0.022564 | 0.048314 | 0.1497213 | 0.1813114 | 0.104858 | 0.0366339 | 0.026015 | 0.021768 | 0.012477 | 0.015662 | 0.004247 | 0.014335 | 0.01168 | 0.008495 | |
| 0.1-0.2 | 0 | 0 | 0 | 0.002124 | 0.0151314 | 0.0461906 | 0.0299973 | 0.0167242 | 0.012211 | 0.012742 | 0.009026 | 0.010619 | 0.003186 | 0.007698 | 0.012742 | 0.009026 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0.0005309 | 0.0050438 | 0.0130077 | 0.0084948 | 0.007433 | 0.006902 | 0.005575 | 0.007698 | 0.002124 | 0.006902 | 0.007168 | 0.010088 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0015928 | 0.0023892 | 0.001327 | 0.002655 | 0.00292 | 0.002124 | 0.000265 | 0.003186 | 0.003451 | 0.004247 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0013273 | 0.001062 | 0.002389 | 0.000531 | 0.003982 | 0.000531 | 0.00292 | 0.005044 | 0.003982 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0.0002655 | 0 | 0.0002655 | 0.000265 | 0.000531 | 0 | 0 | 0.000265 | 0.000531 | 0.001062 | 0.000265 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0002655 | 0 | 0.000265 | 0 | 0 | 0 | 0 | 0 | 0.001327 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000265 | 0.000265 | 0.001062 | 0 | 0.000265 | 0.001327 | 0.001593 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000265 | 0.000265 | 0 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000531 | 0 | 0.000796 | 0 | 0.001593 | 0.001062 | 0.000265 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.002124 | 0.002389 | 0.008229 | |

| | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|--|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | | |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Friction Products | | | | | | | | | | | | | | | | |
| Operation: | Product Finishing | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0.000741 | 0.012593 | 0.031852 | 0.1107407 | 0.1374074 | 0.082963 | 0.0418519 | 0.026296 | 0.047407 | 0.017407 | 0.011481 | 0.004444 | 0.014444 | 0.013333 | 0.007778 | |
| 0.1-0.2 | 0 | 0 | 0 | 0.000741 | 0.017037 | 0.0407407 | 0.0277778 | 0.0140741 | 0.013333 | 0.021111 | 0.004815 | 0.006296 | 0.001481 | 0.005185 | 0.018148 | 0.005185 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0.0003704 | 0.0081481 | 0.01 | 0.0088889 | 0.008889 | 0.014074 | 0.004074 | 0.004815 | 0.001481 | 0.003704 | 0.010741 | 0.007407 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0.0022222 | 0.0011111 | 0.0044444 | 0.004444 | 0.006667 | 0.002963 | 0.002593 | 0.001481 | 0.001111 | 0.007037 | 0.002222 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0014815 | 0.0062963 | 0.003333 | 0.006667 | 0.003333 | 0.007407 | 0.002222 | 0.004074 | 0.012963 | 0.010741 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0014815 | 0.00037 | 0.001111 | 0.000741 | 0.001111 | 0.00037 | 0.000741 | 0.002222 | 0.002593 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0003704 | 0.0007407 | 0.001111 | 0.001111 | 0 | 0.001111 | 0.000741 | 0 | 0.002222 | 0.002222 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0.0003704 | 0 | 0 | 0 | 0.00037 | 0.001481 | 0.00037 | 0 | 0 | 0.00037 | 0.001111 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000741 | 0 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00037 | 0.000741 | 0.001481 | 0.00037 | 0 | 0.00037 | 0.002593 | 0 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000741 | 0.001111 | 0.000741 | 0 | 0.006296 | 0.045926 | |

BINS OF INTEREST BY OPERATION

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 16</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Friction Products | | | | |
| Operation: | Mixing | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.8268 | 0.0257 | 0.0297 | 0.0411 | |
| 0.25<w<0.4 | 0.0534 | 0.0070 | 0.0100 | | |
| w < 0.4 | 0.8802 | 0.0327 | 0.0397 | | |
| w > 0.4 | 0.0233 | 0.0078 | 0.0163 | | |

BINS OF INTEREST ACROSS OPERATIONS

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|--------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Friction Products | | | | |
| Operation: | All Operations | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.7956 | 0.0302 | 0.0230 | 0.0642 | |
| 0.25<w<0.4 | 0.0537 | 0.0088 | 0.0084 | | |
| w < 0.4 | 0.8492 | 0.0390 | 0.0314 | | |
| w > 0.4 | 0.0334 | 0.0155 | 0.0315 | | |

NOTE: For the purposes of assigning bins with a width cutoff of 0.25 um, a factor of 0.50 was assumed.

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 17</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Friction Products | | | | |
| Operation: | Product Forming | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.8354 | 0.0280 | 0.0226 | 0.0431 | |
| 0.25<w<0.4 | 0.0483 | 0.0070 | 0.0093 | | |
| w < 0.4 | 0.8837 | 0.0350 | 0.0319 | | |
| w > 0.4 | 0.0226 | 0.0111 | 0.0157 | | |

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 18</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Friction Products | | | | |
| Operation: | Product Finishing | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.7244 | 0.0369 | 0.0167 | 0.1083 | |
| 0.25<w<0.4 | 0.0593 | 0.0124 | 0.0059 | | |
| w < 0.4 | 0.7837 | 0.0493 | 0.0226 | | |
| w > 0.4 | 0.0544 | 0.0274 | 0.0626 | | |

RAW DATA TABLES AS PRESENTED IN DEMENT AND HARRIS 1979

| | | | | | | | | | | | | | | | | |
|---|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|
| Reference: | Dement and Harris 1979 Table C-7 | | | | | | | | | | | | | | Total | 2345 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | |
| Industry: | Cement Pipe | | | | | | | | | | | | | | | |
| Operation: | Mixing | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 |
| 0.08 | 0 | 0 | 24 | 72 | 265 | 353 | 173 | 110 | 65 | 48 | 22 | 25 | 13 | 21 | 15 | 13 |
| 0.15 | 0 | 0 | 0 | 0 | 27 | 126 | 75 | 61 | 39 | 33 | 15 | 27 | 10 | 21 | 35 | 34 |
| 0.25 | 0 | 0 | 0 | 0 | 0 | 60 | 40 | 44 | 32 | 19 | 19 | 14 | 8 | 18 | 28 | 16 |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 17 | 17 | 13 | 10 | 15 | 13 | 4 | 7 | 20 | 15 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 2 | 13 | 8 | 7 | 2 | 2 | 1 | 9 | 15 | 24 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 2 | 0 | 1 | 2 | 2 | 4 |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 5 | 5 |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 1 |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 1 | 1 |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 3 | 2 | 1 |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 27 | 27 |

| | | | | | | | | | | | | | | | | |
|---|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|
| Reference: | Dement and Harris 1979 Table C-8 | | | | | | | | | | | | | | Total | 2555 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | |
| Industry: | Cement Pipe | | | | | | | | | | | | | | | |
| Operation: | Product Forming | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 |
| 0.08 | 0 | 0 | 17 | 42 | 224 | 333 | 399 | 139 | 72 | 77 | 51 | 44 | 18 | 48 | 52 | 28 |
| 0.15 | 0 | 0 | 0 | 0 | 23 | 132 | 96 | 66 | 41 | 47 | 27 | 32 | 7 | 31 | 27 | 24 |
| 0.25 | 0 | 0 | 0 | 0 | 0 | 34 | 46 | 39 | 27 | 22 | 16 | 12 | 5 | 15 | 19 | 11 |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 14 | 9 | 7 | 7 | 7 | 6 | 3 | 9 | 13 | 4 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 1 | 10 | 9 | 11 | 6 | 5 | 4 | 12 | 11 | 19 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 2 |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 2 |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 2 | 0 |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 13 |

| | | | | | | | | | | | | | | | | |
|---|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-----------|
| Reference: | Dement and Harris 1979 Table C-9 | | | | | | | | | | | | | | Total | 4846 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | |
| Industry: | Cement Pipe | | | | | | | | | | | | | | | |
| Operation: | Product Finishing | | | | | | | | | | | | | | | |
| Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 |
| 0.08 | 0 | 8 | 241 | 332 | 852 | 877 | 502 | 227 | 129 | 74 | 44 | 39 | 26 | 40 | 53 | 17 |
| 0.15 | 0 | 0 | 0 | 7 | 54 | 284 | 152 | 89 | 69 | 45 | 30 | 25 | 26 | 19 | 24 | 15 |
| 0.25 | 0 | 0 | 0 | 0 | 0 | 68 | 55 | 36 | 29 | 50 | 32 | 14 | 4 | 11 | 20 | 14 |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 5 | 10 | 15 | 16 | 3 | 5 | 6 | 5 | 4 | 22 | 5 |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 6 | 5 | 1 | 12 | 9 | 36 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 0 | 1 |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 3 |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 2 |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 13 |

DATA NORMALIZED TO 100

| | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Cement Pipe | | | | | | | | | | | | | | | | |
| Operation: | Mixing | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0 | 0.010235 | 0.030704 | 0.113006 | 0.150533 | 0.073774 | 0.0469083 | 0.027719 | 0.020469 | 0.009382 | 0.010661 | 0.005544 | 0.008955 | 0.006397 | 0.005544 | |
| 0.1-0.2 | 0 | 0 | 0 | 0 | 0.011514 | 0.053731 | 0.0319829 | 0.0260128 | 0.016631 | 0.014072 | 0.006397 | 0.011514 | 0.004264 | 0.008955 | 0.014925 | 0.014499 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0 | 0.025586 | 0.0170576 | 0.0187633 | 0.013646 | 0.008102 | 0.008102 | 0.00597 | 0.003412 | 0.007676 | 0.01194 | 0.006823 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0072495 | 0.0072495 | 0.005544 | 0.004264 | 0.006397 | 0.005544 | 0.001706 | 0.002985 | 0.008529 | 0.006397 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0008529 | 0.0055437 | 0.003412 | 0.002985 | 0.000853 | 0.000853 | 0.000426 | 0.003838 | 0.006397 | 0.010235 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0004264 | 0.001706 | 0.000853 | 0.000853 | 0 | 0.000426 | 0.000853 | 0.000853 | 0.001706 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0008529 | 0 | 0.000426 | 0 | 0.000853 | 0 | 0 | 0.002132 | 0.002132 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000426 | 0.000426 | 0.000853 | 0 | 0 | 0 | 0.000426 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.001279 | 0 | 0 | 0 | 0 | 0.000426 | 0.000426 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000426 | 0 | 0.000853 | 0 | 0.001279 | 0.000853 | 0.000426 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000853 | 0 | 0.001279 | 0.011514 | 0.011514 | |

| | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Cement Pipe | | | | | | | | | | | | | | | | |
| Operation: | Product Forming | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0 | 0.006654 | 0.016438 | 0.087671 | 0.130333 | 0.1561644 | 0.0544031 | 0.02818 | 0.030137 | 0.019961 | 0.017221 | 0.007045 | 0.018787 | 0.020352 | 0.010959 | |
| 0.1-0.2 | 0 | 0 | 0 | 0 | 0.009002 | 0.051663 | 0.0375734 | 0.0258317 | 0.016047 | 0.018395 | 0.010568 | 0.012524 | 0.00274 | 0.012133 | 0.010568 | 0.009393 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0 | 0.013307 | 0.0180039 | 0.0152642 | 0.010568 | 0.008611 | 0.006262 | 0.004697 | 0.001957 | 0.005871 | 0.007436 | 0.004305 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0054795 | 0.0035225 | 0.00274 | 0.00274 | 0.00274 | 0.002348 | 0.001174 | 0.003523 | 0.005088 | 0.001566 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0003914 | 0.0039139 | 0.003523 | 0.004305 | 0.002348 | 0.001957 | 0.001566 | 0.004697 | 0.004305 | 0.007436 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0003914 | 0.000391 | 0 | 0 | 0.001174 | 0 | 0.000391 | 0.000783 | 0.000783 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000391 | 0 | 0.000783 | 0.000783 | 0.000783 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000391 | 0 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000391 | 0 | 0 | 0 | 0.001174 | 0.000783 | 0 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000391 | 0.000391 | 0.000783 | 0.001566 | 0.005088 | |

| | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Chrysotile | | | | | | | | | | | | | | | | |
| Industry: | Cement Pipe | | | | | | | | | | | | | | | | |
| Operation: | Product Finishing | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | |
| 0.05-0.1 | 0 | 0.001651 | 0.049732 | 0.06851 | 0.175815 | 0.180974 | 0.1035906 | 0.0468428 | 0.02662 | 0.01527 | 0.00908 | 0.008048 | 0.005365 | 0.008254 | 0.010937 | 0.003508 | |
| 0.1-0.2 | 0 | 0 | 0 | 0.001444 | 0.011143 | 0.058605 | 0.0313661 | 0.0183657 | 0.014239 | 0.009286 | 0.006191 | 0.005159 | 0.005365 | 0.003921 | 0.004953 | 0.003095 | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0 | 0.014032 | 0.0113496 | 0.0074288 | 0.005984 | 0.010318 | 0.006603 | 0.002889 | 0.000825 | 0.00227 | 0.004127 | 0.002889 | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0.001032 | 0.0020636 | 0.0030953 | 0.003302 | 0.000619 | 0.001032 | 0.001238 | 0.001032 | 0.000825 | 0.00454 | 0.001032 | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0002064 | 0.0008254 | 0.000413 | 0.000413 | 0.001238 | 0.001032 | 0.000206 | 0.002476 | 0.001857 | 0.007429 | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000206 | 0 | 0 | 0.000413 | 0.000206 | 0 | 0 | 0.000206 | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000413 | 0.000206 | 0.000413 | 0.000619 | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000206 | 0 | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000619 | 0 | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000206 | 0 | 0 | 0.000413 | 0.000413 | 0.000413 | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.000413 | 0.002683 | |

BINS OF INTEREST BY OPERATION

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 19</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Cement Pipe | | | | |
| Operation: | Mixing | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.7471 | 0.0273 | 0.0235 | 0.0733 | |
| 0.25<w<0.4 | 0.0951 | 0.0145 | 0.0098 | | |
| w < 0.4 | 0.8422 | 0.0418 | 0.0333 | | |
| w > 0.4 | 0.0337 | 0.0222 | 0.0269 | | |
| CHECK | 1.0000 | | | | |

BINS OF INTEREST ACROSS OPERATIONS

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-------------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index</i> |
| Fiber Type: | Chrysotile | | | | <i>19, 20, 21</i> |
| Industry: | Cement Pipe | | | | |
| Operation: | All Operations | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 | |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | | |

NOTE: For the purposes of assigning bins with a width cutoff of 0.25 um, a factor of 0.50 was assumed.

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 20</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Cement Pipe | | | | |
| Operation: | Product Forming | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.8117 | 0.0346 | 0.0225 | 0.0352 | |
| 0.25<w<0.4 | 0.0665 | 0.0088 | 0.0037 | | |
| w < 0.4 | 0.8783 | 0.0434 | 0.0262 | | |
| w > 0.4 | 0.0294 | 0.0086 | 0.0141 | | |
| CHECK | 1.0000 | | | | |

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 21</i> |
| Fiber Type: | Chrysotile | | | | |
| Industry: | Cement Pipe | | | | |
| Operation: | Product Finishing | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w <0.25 | 0.8957 | 0.0180 | 0.0080 | 0.0243 | |
| 0.25<w<0.4 | 0.0451 | 0.0066 | 0.0025 | | |
| w < 0.4 | 0.9408 | 0.0246 | 0.0105 | | |
| w > 0.4 | 0.0089 | 0.0039 | 0.0113 | | |
| CHECK | 1.0000 | | | | |

RAW DATA TABLES AS PRESENTED IN DEMENT AND HARRIS 1979

| | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-------|-----|
| Reference: | Dement and Harris 1979 Table C-10 | | | | | | | | | | | | | | | Total | 373 |
| Fiber Type: | Amosite | | | | | | | | | | | | | | | | |
| Industry: | Pipe Insulation Mfg. | | | | | | | | | | | | | | | | |
| Operation: | Mixing | | | | | | | | | | | | | | | | |
| Fiber Size Interval | Midpoint (Micrometers) | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | |
| 0.08 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 3 | 3 | 1 | 2 | 4 | 1 | 0 | 3 | 0 | |
| 0.15 | 0 | 0 | 0 | 0 | 0 | 8 | 10 | 5 | 4 | 3 | 5 | 5 | 2 | 1 | 9 | 4 | |
| 0.25 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 5 | 4 | 7 | 4 | 4 | 2 | 3 | 10 | 7 | |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 5 | 1 | 4 | 3 | 3 | 4 | 15 | 4 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 2 | 2 | 1 | 2 | 2 | 1 | 11 | 10 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 4 | 1 | 1 | 2 | 3 | 7 | 8 | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 4 | 4 | 3 | 1 | 3 | 11 | 9 | 9 | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | 1 | 0 | 4 | 2 | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 4 | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 0 | 1 | 2 | 2 | 7 | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 2 | 6 | 19 | |

| | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-------|-----|
| Reference: | Dement and Harris 1979 Table C-11 | | | | | | | | | | | | | | | Total | 277 |
| Fiber Type: | Amosite | | | | | | | | | | | | | | | | |
| Industry: | Pipe Insulation Mfg. | | | | | | | | | | | | | | | | |
| Operation: | Forming | | | | | | | | | | | | | | | | |
| Fiber Size Interval | Midpoint (Micrometers) | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | |
| 0.08 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 6 | 1 | 2 | 1 | 2 | 2 | 1 | 1 | 0 | |
| 0.15 | 0 | 0 | 0 | 0 | 0 | 3 | 6 | 5 | 2 | 4 | 3 | 3 | 3 | 1 | 6 | 1 | |
| 0.25 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 9 | 6 | 2 | 3 | 5 | 3 | 3 | 10 | 8 | |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 3 | 2 | 3 | 2 | 4 | 2 | 4 | 6 | 9 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 1 | 7 | 2 | 2 | 2 | 0 | 0 | 7 | 5 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 3 | 1 | 2 | 3 | 1 | 1 | 3 | 5 | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 1 | 1 | 0 | 0 | 2 | 4 | 4 | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 3 | 3 | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 1 | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 2 | 1 | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 2 | 2 | 6 | 15 | |

| | | | | | | | | | | | | | | | | | |
|----------------------------|-----------------------------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-----|-------|-----|
| Reference: | Dement and Harris 1979 Table C-12 | | | | | | | | | | | | | | | Total | 229 |
| Fiber Type: | Amosite | | | | | | | | | | | | | | | | |
| Industry: | Pipe Insulation Mfg. | | | | | | | | | | | | | | | | |
| Operation: | Finishing | | | | | | | | | | | | | | | | |
| Fiber Size Interval | Midpoint (Micrometers) | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.05 | 0.15 | 0.25 | 0.35 | 0.45 | 0.75 | 1.25 | 1.75 | 2.25 | 2.75 | 3.25 | 3.75 | 4.25 | 4.75 | 7.5 | 15 | |
| 0.08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 0.15 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 3 | 3 | 6 | 3 | 3 | 2 | 1 | 5 | 0 | |
| 0.25 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 5 | 7 | 4 | 2 | 3 | 4 | 4 | 9 | 1 | |
| 0.35 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 0 | 3 | 0 | 0 | 3 | 4 | 6 | 3 | |
| 0.45 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 3 | 1 | 0 | 1 | 0 | 0 | 6 | 1 | |
| 0.55 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 1 | 3 | 4 | 2 | 2 | 3 | 3 | 3 | |
| 0.65 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 3 | 1 | 3 | 2 | 5 | 6 | 4 | |
| 0.75 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 4 | 0 | 2 | 2 | 3 | |
| 0.85 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 1 | 2 | 2 | |
| 0.95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | |
| 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 7 | 15 | |

DATA NORMALIZED TO 100

| | | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|--------------|------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Amosite | | | | | | | | | | | | | | | | | |
| Industry: | Pipe Insulation Mfg. | | | | | | | | | | | | | | | | | |
| Operation: | Mixing | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | | |
| 0.05-0.1 | 0 | 0 | 0 | 0 | 0 | 0.005362 | 0.010724 | 0.008043 | 0.002681 | 0.005362 | 0.010724 | 0.002681 | 0 | 0.008043 | 0 | | | |
| 0.1-0.2 | 0 | 0 | 0 | 0 | 0 | 0.021448 | 0.02681 | 0.013405 | 0.010724 | 0.008043 | 0.013405 | 0.013405 | 0.005362 | 0.002681 | 0.024129 | 0.010724 | | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0 | 0.008043 | 0.021448 | 0.013405 | 0.010724 | 0.018767 | 0.010724 | 0.010724 | 0.005362 | 0.008043 | 0.02681 | 0.018767 | | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0.002681 | 0.005362 | 0.005362 | 0.013405 | 0.002681 | 0.010724 | 0.008043 | 0.008043 | 0.010724 | 0.040214 | 0.010724 | | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.008043 | 0.008043 | 0.005362 | 0.005362 | 0.002681 | 0.005362 | 0.005362 | 0.002681 | 0.029491 | 0.02681 | | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.008043 | 0.005362 | 0.005362 | 0.010724 | 0.002681 | 0.002681 | 0.005362 | 0.008043 | 0.018767 | 0.021448 | | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.013405 | 0.010724 | 0.010724 | 0.008043 | 0.002681 | 0.008043 | 0.029491 | 0.024129 | 0.024129 | | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.002681 | 0.002681 | 0 | 0.005362 | 0.002681 | 0.002681 | 0 | 0.010724 | 0.005362 | | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.002681 | 0.002681 | 0.002681 | 0.002681 | 0.005362 | 0.010724 | | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.002681 | 0 | 0.002681 | 0.008043 | 0 | 0.002681 | 0.005362 | 0.005362 | 0.018767 | | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.002681 | 0.002681 | 0.005362 | 0.010724 | 0.005362 | 0.016086 | 0.050938 | | |

| | | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|--------------|------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Amosite | | | | | | | | | | | | | | | | | |
| Industry: | Pipe Insulation Mfg. | | | | | | | | | | | | | | | | | |
| Operation: | Forming | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | | |
| 0.05-0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01083 | 0.021661 | 0.00361 | 0.00722 | 0.00361 | 0.00722 | 0.00722 | 0.00361 | 0.00361 | 0 | | |
| 0.1-0.2 | 0 | 0 | 0 | 0 | 0 | 0.01083 | 0.021661 | 0.018051 | 0.00722 | 0.01444 | 0.01083 | 0.01083 | 0.01083 | 0.00361 | 0.021661 | 0.00361 | | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0 | 0.01083 | 0.028881 | 0.032491 | 0.021661 | 0.00722 | 0.01083 | 0.018051 | 0.01083 | 0.01083 | 0.036101 | 0.028881 | | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01444 | 0.01083 | 0.00722 | 0.01083 | 0.00722 | 0.01444 | 0.00722 | 0.01444 | 0.021661 | 0.032491 | | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.01444 | 0.00361 | 0.025271 | 0.00722 | 0.00722 | 0.00722 | 0 | 0 | 0.025271 | 0.018051 | | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00361 | 0.01083 | 0.01083 | 0.00361 | 0.00722 | 0.01083 | 0.00361 | 0.00361 | 0.01083 | 0.018051 | | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00361 | 0.01444 | 0.00722 | 0.00361 | 0.00361 | 0 | 0 | 0.00722 | 0.01444 | 0.01444 | | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00722 | 0.00361 | 0 | 0 | 0 | 0 | 0.00722 | 0.01083 | 0.01083 | | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00361 | 0.00361 | 0 | 0.00722 | 0.00361 | | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00361 | 0.00361 | 0 | 0 | 0.00361 | 0.00722 | 0.00361 | | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.00361 | 0.00722 | 0 | 0.00722 | 0.00722 | 0.021661 | 0.054152 | | |

| | | | | | | | | | | | | | | | | | | |
|----------------------|-------------------------------|----------------|----------------|----------------|----------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|---------------|--------------|------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Amosite | | | | | | | | | | | | | | | | | |
| Industry: | Pipe Insulation Mfg. | | | | | | | | | | | | | | | | | |
| Operation: | Finishing | | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.1 | 0.1-0.2 | 0.2-0.3 | 0.3-0.4 | 0.4-0.5 | 0.5-1 | 1-1.5 | 1.5-2 | 2-2.5 | 2.5-3 | 3-3.5 | 3.5-4 | 4-4.5 | 4.5-5 | 5-10 | >10 | | |
| 0.05-0.1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.004367 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 0.1-0.2 | 0 | 0 | 0 | 0 | 0 | 0.008734 | 0.0131 | 0.0131 | 0.0131 | 0.026201 | 0.0131 | 0.0131 | 0.008734 | 0.004367 | 0.021834 | 0 | | |
| 0.2-0.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0.026201 | 0.021834 | 0.030568 | 0.017467 | 0.008734 | 0.0131 | 0.017467 | 0.017467 | 0.039301 | 0.004367 | | |
| 0.3-0.4 | 0 | 0 | 0 | 0 | 0 | 0.004367 | 0.004367 | 0.021834 | 0 | 0.0131 | 0 | 0 | 0.0131 | 0.017467 | 0.026201 | 0.0131 | | |
| 0.4-0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0.004367 | 0.0131 | 0.0131 | 0.004367 | 0 | 0.004367 | 0 | 0 | 0.026201 | 0.004367 | | |
| 0.5-0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0.004367 | 0.026201 | 0.004367 | 0.0131 | 0.017467 | 0.008734 | 0.008734 | 0.0131 | 0.0131 | 0.0131 | | |
| 0.6-0.7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.008734 | 0.008734 | 0.0131 | 0.004367 | 0.0131 | 0.008734 | 0.021834 | 0.026201 | 0.017467 | | |
| 0.7-0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.004367 | 0 | 0.008734 | 0.017467 | 0 | 0.008734 | 0.008734 | 0.0131 | | |
| 0.8-0.9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.008734 | 0 | 0.004367 | 0 | 0.004367 | 0.008734 | 0.008734 | | |
| 0.9-1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.004367 | 0.004367 | 0 | 0.004367 | 0.004367 | 0.004367 | | |
| >1.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.008734 | 0.008734 | 0 | 0.008734 | 0.030568 | 0.065502 | | |

BINS OF INTEREST BY OPERATION

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 22</i> |
| Fiber Type: | Amosite | | | | |
| Industry: | Pipe Insulation Mfg. | | | | |
| Operation: | Mixing | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w < 0.25 | 0.2225 | 0.0456 | 0.0201 | 0.3418 | |
| 0.25<w<0.4 | 0.1206 | 0.0536 | 0.0201 | | |
| w < 0.4 | 0.3432 | 0.0992 | 0.0402 | | |
| w > 0.4 | 0.2493 | 0.1099 | 0.1582 | | |
| CHECK | 1.0000 | | | | |

BINS OF INTEREST ACROSS OPERATIONS

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-------------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index</i> |
| Fiber Type: | Amosite | | | | <i>22, 23, 24</i> |
| Industry: | Pipe Insulation Mfg. | | | | |
| Operation: | All Operations | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w < 0.25 | 0.2220 | 0.0435 | 0.0134 | 0.3181 | |
| 0.25<w<0.4 | 0.1446 | 0.0464 | 0.0274 | | |
| w < 0.4 | 0.3666 | 0.0899 | 0.0409 | | |
| w > 0.4 | 0.2584 | 0.1084 | 0.1359 | | |

NOTE: No information is provided by the authors to allow for splitting bins. For the purposes of assigning bins with a width cutoff of 0.25 um, a factor of 0.50 was assumed.

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 23</i> |
| Fiber Type: | Amosite | | | | |
| Industry: | Pipe Insulation Mfg. | | | | |
| Operation: | Forming | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w < 0.25 | 0.2491 | 0.0433 | 0.0181 | 0.3069 | |
| 0.25<w<0.4 | 0.1625 | 0.0397 | 0.0469 | | |
| w < 0.4 | 0.4116 | 0.0830 | 0.0650 | | |
| w > 0.4 | 0.2202 | 0.0975 | 0.1227 | | |
| CHECK | 1.0000 | | | | |

| | | | | | |
|--------------------|-------------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 24</i> |
| Fiber Type: | Amosite | | | | |
| Industry: | Pipe Insulation Mfg. | | | | |
| Operation: | Finishing | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w < 0.25 | 0.1943 | 0.0415 | 0.0022 | 0.3057 | |
| 0.25<w<0.4 | 0.1507 | 0.0459 | 0.0153 | | |
| w < 0.4 | 0.3450 | 0.0873 | 0.0175 | | |
| w > 0.4 | 0.3057 | 0.1179 | 0.1266 | | |
| CHECK | 1.0000 | | | | |

RAW DATA PRESENTED IN DEMENT AND HARRIS 1979

| | | | | | | | | | | | | | | | | | |
|-------------------|--|------|------|------|------|------|------|-----|-----|------|------|------|------|---|------|-------|-----|
| Reference: | Dement and Harris 1979 Table C-15 | | | | | | | | | | | | | | | Total | 241 |
| Fiber Type: | Tremolite | | | | | | | | | | | | | | | | |
| Industry: | Talc Production | | | | | | | | | | | | | | | | |
| Operation: | Mining and Milling | | | | | | | | | | | | | | | | |
| | Fiber Size Interval Midpoint (Micrometers) | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.15 | 0.44 | 0.74 | 1.03 | 1.32 | 1.62 | 1.91 | 2.2 | 2.5 | 2.79 | 3.23 | 3.82 | 4.41 | 5 | 5.59 | 15 | |
| 0.03 | 2 | 10 | 2 | 5 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.09 | 0 | 13 | 5 | 10 | 6 | 1 | 2 | 3 | 2 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 |
| 0.15 ^a | 0 | 3 | 7 | 9 | 11 | 4 | 8 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.20 | 0 | 0 | 2 | 5 | 8 | 4 | 4 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.26 | 0 | 0 | 2 | 3 | 6 | 4 | 5 | 2 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 0.32 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 4 | 2 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0.38 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 4 | 3 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 |
| 0.44 | 0 | 0 | 0 | 0 | 0 | 2 | 4 | 2 | 2 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0 |
| 0.50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0.56 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 3 | 1 | 4 | 3 | 0 | 0 | 0 | 1 | 0 |
| 0.80 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 2 | 2 | 0 | 3 | 0 | 0 |

Notes:

^a Table C-15 (Dement and Harris, 1979) lists the midpoint of this bin as 0.05. This appears to be a typo as the bins would overlap if that were the case. OSWER assumed that the midpoint of this bin was supposed to be 0.15. For use in calculations, this does not effect the overall result as the bin cut-off specified in the OSWER analysis is $w < 0.4$ um.

DATA NORMALIZED TO 100

| | | | | | | | | | | | | | | | | | |
|---------------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Tremolite | | | | | | | | | | | | | | | | |
| Industry: | Talc Production | | | | | | | | | | | | | | | | |
| Operation: | Mining and Milling | | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.3 | 0.3-0.58 | 0.58-0.9 | 0.9-1.16 | 1.16-1.48 | 1.48-1.76 | 1.76-2.06 | 2.06-2.34 | 2.34-2.66 | 2.66-2.92 | 2.92-3.54 | 3.54-4.1 | 4.1-4.72 | 4.72-5.28 | 5.28-5.9 | >6 | |
| 0-0.06 | 0.0082988 | 0.0414938 | 0.0082988 | 0.0207469 | 0.0082988 | 0.0041494 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.06-0.12 | 0 | 0.0539419 | 0.0207469 | 0.0414938 | 0.0248963 | 0.0041494 | 0.0082988 | 0.0124481 | 0.0082988 | 0 | 0.0041494 | 0 | 0 | 0.0041494 | 0 | 0 | 0 |
| 0.12-0.17 | 0 | 0.0124481 | 0.0290456 | 0.0373444 | 0.0456432 | 0.0165975 | 0.033195 | 0.0082988 | 0 | 0 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.17-0.23 | 0 | 0 | 0.0082988 | 0.0207469 | 0.033195 | 0.0165975 | 0.0165975 | 0.0041494 | 0.0124481 | 0.0041494 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.23-0.29 | 0 | 0 | 0.0082988 | 0.0124481 | 0.0248963 | 0.0165975 | 0.0207469 | 0.0082988 | 0 | 0.0041494 | 0 | 0.0082988 | 0 | 0 | 0.0041494 | 0 | 0 |
| 0.29-0.35 | 0 | 0 | 0 | 0.0041494 | 0.0041494 | 0.0124481 | 0 | 0.0165975 | 0.0082988 | 0 | 0.0041494 | 0 | 0 | 0 | 0.0041494 | 0 | 0 |
| 0.35-0.41 | 0 | 0 | 0 | 0 | 0.0082988 | 0.0041494 | 0.0041494 | 0.0165975 | 0.0124481 | 0.0041494 | 0 | 0.0082988 | 0 | 0 | 0 | 0.0041494 | 0 |
| 0.41-0.47 | 0 | 0 | 0 | 0 | 0 | 0.0082988 | 0.0165975 | 0.0082988 | 0.0082988 | 0 | 0.0082988 | 0.0082988 | 0.0041494 | 0 | 0 | 0 | 0 |
| 0.47-0.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0041494 | 0 | 0 |
| 0.53-0.59 | 0 | 0 | 0 | 0 | 0 | 0.0041494 | 0.0082988 | 0.0041494 | 0.0124481 | 0.0041494 | 0.0165975 | 0.0124481 | 0 | 0 | 0 | 0.0041494 | 0 |
| >0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0082988 | 0.0124481 | 0.0082988 | 0.0082988 | 0.0082988 | 0 | 0.0124481 | 0 | 0 |

| | | | | | | | | | | | | | | | | | |
|---------------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Tremolite | | | | | | | | | | | | | | | 0.5 | length |
| Industry: | Talc Production | | | | | | | | | | | | | | | 0.667 | width |
| Operation: | Mining and Milling | | | | | | | | | | | | | | | 0.833 | width |
| | Length (um) | | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.3 | 0.3-0.58 | 0.58-0.9 | 0.9-1.16 | 1.16-1.48 | 1.48-1.76 | 1.76-2.06 | 2.06-2.34 | 2.34-2.66 | 2.66-2.92 | 2.92-3.54 | 3.54-4.1 | 4.1-4.72 | 4.72-5.28 | 5.28-5.9 | 5.9-24.1 | |
| 0-0.06 | 0.0082988 | 0.0414938 | 0.0082988 | 0.0207469 | 0.0082988 | 0.0041494 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.06-0.12 | 0 | 0.0539419 | 0.0207469 | 0.0414938 | 0.0248963 | 0.0041494 | 0.0082988 | 0.0124481 | 0.0082988 | 0 | 0.0041494 | 0 | 0 | 0.0041494 | 0 | 0 | 0 |
| 0.12-0.17 | 0 | 0.0124481 | 0.0290456 | 0.0373444 | 0.0456432 | 0.0165975 | 0.033195 | 0.0082988 | 0 | 0 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.17-0.23 | 0 | 0 | 0.0082988 | 0.0207469 | 0.033195 | 0.0165975 | 0.0165975 | 0.0041494 | 0.0124481 | 0.0041494 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.23-0.25 | 0 | 0 | 0.0027663 | 0.0041494 | 0.0082988 | 0.0055325 | 0.0069156 | 0.0027663 | 0 | 0.0013831 | 0 | 0.0027663 | 0 | 0 | 0.0013831 | 0 | 0 |
| 0.25-0.29 | 0 | 0 | 0.0055325 | 0.0082988 | 0.0165975 | 0.011065 | 0.0138313 | 0.0055325 | 0 | 0.0027663 | 0 | 0.0055325 | 0 | 0 | 0.0027663 | 0 | 0 |
| 0.29-0.35 | 0 | 0 | 0 | 0.0041494 | 0.0041494 | 0.0124481 | 0 | 0.0165975 | 0.0082988 | 0 | 0.0041494 | 0 | 0 | 0 | 0.0041494 | 0 | 0 |
| 0.35-0.40 | 0 | 0 | 0 | 0 | 0.0069156 | 0.0034578 | 0.0034578 | 0.0138313 | 0.0103734 | 0.0034578 | 0 | 0.0069156 | 0 | 0 | 0 | 0.0034578 | 0 |
| 0.40-0.41 | 0 | 0 | 0 | 0 | 0.0013831 | 0.0006916 | 0.0006916 | 0.0027663 | 0.0020747 | 0.0006916 | 0 | 0.0013831 | 0 | 0 | 0 | 0.0006916 | 0 |
| 0.41-0.47 | 0 | 0 | 0 | 0 | 0 | 0.0082988 | 0.0165975 | 0.0082988 | 0.0082988 | 0 | 0.0082988 | 0.0082988 | 0.0041494 | 0 | 0 | 0 | 0 |
| 0.47-0.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0041494 | 0 | 0 |
| 0.53-0.59 | 0 | 0 | 0 | 0 | 0 | 0.0041494 | 0.0082988 | 0.0041494 | 0.0124481 | 0.0041494 | 0.0165975 | 0.0124481 | 0 | 0 | 0 | 0.0041494 | 0 |
| >0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0082988 | 0.0124481 | 0.0082988 | 0.0082988 | 0.0082988 | 0 | 0.0124481 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | |
|---------------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | Total | 1.00 | |
| Fiber Type: | Tremolite | | | | | | | | | | | | | | | 0.5 | length | |
| Industry: | Talc Production | | | | | | | | | | | | | | | 0.775 | length | |
| Operation: | Mining and Milling | | | | | | | | | | | | | | | 0.667 | width | |
| | Length (um) | | | | | | | | | | | | | | | 0.833 | width | |
| Diameter (um) | 0-0.3 | 0.3-0.58 | 0.58-0.9 | 0.9-1.16 | 1.16-1.48 | 1.48-1.76 | 1.76-2.06 | 2.06-2.34 | 2.34-2.66 | 2.66-2.92 | 2.92-3.54 | 3.54-4.1 | 4.1-4.72 | 4.72-5.0 | 5-5.28 | 5.28-5.9 | 5.9-10 | >10 |
| 0-0.06 | 0.0082988 | 0.0414938 | 0.0082988 | 0.0207469 | 0.0082988 | 0.0041494 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.06-0.12 | 0 | 0.0539419 | 0.0207469 | 0.0414938 | 0.0248963 | 0.0041494 | 0.0082988 | 0.0124481 | 0.0082988 | 0 | 0.0041494 | 0 | 0 | 0.0020747 | 0.0020747 | 0 | 0 | 0 |
| 0.12-0.17 | 0 | 0.0124481 | 0.0290456 | 0.0373444 | 0.0456432 | 0.0165975 | 0.033195 | 0.0082988 | 0 | 0 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.17-0.23 | 0 | 0 | 0.0082988 | 0.0207469 | 0.033195 | 0.0165975 | 0.0165975 | 0.0041494 | 0.0124481 | 0.0041494 | 0.0041494 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.23-0.25 | 0 | 0 | 0.0027663 | 0.0041494 | 0.0082988 | 0.0055325 | 0.0069156 | 0.0027663 | 0 | 0.0013831 | 0 | 0.0027663 | 0 | 0 | 0 | 0.0013831 | 0 | 0 |
| 0.25-0.29 | 0 | 0 | 0.0055325 | 0.0082988 | 0.0165975 | 0.011065 | 0.0138313 | 0.0055325 | 0 | 0.0027663 | 0 | 0.0055325 | 0 | 0 | 0 | 0.0027663 | 0 | 0 |
| 0.29-0.35 | 0 | 0 | 0 | 0.0041494 | 0.0041494 | 0.0124481 | 0 | 0.0165975 | 0.0082988 | 0 | 0.0041494 | 0 | 0 | 0 | 0 | 0.0041494 | 0 | 0 |
| 0.35-0.40 | 0 | 0 | 0 | 0 | 0.0069156 | 0.0034578 | 0.0034578 | 0.0138313 | 0.0103734 | 0.0034578 | 0 | 0.0069156 | 0 | 0 | 0 | 0 | 0.000779 | 0.002679 |
| 0.40-0.41 | 0 | 0 | 0 | 0 | 0.0013831 | 0.0006916 | 0.0006916 | 0.0027663 | 0.0020747 | 0.0006916 | 0 | 0.0013831 | 0 | 0 | 0 | 0.000156 | 0.000536 | 0 |
| 0.41-0.47 | 0 | 0 | 0 | 0 | 0 | 0.0082988 | 0.0165975 | 0.0082988 | 0.0082988 | 0 | 0.0082988 | 0.0082988 | 0.0041494 | 0 | 0 | 0 | 0 | 0 |
| 0.47-0.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0041494 | 0 | 0 |
| 0.53-0.59 | 0 | 0 | 0 | 0 | 0 | 0.0041494 | 0.0082988 | 0.0041494 | 0.0124481 | 0.0041494 | 0.0165975 | 0.0124481 | 0 | 0 | 0 | 0 | 0.000935 | 0.003215 |
| >0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.0082988 | 0.0124481 | 0.0082988 | 0.0082988 | 0.0082988 | 0 | 0 | 0.0124481 | 0 | 0 |

BINS OF INTEREST BY OPERATION

| | | | | |
|--------------------|-------------------------------|-----------------|--------|--------|
| Reference: | Dement and Harris 1979 | <i>Index 27</i> | | |
| Fiber Type: | Tremolite | | | |
| Industry: | Talc Production | | | |
| Operation: | Mining and Milling | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.6176 | 0.0035 | 0.0000 | 0.0318 |
| 0.25<w<0.4 | 0.1674 | 0.0077 | 0.0027 | |
| w < 0.4 | 0.7849 | 0.0112 | 0.0027 | |
| w > 0.4 | 0.1798 | 0.0177 | 0.0038 | |

RAW DATA PRESENTED IN DEMENT AND HARRIS 1979

| Reference: Dement and Harris 1979 Table C-13 | | | | | | | | | | | | | | | | Total | 849 | |
|--|------|------|------|------|------|------|------|-----|-----|------|------|------|------|---|------|-------|-----|--|
| Fiber Type: Anthophyllite | | | | | | | | | | | | | | | | | | |
| Industry: Talc Production | | | | | | | | | | | | | | | | | | |
| Operation: Mining and Milling | | | | | | | | | | | | | | | | | | |
| Length (um) | | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.15 | 0.44 | 0.74 | 1.03 | 1.32 | 1.62 | 1.91 | 2.2 | 2.5 | 2.79 | 3.23 | 3.82 | 4.41 | 5 | 5.59 | 15 | | |
| 0.03 | 11 | 80 | 38 | 19 | 26 | 7 | 9 | 5 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | | |
| 0.09 | 1 | 48 | 52 | 26 | 17 | 15 | 6 | 5 | 7 | 1 | 3 | 1 | 2 | 0 | 2 | 1 | | |
| 0.15 ^a | 0 | 12 | 20 | 27 | 23 | 13 | 8 | 6 | 6 | 5 | 5 | 1 | 4 | 0 | 4 | 2 | | |
| 0.2 | 0 | 0 | 2 | 9 | 13 | 9 | 9 | 7 | 2 | 4 | 5 | 3 | 2 | 0 | 4 | 3 | | |
| 0.26 | 0 | 0 | 5 | 5 | 11 | 14 | 9 | 10 | 6 | 6 | 11 | 0 | 3 | 1 | 6 | 0 | | |
| 0.32 | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 | 3 | 1 | | |
| 0.38 | 0 | 0 | 1 | 0 | 3 | 4 | 1 | 3 | 3 | 2 | 3 | 1 | 2 | 3 | 0 | 10 | | |
| 0.44 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 1 | 5 | 4 | 2 | 0 | 2 | 0 | 5 | 2 | | |
| 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | | |
| 0.56 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 4 | 2 | 4 | 4 | 5 | 5 | 4 | 4 | | |
| 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 6 | 2 | 0 | 22 | 8 | | |

| Reference: Dement and Harris 1979 Table C-14 | | | | | | | | | | | | | | | | Total | 318 | |
|--|------|------|------|------|------|------|------|-----|-----|------|------|------|------|---|------|-------|-----|--|
| Fiber Type: Anthophyllite | | | | | | | | | | | | | | | | | | |
| Industry: Talc Production | | | | | | | | | | | | | | | | | | |
| Operation: Mining and Milling | | | | | | | | | | | | | | | | | | |
| Length (um) | | | | | | | | | | | | | | | | | | |
| Diameter (um) | 0.15 | 0.44 | 0.74 | 1.03 | 1.32 | 1.62 | 1.91 | 2.2 | 2.5 | 2.79 | 3.23 | 3.82 | 4.41 | 5 | 5.59 | 15 | | |
| 0.03 | 5 | 11 | 11 | 5 | 6 | 1 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 0.09 | 0 | 13 | 14 | 11 | 5 | 5 | 7 | 2 | 2 | 3 | 0 | 1 | 1 | 1 | 0 | 0 | | |
| 0.15 ^a | 0 | 5 | 13 | 14 | 10 | 8 | 5 | 2 | 0 | 1 | 2 | 4 | 2 | 0 | 3 | 0 | | |
| 0.2 | 0 | 0 | 5 | 1 | 4 | 4 | 4 | 5 | 1 | 3 | 3 | 0 | 4 | 3 | 0 | 0 | | |
| 0.26 | 0 | 0 | 6 | 5 | 2 | 4 | 3 | 1 | 1 | 4 | 3 | 0 | 1 | 0 | 2 | 1 | | |
| 0.32 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | | |
| 0.38 | 0 | 0 | 0 | 0 | 2 | 2 | 6 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 2 | 4 | | |
| 0.44 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | | |
| 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 0.56 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 3 | 4 | 2 | 2 | 0 | 4 | 2 | | |
| 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 4 | 7 | | |

Notes:

^a Tables C-13 and C-14 (Dement and Harris, 1979) lists the midpoint of this bin as 0.05. This appears to be a typo as the bins would overlap if that were the case. OSWER assumed that the midpoint of this bin was supposed to be 0.15. For use in calculations, this does not effect the overall result as the bin cut-off specified in the OSWER analysis is $w < 0.4 \mu\text{m}$.

DATA NORMALIZED TO 100

| | | | | | | | | | | | | | | | | |
|---------------|------------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|-----------|----------|----------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | 1.00 | |
| Fiber Type: | Anthophyllite | | | | | | | | | | | | | | | |
| Industry: | Talc Production | | | | | | | | | | | | | | | |
| Operation: | Mining and Milling | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.3 | 0.3-0.58 | 0.58-0.9 | 0.9-1.16 | 1.16-1.48 | 1.48-1.76 | 1.76-2.06 | 2.06-2.34 | 2.34-2.66 | 2.66-2.92 | 2.92-3.54 | 3.54-4.1 | 4.1-4.72 | 4.72-5.28 | 5.28-5.9 | >6 |
| 0-0.06 | 0.012956 | 0.094229 | 0.044759 | 0.022379 | 0.030624 | 0.008245 | 0.010601 | 0.005889 | 0 | 0.002356 | 0.001178 | 0 | 0.002356 | 0 | 0 | 0 |
| 0.06-0.12 | 0.001178 | 0.056537 | 0.061249 | 0.030624 | 0.020024 | 0.017668 | 0.007067 | 0.005889 | 0.008245 | 0.001178 | 0.003534 | 0.001178 | 0.002356 | 0 | 0.002356 | 0.001178 |
| 0.12-0.17 | 0 | 0.014134 | 0.023557 | 0.031802 | 0.027091 | 0.015312 | 0.009423 | 0.007067 | 0.007067 | 0.005889 | 0.005889 | 0.001178 | 0.004711 | 0 | 0.004711 | 0.002356 |
| 0.17-0.23 | 0 | 0 | 0.002356 | 0.010601 | 0.015312 | 0.010601 | 0.010601 | 0.008245 | 0.002356 | 0.004711 | 0.005889 | 0.003534 | 0.002356 | 0 | 0.004711 | 0.003534 |
| 0.23-0.29 | 0 | 0 | 0.005889 | 0.005889 | 0.012956 | 0.01649 | 0.010601 | 0.011779 | 0.007067 | 0.007067 | 0.012956 | 0 | 0.003534 | 0.001178 | 0.007067 | 0 |
| 0.29-0.35 | 0 | 0 | 0 | 0 | 0.003534 | 0.002356 | 0.002356 | 0.002356 | 0.002356 | 0.002356 | 0.002356 | 0.001178 | 0.002356 | 0.003534 | 0.001178 | 0 |
| 0.35-0.41 | 0 | 0 | 0.001178 | 0 | 0.003534 | 0.004711 | 0.001178 | 0.003534 | 0.003534 | 0.002356 | 0.003534 | 0.001178 | 0.002356 | 0.003534 | 0 | 0.011779 |
| 0.41-0.47 | 0 | 0 | 0 | 0 | 0.002356 | 0.003534 | 0 | 0.001178 | 0.005889 | 0.004711 | 0.002356 | 0 | 0.002356 | 0 | 0.005889 | 0.002356 |
| 0.47-0.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.001178 | 0 | 0 | 0 | 0.001178 | 0 | 0.001178 | 0 |
| 0.53-0.59 | 0 | 0 | 0 | 0 | 0 | 0.002356 | 0 | 0.001178 | 0.004711 | 0.002356 | 0.004711 | 0.004711 | 0.005889 | 0.005889 | 0.004711 | 0.004711 |
| >0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.003534 | 0.002356 | 0.007067 | 0.002356 | 0 | 0.025913 | 0.009423 |

| | | | | | | | | | | | | | | | | |
|---------------|------------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|-----------|----------|----------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | | |
| Fiber Type: | Anthophyllite | | | | | | | | | | | | | | | |
| Industry: | Talc Production | | | | | | | | | | | | | | | |
| Operation: | Mining and Milling | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.3 | 0.3-0.58 | 0.58-0.9 | 0.9-1.16 | 1.16-1.48 | 1.48-1.76 | 1.76-2.06 | 2.06-2.34 | 2.34-2.66 | 2.66-2.92 | 2.92-3.54 | 3.54-4.1 | 4.1-4.72 | 4.72-5.28 | 5.28-5.9 | >6 |
| 0-0.06 | 0.015723 | 0.034591 | 0.034591 | 0.015723 | 0.018868 | 0.003145 | 0.003145 | 0.006289 | 0 | 0.006289 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.06-0.12 | 0 | 0.040881 | 0.044025 | 0.034591 | 0.015723 | 0.015723 | 0.022013 | 0.006289 | 0.006289 | 0.009434 | 0 | 0.003145 | 0.003145 | 0.003145 | 0 | 0 |
| 0.12-0.17 | 0 | 0.015723 | 0.040881 | 0.044025 | 0.031447 | 0.025157 | 0.015723 | 0.006289 | 0 | 0.003145 | 0.006289 | 0.012579 | 0.006289 | 0 | 0.009434 | 0 |
| 0.17-0.23 | 0 | 0 | 0.015723 | 0.003145 | 0.012579 | 0.012579 | 0.012579 | 0.015723 | 0.003145 | 0.009434 | 0.009434 | 0 | 0.012579 | 0.009434 | 0 | 0 |
| 0.23-0.29 | 0 | 0 | 0.018868 | 0.015723 | 0.006289 | 0.012579 | 0.009434 | 0.003145 | 0.003145 | 0.012579 | 0.009434 | 0 | 0.003145 | 0 | 0.006289 | 0.003145 |
| 0.29-0.35 | 0 | 0 | 0 | 0 | 0.009434 | 0 | 0 | 0.009434 | 0 | 0 | 0 | 0.003145 | 0 | 0 | 0 | 0.003145 |
| 0.35-0.41 | 0 | 0 | 0 | 0 | 0.006289 | 0.006289 | 0.018868 | 0.006289 | 0.003145 | 0.003145 | 0.006289 | 0 | 0 | 0 | 0.006289 | 0.012579 |
| 0.41-0.47 | 0 | 0 | 0 | 0 | 0 | 0.003145 | 0 | 0 | 0 | 0.003145 | 0.003145 | 0.003145 | 0 | 0 | 0.003145 | 0.003145 |
| 0.47-0.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0.53-0.59 | 0 | 0 | 0 | 0 | 0 | 0.006289 | 0 | 0.003145 | 0.006289 | 0.009434 | 0.012579 | 0.006289 | 0.006289 | 0 | 0.012579 | 0.006289 |
| >0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.003145 | 0 | 0 | 0 | 0.003145 | 0 | 0.012579 | 0.022013 |

| | | | | | | | | | | | | | | | | |
|---------------|------------------------|----------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------|----------|-----------|----------|----------|
| Reference: | Dement and Harris 1979 | | | | | | | | | | | | | | Total | 1.00 |
| Fiber Type: | Anthophyllite | | | | | | | | | | | | | | 0.667 | width |
| Industry: | Talc Production | | | | | | | | | | | | | | 0.833 | width |
| Operation: | Mining and Milling | | | | | | | | | | | | | | | |
| | Length (um) | | | | | | | | | | | | | | | |
| Diameter (um) | 0-0.3 | 0.3-0.58 | 0.58-0.9 | 0.9-1.16 | 1.16-1.48 | 1.48-1.76 | 1.76-2.06 | 2.06-2.34 | 2.34-2.66 | 2.66-2.92 | 2.92-3.54 | 3.54-4.1 | 4.1-4.72 | 4.72-5.28 | 5.28-5.9 | 5.9-24.1 |
| 0-0.06 | 0.012956 | 0.094229 | 0.044759 | 0.022379 | 0.030624 | 0.008245 | 0.010601 | 0.005889 | 0 | 0.002356 | 0.001178 | 0 | 0.002356 | 0 | 0 | 0 |
| 0.06-0.12 | 0.001178 | 0.056537 | 0.061249 | 0.030624 | 0.020024 | 0.017668 | 0.007067 | 0.005889 | 0.008245 | 0.001178 | 0.003534 | 0.001178 | 0.002356 | 0 | 0.002356 | 0.001178 |
| 0.12-0.17 | 0 | 0.014134 | 0.023557 | 0.031802 | 0.027091 | 0.015312 | 0.009423 | 0.007067 | 0.007067 | 0.005889 | 0.005889 | 0.001178 | 0.004711 | 0 | 0.004711 | 0.002356 |
| 0.17-0.23 | 0 | 0 | 0.002356 | 0.010601 | 0.015312 | 0.010601 | 0.010601 | 0.008245 | 0.002356 | 0.004711 | 0.005889 | 0.003534 | 0.002356 | 0 | 0.004711 | 0.003534 |
| 0.23-0.29 | 0 | 0 | 0.001963 | 0.001963 | 0.004319 | 0.005497 | 0.003534 | 0.003926 | 0.002356 | 0.002356 | 0.004319 | 0 | 0.001178 | 0.000393 | 0.002356 | 0 |
| 0.25-0.29 | 0 | 0 | 0.003926 | 0.003926 | 0.008638 | 0.010993 | 0.007067 | 0.007852 | 0.004711 | 0.004711 | 0.008638 | 0 | 0.002356 | 0.000785 | 0.004711 | 0 |
| 0.29-0.35 | 0 | 0 | 0 | 0 | 0.003534 | 0.002356 | 0.002356 | 0.002356 | 0.002356 | 0.002356 | 0.002356 | 0.002356 | 0.001178 | 0.002356 | 0.003534 | 0.001178 |
| 0.35-0.40 | 0 | 0 | 0.000982 | 0 | 0.002945 | 0.003926 | 0.000982 | 0.002945 | 0.002945 | 0.001963 | 0.002945 | 0.000982 | 0.001963 | 0.002945 | 0 | 0.009815 |
| 0.40-0.41 | 0 | 0 | 0.000196 | 0 | 0.000589 | 0.000785 | 0.000196 | 0.000589 | 0.000589 | 0.000393 | 0.000589 | 0.000196 | 0.000393 | 0.000589 | 0 | 0.001963 |
| 0.41-0.47 | 0 | 0 | 0 | 0 | 0.002356 | 0.003534 | 0 | 0.001178 | 0.005889 | 0.004711 | 0.002356 | 0 | 0.002356 | 0 | 0.005889 | 0.002356 |
| 0.47-0.53 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.001178 | 0 | 0 | 0.001178 | 0 | 0.001178 | 0 |
| 0.53-0.59 | 0 | 0 | 0 | 0 | 0 | 0.002356 | 0 | 0.001178 | 0.004711 | 0.002356 | 0.004711 | 0.004711 | 0.005889 | 0.005889 | 0.004711 | 0.004711 |
| >0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.003534 | 0.002356 | 0.007067 | 0.002356 | 0 | 0.025913 | 0.009423 |

BINS OF INTEREST BY OPERATION

| | | | | | |
|--------------------|------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 25</i> |
| Fiber Type: | Anthophyllite | | | | |
| Industry: | Talc Production | | | | |
| Operation: | Mining and Milling | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w < 0.25 | 0.7136 | 0.0159 | 0.0055 | 0.0817 | |
| 0.25 < w < 0.4 | 0.1096 | 0.0138 | 0.0085 | | |
| w < 0.4 | 0.8232 | 0.0297 | 0.0140 | | |
| w > 0.4 | 0.0737 | 0.0451 | 0.0143 | | |

BINS OF INTEREST ACROSS OPERATIONS

| | | | | | |
|--------------------|------------------------|--------|--------|--------|--------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index</i> |
| Fiber Type: | Anthophyllite | | | | |
| Industry: | Talc Production | | | | |
| Operation: | Combined | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w < 0.25 | 0.7027 | 0.0170 | 0.0031 | 0.0849 | |
| 0.25 < w < 0.4 | 0.1182 | 0.0134 | 0.0103 | | |
| w < 0.4 | 0.8209 | 0.0304 | 0.0135 | | |
| w > 0.4 | 0.0741 | 0.0410 | 0.0201 | | |

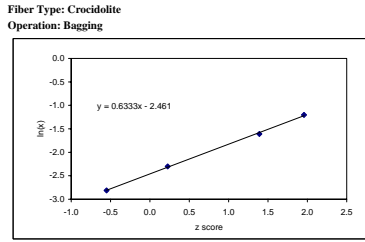
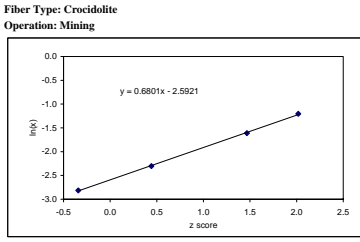
| | | | | | |
|--------------------|------------------------|--------|--------|--------|-----------------|
| Reference: | Dement and Harris 1979 | | | | <i>Index 26</i> |
| Fiber Type: | Anthophyllite | | | | |
| Industry: | Talc Production | | | | |
| Operation: | Mining and Milling | | | | |
| | L<5 | L5-10 | L>10 | PCME | |
| w < 0.25 | 0.6918 | 0.0181 | 0.0008 | 0.0881 | |
| 0.25 < w < 0.4 | 0.1268 | 0.0130 | 0.0122 | | |
| w < 0.4 | 0.8187 | 0.0310 | 0.0130 | | |
| w > 0.4 | 0.0744 | 0.0369 | 0.0260 | | |

RAW DATA AS PRESENTED IN GIBBS AND HWANG 1980 TABLE 2

Fiber Type: Crocidolite
Industry: Mining/Milling
Operation: Mining

| Width (um) | Length (um) | | | | | Total | CDF |
|-------------|-------------|-----------|-----------|------------|-------------|-------|-------|
| | ≤ 2.5 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | | |
| ≤ 0.06 | 34.09 | 2.16 | 0.25 | 0.04 | 0.07 | 36.61 | 36.61 |
| 0.061-0.100 | 27.01 | 2.7 | 0.65 | 0.07 | 0.07 | 30.5 | 67.11 |
| 0.101-0.200 | 19.96 | 3.99 | 0.86 | 0.43 | 0.54 | 25.78 | 92.89 |
| 0.201-0.300 | 3.31 | 1.04 | 0.43 | 0.11 | 0.04 | 4.93 | 97.82 |
| >0.300 | 0.9 | 0.81 | 0.3 | 0.11 | 0.11 | 2.12 | 99.94 |
| Total | | | | | | 99.94 | |

| x | p-tile | ln(x) | z | | |
|------|--------|------------|------------|--------------------|--------|
| 0.06 | 0.3661 | -2.8134107 | -0.3422005 | slope = sigma | 0.680 |
| 0.10 | 0.6711 | -2.3025851 | 0.44295263 | intercept = mu | -2.592 |
| 0.20 | 0.9289 | -1.6094379 | 1.46764749 | percentile for 0.4 | 0.9931 |
| 0.30 | 0.9782 | -1.2039728 | 2.0179161 | percentile for 0.3 | 0.9794 |



Fiber Type: Crocidolite
Industry: Mining/Milling
Operation: Bagging

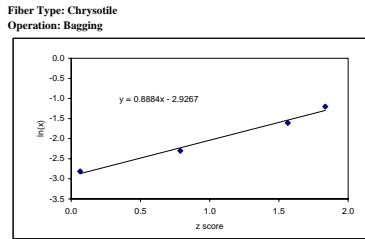
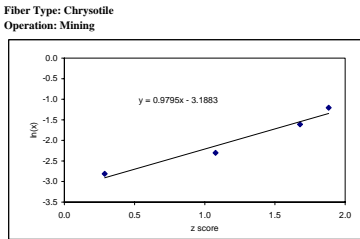
| Width (um) | Length (um) | | | | | Total | CDF |
|-------------|-------------|-----------|-----------|------------|-------------|--------|--------|
| | ≤ 2.5 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | | |
| ≤ 0.06 | 26.9 | 1.88 | 0.22 | 0.11 | 0 | 29.11 | 29.11 |
| 0.061-0.100 | 24.74 | 3.92 | 0.61 | 0.39 | 0.17 | 29.83 | 58.94 |
| 0.101-0.200 | 22.81 | 6.29 | 2.48 | 0.77 | 0.5 | 32.85 | 91.79 |
| 0.201-0.300 | 2.6 | 1.82 | 0.83 | 0.22 | 0.22 | 5.69 | 97.48 |
| >0.300 | 0.72 | 1.27 | 0.34 | 0.23 | 0 | 2.56 | 100.04 |
| Total | | | | | | 100.04 | |

| x | p-tile | ln(x) | z | | |
|------|--------|------------|------------|--------------------|--------|
| 0.06 | 0.2911 | -2.8134107 | -0.5501741 | slope = sigma | 0.633 |
| 0.10 | 0.5894 | -2.3025851 | 0.22600183 | intercept = mu | -2.461 |
| 0.20 | 0.9179 | -1.6094379 | 1.39108386 | percentile for 0.4 | 0.9926 |
| 0.30 | 0.9748 | -1.2039728 | 1.95655339 | percentile for 0.3 | 0.9764 |

Fiber Type: Chrysotile
Industry: Mining/Milling
Operation: Mining

| Width (um) | Length (um) | | | | | Total | CDF |
|-------------|-------------|-----------|-----------|------------|-------------|-------|-------|
| | ≤ 2.5 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | | |
| ≤ 0.06 | 60.73 | 0.57 | 0 | 0 | 0 | 61.3 | 61.3 |
| 0.061-0.100 | 23.79 | 0.66 | 0.13 | 0.04 | 0 | 24.62 | 85.92 |
| 0.101-0.200 | 8.59 | 0.66 | 0.13 | 0 | 0.04 | 9.42 | 95.34 |
| 0.201-0.300 | 1.23 | 0.31 | 0.13 | 0 | 0 | 1.67 | 97.01 |
| >0.300 | 0.97 | 1.19 | 0.51 | 0.12 | 0.13 | 2.92 | 99.93 |
| Total | | | | | | 99.93 | |

| x | p-tile | ln(x) | z | | |
|------|--------|------------|------------|--------------------|--------|
| 0.06 | 0.613 | -2.8134107 | 0.28714669 | slope = sigma | 0.979 |
| 0.10 | 0.8592 | -2.3025851 | 1.07673203 | intercept = mu | -3.188 |
| 0.20 | 0.9534 | -1.6094379 | 1.67875398 | percentile for 0.4 | 0.9898 |
| 0.30 | 0.9701 | -1.2039728 | 1.88226533 | percentile for 0.3 | 0.9786 |



Fiber Type: Chrysotile
Industry: Mining/Milling
Operation: Bagging

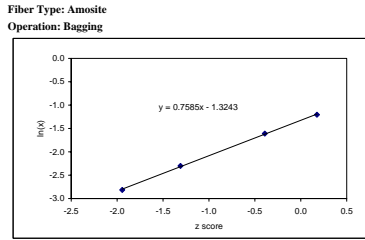
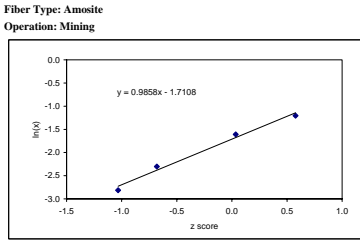
| Width (um) | Length (um) | | | | | Total | CDF |
|-------------|-------------|-----------|-----------|------------|-------------|-------|-------|
| | ≤ 2.5 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | | |
| ≤ 0.06 | 51.65 | 0.62 | 0.16 | 0.10 | 0.03 | 52.56 | 52.56 |
| 0.061-0.100 | 23.99 | 1.41 | 0.39 | 0.10 | 0.03 | 25.92 | 78.48 |
| 0.101-0.200 | 12.38 | 2.04 | 0.66 | 0.20 | 0.36 | 15.64 | 94.12 |
| 0.201-0.300 | 1.38 | 0.79 | 0.16 | 0.06 | 0.15 | 2.55 | 96.67 |
| >0.300 | 0.74 | 0.88 | 0.88 | 0.32 | 0.33 | 3.15 | 99.82 |
| Total | | | | | | 99.82 | |

| x | p-tile | ln(x) | z | | |
|------|--------|------------|------------|--------------------|--------|
| 0.06 | 0.5256 | -2.8134107 | 0.06421379 | slope = sigma | 0.888 |
| 0.10 | 0.7848 | -2.3025851 | 0.78850735 | intercept = mu | -2.927 |
| 0.20 | 0.9412 | -1.6094379 | 1.56492712 | percentile for 0.4 | 0.9882 |
| 0.30 | 0.9667 | -1.2039728 | 1.83436386 | percentile for 0.3 | 0.9738 |

Fiber Type: Amosite
Industry: Mining/Milling
Operation: Mining

| Width (um) | Length (um) | | | | | Total | CDF |
|-------------|-------------|-----------|-----------|------------|-------------|-------|-------|
| | ≤ 2.5 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | | |
| ≤ 0.06 | 14.84 | 0.25 | 0 | 0 | 0 | 15.09 | 15.09 |
| 0.061-0.100 | 8.98 | 0.62 | 0.12 | 0 | 0 | 9.72 | 24.81 |
| 0.101-0.200 | 19.45 | 4.99 | 1.62 | 0.37 | 0.12 | 26.55 | 51.36 |
| 0.201-0.300 | 11.47 | 5.74 | 1.75 | 0.87 | 0.62 | 20.45 | 71.81 |
| >0.300 | 9.09 | 12.2 | 3.86 | 1.86 | 0.99 | 28 | 99.81 |
| Total | | | | | | 99.81 | |

| x | p-tile | ln(x) | z | | |
|------|--------|------------|------------|--------------------|--------|
| 0.06 | 0.1509 | -2.8134107 | -1.0325811 | slope = sigma | 0.699 |
| 0.10 | 0.2481 | -2.3025851 | -0.6804809 | intercept = mu | -1.723 |
| 0.20 | 0.5136 | -1.6094379 | 0.03409675 | percentile for 0.4 | 0.9931 |
| 0.30 | 0.7181 | -1.2039728 | 0.57720645 | percentile for 0.3 | 0.9794 |



Fiber Type: Amosite
Industry: Mining/Milling
Operation: Bagging

| Width (um) | Length (um) | | | | | Total | CDF |
|-------------|-------------|-----------|-----------|------------|-------------|-------|-------|
| | ≤ 2.5 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | | |
| ≤ 0.06 | 2.59 | 0 | 0 | 0 | 0 | 2.59 | 2.59 |
| 0.061-0.100 | 5.97 | 0.75 | 0.12 | 0.08 | 0 | 6.92 | 9.51 |
| 0.101-0.200 | 17.21 | 4.63 | 1.8 | 0.9 | 0.71 | 25.25 | 34.76 |
| 0.201-0.300 | 12.55 | 5.79 | 2.03 | 1.01 | 0.86 | 22.24 | 57 |
| >0.300 | 11.31 | 14.68 | 6.75 | 4.33 | 4.77 | 41.84 | 98.84 |
| Total | | | | | | 98.84 | |

| x | p-tile | ln(x) | z | | |
|------|--------|------------|------------|--------------------|--------|
| 0.06 | 0.0259 | -2.8134107 | -1.9447921 | slope = sigma | 0.758 |
| 0.10 | 0.0951 | -2.3025851 | -1.3099877 | intercept = mu | -1.324 |
| 0.20 | 0.3476 | -1.6094379 | -0.3918081 | percentile for 0.4 | 0.9931 |
| 0.30 | 0.57 | -1.2039728 | 0.17637416 | percentile for 0.3 | 0.9794 |

DATA PRESENTED IN GIBBS AND HWANG 1980 TABLE 1

| Length (um) | Crocidolite | | Amosite | | Chrysotile | |
|-------------------|-------------|---------|---------|---------|------------|---------|
| | Mining | Bagging | Mining | Bagging | Mining | Bagging |
| < 1 | 52.430 | 43.340 | 31.800 | 18.520 | 85.950 | 70.620 |
| 1-2 | 26.050 | 27.880 | 21.940 | 21.970 | 7.890 | 16.410 |
| 2-3 | 10.330 | 11.540 | 17.210 | 15.890 | 2.690 | 5.420 |
| 3-4 | 4.710 | 6.730 | 10.100 | 11.760 | 1.500 | 2.040 |
| 4-5 | 2.450 | 3.430 | 6.610 | 7.320 | 0.700 | 1.410 |
| 5-7.5 | 2.490 | 4.460 | 7.357 | 10.706 | 0.926 | 2.265 |
| 7.5-10 | 0.670 | 1.710 | 3.117 | 6.311 | 0.176 | 0.787 |
| 10-20 | 0.830 | 0.880 | 1.746 | 6.349 | 0.176 | 0.919 |
| 20-30 | 0.070 | 0.004 | 0.180 | 0.714 | 0.006 | 0.131 |
| 30-40 | 0.005 | 0.008 | 0.108 | 0.376 | 0.002 | 0.042 |
| 40-50 | 0.005 | 0.008 | 0.036 | 0.038 | 0.002 | 0.013 |
| 50-100 | 0.038 | 0.033 | 0.048 | 0.087 | 0.001 | 0.024 |
| >100 | 0.010 | 0.008 | 0.072 | 0.044 | 0.001 | 0.015 |
| 0 - 20 | 99.960 | 99.970 | 99.880 | 98.826 | 100.008 | 99.871 |
| > 20 | 0.128 | 0.061 | 0.444 | 1.259 | 0.012 | 0.225 |
| Total | 100.088 | 100.031 | 100.324 | 100.085 | 100.020 | 100.096 |
| Adj factor | 0.99872 | 0.99939 | 0.99557 | 0.98742 | 0.99988 | 0.99775 |

GIBBS AND HWANG 1980 TABLE 2

UNADJUSTED

Fiber Type: Crocidolite
Operation: Mining

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|--------|-------|-------|-------|-------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 34.090 | 2.160 | 0.250 | 0.040 | 0.070 |
| 0.06 | 0.1 | 27.010 | 2.700 | 0.650 | 0.070 | 0.070 |
| 0.1 | 0.2 | 19.960 | 3.990 | 0.860 | 0.430 | 0.540 |
| 0.2 | 0.3 | 3.310 | 1.040 | 0.430 | 0.110 | 0.040 |
| >0.3 | | 0.900 | 0.810 | 0.300 | 0.000 | 0.110 |

99.940

Fiber Type: Crocidolite
Operation: Bagging

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|------|------|------|------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 26.9 | 1.88 | 0.22 | 0.11 | 0 |
| 0.06 | 0.1 | 24.74 | 3.92 | 0.61 | 0.39 | 0.17 |
| 0.1 | 0.2 | 22.81 | 6.29 | 2.48 | 0.77 | 0.5 |
| 0.2 | 0.3 | 2.6 | 1.82 | 0.83 | 0.22 | 0.22 |
| >0.3 | | 0.72 | 1.27 | 0.34 | 0.23 | 0 |

100.040

NORMALIZED TO 100

Fiber Type: Crocidolite
Operation: Mining

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|-------|-------|-------|-------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 0.341 | 0.022 | 0.003 | 0.000 | 0.001 |
| 0.06 | 0.1 | 0.270 | 0.027 | 0.007 | 0.001 | 0.001 |
| 0.1 | 0.2 | 0.200 | 0.040 | 0.009 | 0.004 | 0.005 |
| 0.2 | 0.3 | 0.033 | 0.010 | 0.004 | 0.001 | 0.000 |
| >0.3 | | 0.009 | 0.008 | 0.003 | 0.000 | 0.001 |

1.000

Fiber Type: Crocidolite
Operation: Bagging

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|-------|-------|-------|-------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 0.269 | 0.019 | 0.002 | 0.001 | 0.000 |
| 0.06 | 0.1 | 0.247 | 0.039 | 0.006 | 0.004 | 0.002 |
| 0.1 | 0.2 | 0.228 | 0.063 | 0.025 | 0.008 | 0.005 |
| 0.2 | 0.3 | 0.026 | 0.018 | 0.008 | 0.002 | 0.002 |
| >0.3 | | 0.007 | 0.013 | 0.003 | 0.002 | 0.000 |

1.000

ADJUSTED FOR LENGTH

Fiber Type: Crocidolite; Operation: Mining

| | | Adj Fact | | 0.00127887 | | 0.008 | |
|------|------|----------|--------|------------|--------|--------|--------|
| | | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.3407 | 0.0216 | 0.0025 | 0.0004 | 0.0007 | 0.0001 |
| 0.06 | 0.1 | 0.2699 | 0.0270 | 0.0065 | 0.0007 | 0.0007 | 0.0001 |
| 0.1 | 0.2 | 0.1995 | 0.0399 | 0.0086 | 0.0043 | 0.0054 | 0.0008 |
| 0.2 | 0.3 | 0.0331 | 0.0104 | 0.0043 | 0.0011 | 0.0004 | 0.0001 |
| >0.3 | | 0.0090 | 0.0081 | 0.0030 | 0.0000 | 0.0011 | 0.0002 |

0.9987

1.0000

Fiber Type: Crocidolite; Operation: Bagging

| | | Adj Fact | | 0.00060981 | | 0.009 | |
|------|------|----------|-------|------------|-------|-------|------------|
| | | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.269 | 0.019 | 0.002 | 0.001 | 0.000 | 0 |
| 0.06 | 0.1 | 0.247 | 0.039 | 0.006 | 0.004 | 0.002 | 0.00011648 |
| 0.1 | 0.2 | 0.228 | 0.063 | 0.025 | 0.008 | 0.005 | 0.00034259 |
| 0.2 | 0.3 | 0.026 | 0.018 | 0.008 | 0.002 | 0.002 | 0.00015074 |
| >0.3 | | 0.007 | 0.013 | 0.003 | 0.002 | 0.000 | 0 |

0.9994

1.0000

Fiber Type: Chrysotile
Operation: Mining

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|------|------|------|------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 60.73 | 0.57 | 0 | 0 | 0 |
| 0.06 | 0.1 | 23.79 | 0.66 | 0.13 | 0.04 | 0 |
| 0.1 | 0.2 | 8.59 | 0.66 | 0.13 | 0 | 0.04 |
| 0.2 | 0.3 | 1.23 | 0.31 | 0.13 | 0 | 0 |
| >0.3 | | 0.97 | 1.19 | 0.51 | 0.12 | 0.13 |

99.930

Fiber Type: Chrysotile
Operation: Mining

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|-------|-------|-------|-------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 0.608 | 0.006 | 0.000 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.238 | 0.007 | 0.001 | 0.000 | 0.000 |
| 0.1 | 0.2 | 0.086 | 0.007 | 0.001 | 0.000 | 0.000 |
| 0.2 | 0.3 | 0.012 | 0.003 | 0.001 | 0.000 | 0.000 |
| >0.3 | | 0.010 | 0.012 | 0.005 | 0.001 | 0.001 |

1.000

Fiber Type: Chrysotile; Operation: Mining

| | | Adj Fact | | 0.00011998 | 0.002 | |
|------|------|----------|-------|------------|-------|-------|
| | | 0 | 2.5 | 5 | 7.5 | 10 |
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 0.608 | 0.006 | 0.000 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.238 | 0.007 | 0.001 | 0.000 | 0.000 |
| 0.1 | 0.2 | 0.086 | 0.007 | 0.001 | 0.000 | 0.000 |
| 0.2 | 0.3 | 0.012 | 0.003 | 0.001 | 0.000 | 0.000 |
| >0.3 | | 0.010 | 0.012 | 0.005 | 0.001 | 0.001 |

0.9999 1.0000

Fiber Type: Chrysotile
Operation: Bagging

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|------|------|------|------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 51.65 | 0.62 | 0.16 | 0.1 | 0.03 |
| 0.06 | 0.1 | 23.99 | 1.41 | 0.39 | 0.1 | 0.03 |
| 0.1 | 0.2 | 12.38 | 2.04 | 0.66 | 0.2 | 0.36 |
| 0.2 | 0.3 | 1.38 | 0.79 | 0.16 | 0.06 | 0.16 |
| >0.3 | | 0.74 | 0.88 | 0.88 | 0.32 | 0.33 |

99.820

Fiber Type: Chrysotile
Operation: Bagging

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|-------|-------|-------|-------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 0.517 | 0.006 | 0.002 | 0.001 | 0.000 |
| 0.06 | 0.1 | 0.240 | 0.014 | 0.004 | 0.001 | 0.000 |
| 0.1 | 0.2 | 0.124 | 0.020 | 0.007 | 0.002 | 0.004 |
| 0.2 | 0.3 | 0.014 | 0.008 | 0.002 | 0.001 | 0.002 |
| >0.3 | | 0.007 | 0.009 | 0.009 | 0.003 | 0.003 |

1.000

Fiber Type: Chrysotile; Operation: Bagging

| | | Adj Fact | | 0.99775 | 0.00224784 | 0.009 | |
|------|------|----------|-------|---------|------------|-------|--|
| | | 0 | 2.5 | 5 | 7.5 | 10 | |
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.516 | 0.006 | 0.002 | 0.001 | 0.000 | |
| 0.06 | 0.1 | 0.240 | 0.014 | 0.004 | 0.001 | 0.000 | |
| 0.1 | 0.2 | 0.124 | 0.020 | 0.007 | 0.002 | 0.004 | |
| 0.2 | 0.3 | 0.014 | 0.008 | 0.002 | 0.001 | 0.002 | |
| >0.3 | | 0.007 | 0.009 | 0.009 | 0.003 | 0.003 | |

0.9978 1.0000

Fiber Type: Amosite
Operation: Mining

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|------|------|------|------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 14.84 | 0.25 | 0 | 0 | 0 |
| 0.06 | 0.1 | 8.98 | 0.62 | 0.12 | 0 | 0 |
| 0.1 | 0.2 | 19.45 | 4.99 | 1.62 | 0.37 | 0.12 |
| 0.2 | 0.3 | 11.47 | 5.74 | 1.75 | 0.87 | 0.62 |
| >0.3 | | 9.09 | 12.2 | 3.86 | 1.86 | 0.99 |

99.810

Fiber Type: Amosite
Operation: Mining

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|-------|-------|-------|-------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 0.149 | 0.003 | 0.000 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.090 | 0.006 | 0.001 | 0.000 | 0.000 |
| 0.1 | 0.2 | 0.195 | 0.050 | 0.016 | 0.004 | 0.001 |
| 0.2 | 0.3 | 0.115 | 0.058 | 0.018 | 0.009 | 0.006 |
| >0.3 | | 0.091 | 0.122 | 0.039 | 0.019 | 0.010 |

1.000

Fiber Type: Amosite; Operation: Mining

| | | Adj Fact | | 0.99557 | 0.00442566 | 0.017 | |
|------|------|----------|-------|---------|------------|-------|--|
| | | 0 | 2.5 | 5 | 7.5 | 10 | |
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.148 | 0.002 | 0.000 | 0.000 | 0.000 | |
| 0.06 | 0.1 | 0.090 | 0.006 | 0.001 | 0.000 | 0.000 | |
| 0.1 | 0.2 | 0.194 | 0.050 | 0.016 | 0.004 | 0.001 | |
| 0.2 | 0.3 | 0.114 | 0.057 | 0.017 | 0.009 | 0.006 | |
| >0.3 | | 0.091 | 0.122 | 0.039 | 0.019 | 0.010 | |

0.9956 1.0000

Fiber Type: Amosite
Operation: Bagging

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|-------|------|------|------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 2.59 | 0 | 0 | 0 | 0 |
| 0.06 | 0.1 | 5.97 | 0.75 | 0.12 | 0.08 | 0 |
| 0.1 | 0.2 | 17.21 | 4.63 | 1.8 | 0.9 | 0.71 |
| 0.2 | 0.3 | 12.55 | 5.79 | 2.03 | 1.01 | 0.86 |
| >0.3 | | 11.31 | 14.68 | 6.75 | 4.33 | 4.77 |

98.840

Fiber Type: Amosite
Operation: Bagging

| | | 0 | 2.5 | 5 | 7.5 | 10 |
|------|------|-------|-------|-------|-------|-------|
| | | 2.5 | 5 | 7.5 | 10 | 20 |
| 0 | 0.06 | 0.026 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.060 | 0.008 | 0.001 | 0.001 | 0.000 |
| 0.1 | 0.2 | 0.174 | 0.047 | 0.018 | 0.009 | 0.007 |
| 0.2 | 0.3 | 0.127 | 0.059 | 0.021 | 0.010 | 0.009 |
| >0.3 | | 0.114 | 0.149 | 0.068 | 0.044 | 0.048 |

1.000

Fiber Type: Amosite; Operation: Bagging

| | | Adj Fact | | 0.98742 | 0.01257931 | 0.063 | |
|------|------|----------|-------|---------|------------|-------|--|
| | | 0 | 2.5 | 5 | 7.5 | 10 | |
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.026 | 0.000 | 0.000 | 0.000 | 0.000 | |
| 0.06 | 0.1 | 0.060 | 0.007 | 0.001 | 0.001 | 0.000 | |
| 0.1 | 0.2 | 0.172 | 0.046 | 0.018 | 0.009 | 0.007 | |
| 0.2 | 0.3 | 0.125 | 0.058 | 0.020 | 0.010 | 0.009 | |
| >0.3 | | 0.113 | 0.147 | 0.067 | 0.043 | 0.048 | |

0.9874 1.0000

WIDTH EXTRAPOLATION

Fiber Type: Crocidolite

Operation: Mining

| Fraction | 0.33 | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
|----------|------|--------|--------|--------|--------|--------|--------|
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.3407 | 0.0216 | 0.0025 | 0.0004 | 0.0007 | 0.0001 |
| 0.06 | 0.1 | 0.2699 | 0.0270 | 0.0065 | 0.0007 | 0.0007 | 0.0001 |
| 0.1 | 0.2 | 0.1995 | 0.0399 | 0.0086 | 0.0043 | 0.0054 | 0.0008 |
| 0.2 | 0.3 | 0.0331 | 0.0104 | 0.0043 | 0.0011 | 0.0004 | 0.0001 |
| 0.3 | 0.4 | 0.0060 | 0.0054 | 0.0020 | 0.0000 | 0.0007 | 0.0001 |
| > 0.4 | | 0.0030 | 0.0027 | 0.0010 | 0.0000 | 0.0004 | 0.0001 |

Note: Compare with Hwang and Gibbs 1981 Table 5

Fiber Type: Crocidolite

Operation: Bagging

| Fraction | 0.31 | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
|----------|------|--------|--------|--------|--------|--------|--------|
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.269 | 0.019 | 0.002 | 0.001 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.247 | 0.039 | 0.006 | 0.004 | 0.002 | 0.000 |
| 0.1 | 0.2 | 0.228 | 0.063 | 0.025 | 0.008 | 0.005 | 0.000 |
| 0.2 | 0.3 | 0.026 | 0.018 | 0.008 | 0.002 | 0.002 | 0.000 |
| 0.3 | 0.4 | 0.0049 | 0.0087 | 0.0023 | 0.0016 | 0.0000 | 0.0000 |
| > 0.4 | | 0.0022 | 0.0040 | 0.0011 | 0.0007 | 0.0000 | 0.0000 |

Note: Compare with Hwang and Gibbs 1981 Table 5

BINS OF INTEREST BY OPERATION

| Fiber Type: Crocidolite | | Index 3 | | | |
|-------------------------|--|---------|--------|--------|------------|
| Operation: Mining | | Length | | | |
| Width | | 0-5 | 5-10 | >10 | PCME |
| < 0.25 | | 0.9202 | 0.0257 | 0.0081 | 0.00719555 |
| 0.25-0.4 | | 0.0331 | 0.0047 | 0.0011 | |
| <0.4 | | 0.9534 | 0.0304 | 0.0092 | |
| > 0.4 | | 0.0057 | 0.0010 | 0.0004 | |
| | | | | | |

NOTE: Factor for splitting width bins=0.5.

| Fiber Type: Crocidolite | | Index 4 | | | |
|-------------------------|--|---------|--------|--------|------------|
| Operation: Bagging | | Length | | | |
| Width | | 0-5 | 5-10 | >10 | PCME |
| < 0.25 | | 0.8866 | 0.0510 | 0.0083 | 0.01211321 |
| 0.25-0.4 | | 0.0358 | 0.0092 | 0.0012 | |
| <0.4 | | 0.9224 | 0.0602 | 0.0095 | |
| > 0.4 | | 0.0062 | 0.0018 | 0.0000 | |
| | | | | | |

NOTE: Factor for splitting width bins=0.5.

BINS OF INTEREST ACROSS OPERATIONS

| Fiber Type: Crocidolite | | Index 3, 4 | | | |
|--------------------------------------|--|------------|--------|--------|---------|
| Operation: Combined Mining & Bagging | | Length | | | |
| Width | | 0-5 | 5-10 | >10 | PCME |
| < 0.25 | | 0.9034 | 0.0383 | 0.0082 | 0.00965 |
| 0.25-0.4 | | 0.0344 | 0.0069 | 0.0011 | |
| < 0.4 | | 0.9379 | 0.0453 | 0.0093 | |
| > 0.4 | | 0.0059 | 0.0014 | 0.0002 | |
| | | | | | |

NOTE: Factor for splitting width bins=0.5.

Fiber Type: Chrysotile
Operation: Mining

| Fraction | 0.48 | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
|----------|------|--------|--------|--------|--------|--------|--------|
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.608 | 0.006 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.238 | 0.007 | 0.001 | 0.000 | 0.000 | 0.000 |
| 0.1 | 0.2 | 0.086 | 0.007 | 0.001 | 0.000 | 0.000 | 0.000 |
| 0.2 | 0.3 | 0.012 | 0.003 | 0.001 | 0.000 | 0.000 | 0.000 |
| 0.3 | 0.4 | 0.0051 | 0.0062 | 0.0027 | 0.0006 | 0.0007 | 0.0000 |
| > 0.4 | | 0.0046 | 0.0057 | 0.0024 | 0.0006 | 0.0006 | 0.0000 |

Fiber Type: Chrysotile
Operation: Bagging

| Fraction | 0.45 | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
|----------|------|--------|--------|--------|--------|--------|--------|
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.516 | 0.006 | 0.002 | 0.001 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.240 | 0.014 | 0.004 | 0.001 | 0.000 | 0.000 |
| 0.1 | 0.2 | 0.124 | 0.020 | 0.007 | 0.002 | 0.004 | 0.001 |
| 0.2 | 0.3 | 0.014 | 0.008 | 0.002 | 0.001 | 0.002 | 0.000 |
| 0.3 | 0.4 | 0.0041 | 0.0048 | 0.0048 | 0.0018 | 0.0018 | 0.0004 |
| > 0.4 | | 0.0033 | 0.0040 | 0.0040 | 0.0014 | 0.0015 | 0.0004 |

Fiber Type: Amosite
Operation: Mining

| Fraction | 0.33 | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
|----------|------|--------|--------|--------|--------|--------|--------|
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.148 | 0.002 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.090 | 0.006 | 0.001 | 0.000 | 0.000 | 0.000 |
| 0.1 | 0.2 | 0.194 | 0.050 | 0.016 | 0.004 | 0.001 | 0.000 |
| 0.2 | 0.3 | 0.114 | 0.057 | 0.017 | 0.009 | 0.006 | 0.002 |
| 0.3 | 0.4 | 0.0605 | 0.0812 | 0.0257 | 0.0124 | 0.0066 | 0.0017 |
| > 0.4 | | 0.0302 | 0.0405 | 0.0128 | 0.0062 | 0.0033 | 0.0008 |

Fiber Type: Amosite
Operation: Bagging

| Fraction | 0.33 | 0 | 2.5 | 5 | 7.5 | 10 | > 20 |
|----------|------|--------|--------|--------|--------|--------|--------|
| | | 2.5 | 5 | 7.5 | 10 | 20 | |
| 0 | 0.06 | 0.026 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 0.06 | 0.1 | 0.060 | 0.007 | 0.001 | 0.001 | 0.000 | 0.000 |
| 0.1 | 0.2 | 0.172 | 0.046 | 0.018 | 0.009 | 0.007 | 0.001 |
| 0.2 | 0.3 | 0.125 | 0.058 | 0.020 | 0.010 | 0.009 | 0.002 |
| 0.3 | 0.4 | 0.0754 | 0.0978 | 0.0450 | 0.0288 | 0.0318 | 0.0063 |
| > 0.4 | | 0.0376 | 0.0488 | 0.0225 | 0.0144 | 0.0159 | 0.0032 |

| Fiber Type: Chrysotile | | | | | Index 5 | |
|------------------------|--------|--------|--------|------------|---------|--|
| Operation: Mining | | | | | Length | |
| Width | 0-5 | 5-10 | >10 | PCME | | |
| < 0.25 | 0.9583 | 0.0037 | 0.0004 | 0.00834653 | | |
| 0.25-0.4 | 0.0190 | 0.0040 | 0.0007 | | | |
| <0.4 | 0.9773 | 0.0076 | 0.0012 | | | |
| > 0.4 | 0.0103 | 0.0030 | 0.0007 | | | |

NOTE: Factor for splitting width bins=0.5.

| Fiber Type: Chrysotile | | | | | Index 6 | |
|------------------------|--------|--------|--------|------------|---------|--|
| Operation: Bagging | | | | | Length | |
| Width | 0-5 | 5-10 | >10 | PCME | | |
| < 0.25 | 0.9313 | 0.0172 | 0.0062 | 0.01820505 | | |
| 0.25-0.4 | 0.0197 | 0.0077 | 0.0033 | | | |
| <0.4 | 0.9511 | 0.0249 | 0.0095 | | | |
| > 0.4 | 0.0073 | 0.0054 | 0.0019 | | | |

NOTE: Factor for splitting width bins=0.5.

| Fiber Type: Amosite | | | | | Index 1 | |
|---------------------|--------|--------|--------|------------|---------|--|
| Operation: Mining | | | | | Length | |
| Width | 0-5 | 5-10 | >10 | PCME | | |
| < 0.25 | 0.5759 | 0.0341 | 0.0054 | 0.08641485 | | |
| 0.25-0.4 | 0.2275 | 0.0511 | 0.0122 | | | |
| <0.4 | 0.8034 | 0.0852 | 0.0175 | | | |
| > 0.4 | 0.0707 | 0.0190 | 0.0041 | | | |

NOTE: Factor for splitting width bins=0.5.

| Fiber Type: Amosite | | | | | Index 2 | |
|---------------------|--------|--------|--------|------------|---------|--|
| Operation: Bagging | | | | | Length | |
| Width | 0-5 | 5-10 | >10 | PCME | | |
| < 0.25 | 0.4028 | 0.0442 | 0.0137 | 0.18814105 | | |
| 0.25-0.4 | 0.2648 | 0.0890 | 0.0432 | | | |
| <0.4 | 0.6676 | 0.1332 | 0.0569 | | | |
| > 0.4 | 0.0865 | 0.0369 | 0.0190 | | | |

NOTE: Factor for splitting width bins=0.5.

| Fiber Type: Chrysotile | | | | | Index 5, 6 | |
|--------------------------------------|--------|--------|--------|---------|------------|--|
| Operation: Combined Mining & Bagging | | | | | Length | |
| Width | 0-5 | 5-10 | >10 | PCME | | |
| < 0.25 | 0.9448 | 0.0104 | 0.0033 | 0.01328 | | |
| 0.25-0.4 | 0.0194 | 0.0058 | 0.0020 | | | |
| < 0.4 | 0.9642 | 0.0162 | 0.0053 | | | |
| > 0.4 | 0.0088 | 0.0042 | 0.0013 | | | |

NOTE: Factor for splitting width bins=0.5.

| Fiber Type: Amosite | | | | | Index 1, 2 | |
|--------------------------------------|--------|--------|--------|---------|------------|--|
| Operation: Combined Mining & Bagging | | | | | Length | |
| Width | 0-5 | 5-10 | >10 | PCME | | |
| < 0.25 | 0.4893 | 0.0391 | 0.0095 | 0.13728 | | |
| 0.25-0.4 | 0.2461 | 0.0701 | 0.0277 | | | |
| < 0.4 | 0.7355 | 0.1092 | 0.0372 | | | |
| > 0.4 | 0.0786 | 0.0279 | 0.0116 | | | |

NOTE: Factor for splitting width bins=0.5.

RAW DATA AS PRESENTED IN HWANG AND GIBBS 1981

| | | | | | | | | |
|----------------------|---------------------------------------|------------------|------------------|-------------------|--------------------|------------------|-------|--------|
| Reference: | Hwang and Gibbs 1981 (Table 5) | | | | | | Total | 100.00 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Mining and Milling | | | | | | | |
| Operation: | Mining | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.060 | 34.09 | 2.16 | 0.25 | 0.04 | 0.07 | 0 | | |
| 0.061-0.100 | 27.01 | 2.7 | 0.65 | 0.07 | 0.07 | 0 | | |
| 0.101-0.200 | 19.94 | 3.99 | 0.86 | 0.43 | 0.54 | 0.04 | | |
| 0.201-0.300 | 3.31 | 1.04 | 0.43 | 0.11 | 0.04 | 0.04 | | |
| 0.301-0.400 | 0.65 | 0.4 | 0.14 | 0 | 0 | 0 | | |
| 0.401-0.500 | 0.25 | 0.22 | 0.04 | 0 | 0.04 | 0 | | |
| >0.500 | 0 | 0.19 | 0.12 | 0 | 0.07 | 0 | | |

| | | | | | | | | |
|----------------------|---------------------------------------|------------------|------------------|-------------------|--------------------|------------------|-------|--------|
| Reference: | Hwang and Gibbs 1981 (Table 5) | | | | | | Total | 100.04 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Mining and Milling | | | | | | | |
| Operation: | Bagging | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.060 | 26.9 | 1.88 | 0.22 | 0.11 | 0 | 0 | | |
| 0.061-0.100 | 24.74 | 3.92 | 0.61 | 0.39 | 0.17 | 0 | | |
| 0.101-0.200 | 22.81 | 6.29 | 2.48 | 0.77 | 0.5 | 0 | | |
| 0.201-0.300 | 2.6 | 1.82 | 0.83 | 0.22 | 0.22 | 0 | | |
| 0.301-0.400 | 0.5 | 0.83 | 0.17 | 0.11 | 0 | 0 | | |
| 0.401-0.500 | 0.22 | 0.22 | 0.06 | 0.06 | 0 | 0 | | |
| >0.500 | 0 | 0.22 | 0.11 | 0.06 | 0 | 0 | | |

| | | | | | | | | |
|----------------------|---------------------------------------|------------------|------------------|-------------------|--------------------|------------------|-------|-------|
| Reference: | Hwang and Gibbs 1981 (Table 5) | | | | | | Total | 99.94 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Cement Manufacturing | | | | | | | |
| Operation: | Dumping (Preparation) | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.060 | 26.79 | 1.24 | 0 | 0 | 0.04 | 0.04 | | |
| 0.061-0.100 | 33.17 | 2.44 | 0.39 | 0 | 0.04 | 0 | | |
| 0.101-0.200 | 23.42 | 3.56 | 0.58 | 0.12 | 0 | 0 | | |
| 0.201-0.300 | 3.64 | 1.86 | 0.23 | 0.12 | 0.04 | 0 | | |
| 0.301-0.400 | 0.81 | 0.62 | 0.08 | 0.12 | 0.04 | 0 | | |
| 0.401-0.500 | 0.04 | 0.27 | 0 | 0 | 0 | 0 | | |
| >0.500 | 0.04 | 0.2 | 0 | 0 | 0 | 0 | | |

| | | | | | | | |
|----------------------|------------------------------------|------------------|------------------|-------------------|--------------------|------------------|-------|
| Reference: | Hwang and Gibbs 1981 Table 3(a) | | | | | Total | 99.98 |
| Fiber Type: | Crocidolite | | | | | | |
| Industry: | Mining and Milling | | | | | | |
| Operation: | Mining, storage, crushing, bagging | | | | | | |
| | Length (um) | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | |
| <=0.10 | 55.66 | 4.87 | 0.76 | 0.17 | 0.11 | 0 | |
| 0.11-0.20 | 22.21 | 5.13 | 1.43 | 0.48 | 0.36 | 0.01 | |
| 0.21-0.40 | 4.25 | 2.2 | 0.78 | 0.21 | 0.11 | 0.01 | |
| >0.40 | 0.28 | 0.58 | 0.19 | 0.09 | 0.09 | 0 | |

| | | | | | | | |
|----------------------|---------------------------------|------------------|------------------|-------------------|--------------------|------------------|-----|
| Reference: | Hwang and Gibbs 1981 Table 3(a) | | | | | Total | 100 |
| Fiber Type: | Crocidolite | | | | | | |
| Industry: | Cement Manufacturing | | | | | | |
| Operation: | Preparation (Dumping/Mixing) | | | | | | |
| | Length (um) | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | |
| <=0.10 | 55.61 | 4.03 | 0.59 | 0.14 | 0.17 | 0.03 | |
| 0.11-0.20 | 23.97 | 4.31 | 0.73 | 0.14 | 0.11 | 0 | |
| 0.21-0.40 | 5.09 | 2.94 | 0.5 | 0.31 | 0.14 | 0 | |
| >0.40 | 0.28 | 0.7 | 0.06 | 0.03 | 0.12 | 0 | |

| | | | | | | | |
|----------------------|---------------------------------|------------------|------------------|-------------------|--------------------|------------------|--------|
| Reference: | Hwang and Gibbs 1981 Table 3(a) | | | | | Total | 100.02 |
| Fiber Type: | Crocidolite and Chrysotile | | | | | | |
| Industry: | Cement Manufacturing | | | | | | |
| Operation: | Finishing (Cutting) | | | | | | |
| | Length (um) | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | |
| <=0.10 | 93.05 | 3.13 | 0.3 | 0.15 | 0 | 0 | |
| 0.11-0.20 | 2.09 | 0.5 | 0.2 | 0 | 0 | 0 | |
| 0.21-0.40 | 0.2 | 0 | 0.2 | 0 | 0.1 | 0 | |
| >0.40 | 0 | 0.05 | 0 | 0 | 0.05 | 0 | |

NORMALIZED TO 100

| | | | | | | | | |
|----------------------|-----------------------------|------------------|------------------|-------------------|--------------------|------------------|-------|------|
| Reference: | Hwang and Gibbs 1981 | | | | | | Total | 1.00 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Mining and Milling | | | | | | | |
| Operation: | Mining | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.060 | 0.3409 | 0.0216 | 0.0025 | 0.0004 | 0.0007 | 0 | | |
| 0.061-0.100 | 0.2701 | 0.027 | 0.0065 | 0.0007 | 0.0007 | 0 | | |
| 0.101-0.200 | 0.1994 | 0.0399 | 0.0086 | 0.0043 | 0.0054 | 0.0004 | | |
| 0.201-0.300 | 0.0331 | 0.0104 | 0.0043 | 0.0011 | 0.0004 | 0.0004 | | |
| 0.301-0.400 | 0.0065 | 0.004 | 0.0014 | 0 | 0 | 0 | | |
| 0.401-0.500 | 0.0025 | 0.0022 | 0.0004 | 0 | 0.0004 | 0 | | |
| >0.500 | 0 | 0.0019 | 0.0012 | 0 | 0.0007 | 0 | | |

| | | | | | | | | |
|----------------------|-----------------------------|------------------|------------------|-------------------|--------------------|------------------|-------|------|
| Reference: | Hwang and Gibbs 1981 | | | | | | Total | 1.00 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Mining and Milling | | | | | | | |
| Operation: | Bagging | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.060 | 0.2689 | 0.0188 | 0.0022 | 0.0011 | 0 | 0 | | |
| 0.061-0.100 | 0.2473 | 0.0392 | 0.0061 | 0.0039 | 0.0017 | 0 | | |
| 0.101-0.200 | 0.2280 | 0.0629 | 0.0248 | 0.0077 | 0.0050 | 0 | | |
| 0.201-0.300 | 0.0260 | 0.0182 | 0.0083 | 0.0022 | 0.0022 | 0 | | |
| 0.301-0.400 | 0.0050 | 0.0083 | 0.0017 | 0.0011 | 0 | 0 | | |
| 0.401-0.500 | 0.0022 | 0.0022 | 0.0006 | 0.0006 | 0 | 0 | | |
| >0.500 | 0 | 0.0022 | 0.0011 | 0.0006 | 0 | 0 | | |

| | | | | | | | | |
|----------------------|------------------------------|------------------|------------------|-------------------|--------------------|------------------|-------|------|
| Reference: | Hwang and Gibbs 1981 | | | | | | Total | 1.00 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Cement Manufacturing | | | | | | | |
| Operation: | Dumping (Preparation) | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.060 | 0.2681 | 0.0124 | 0.0000 | 0.0000 | 0.0004 | 0.0004 | | |
| 0.061-0.100 | 0.3319 | 0.0244 | 0.0039 | 0.0000 | 0.0004 | 0.0000 | | |
| 0.101-0.200 | 0.2343 | 0.0356 | 0.0058 | 0.0012 | 0.0000 | 0.0000 | | |
| 0.201-0.300 | 0.0364 | 0.0186 | 0.0023 | 0.0012 | 0.0004 | 0.0000 | | |
| 0.301-0.400 | 0.0081 | 0.0062 | 0.0008 | 0.0012 | 0.0004 | 0.0000 | | |
| 0.401-0.500 | 0.0004 | 0.0027 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | |
| >0.500 | 0.0004 | 0.0020 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | | |

BINS OF INTEREST BY OPERATION

| | | | | | |
|--------------------|-----------------------------|---------------|--------------|----------------|-----------------|
| Reference: | Hwang and Gibbs 1981 | | | | <i>Index 10</i> |
| Fiber Type: | Crocidolite | | | | |
| Industry: | Mining and Milling | | | | |
| Operation: | Mining | | | | |
| | | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9206 | 0.0257 | 0.0076 | 0.0072 | |
| 0.25<w<0.4 | 0.0323 | 0.0041 | 0.0004 | | |
| w<0.4 | 0.9529 | 0.0298 | 0.0080 | | |
| w>0.4 | 0.0066 | 0.0016 | 0.0011 | | |

NOTE: Factor for splitting width bins = 0.5.

| | | | | | |
|--------------------|-----------------------------|---------------|--------------|----------------|-----------------|
| Reference: | Hwang and Gibbs 1981 | | | | <i>Index 11</i> |
| Fiber Type: | Crocidolite | | | | |
| Industry: | Mining and Milling | | | | |
| Operation: | Bagging | | | | |
| | | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.8871 | 0.0510 | 0.0078 | 0.0120 | |
| 0.25<w<0.4 | 0.0354 | 0.0080 | 0.0011 | | |
| w<0.4 | 0.9225 | 0.0591 | 0.0089 | | |
| w>0.4 | 0.0066 | 0.0029 | 0.0000 | | |

NOTE: Factor for splitting width bins = 0.5.

| | | | | | |
|--------------------|------------------------------|---------------|--------------|----------------|-----------------|
| Reference: | Hwang and Gibbs 1981 | | | | <i>Index 12</i> |
| Fiber Type: | Crocidolite | | | | |
| Industry: | Cement Manufacturing | | | | |
| Operation: | Dumping (Preparation) | | | | |
| | | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9343 | 0.0127 | 0.0014 | 0.0044 | |
| 0.25<w<0.4 | 0.0418 | 0.0038 | 0.0006 | | |
| w<0.4 | 0.9761 | 0.0164 | 0.0020 | | |
| w>0.4 | 0.0055 | 0.0000 | 0.0000 | | |

NOTE: Factor for splitting width bins = 0.5.

| | | | | | | | | |
|----------------------|---|------------------|------------------|-------------------|--------------------|------------------|-------|-------|
| Reference: | Hwang and Gibbs 1981 | | | | | | Total | 1.000 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Mining and Milling | | | | | | | |
| Operation: | Mining, storage, crushing, bagging | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.10 | 0.55671 | 0.04871 | 0.00760 | 0.00170 | 0.00110 | 0.00000 | | |
| 0.11-0.20 | 0.22214 | 0.05131 | 0.01430 | 0.00480 | 0.00360 | 0.00010 | | |
| 0.21-0.40 | 0.04251 | 0.02200 | 0.00780 | 0.00210 | 0.00110 | 0.00010 | | |
| >0.40 | 0.00280 | 0.00580 | 0.00190 | 0.00090 | 0.00090 | 0.00000 | | |

| | | | | |
|--------------------|---|---------------|--------------|----------------|
| Reference: | Hwang and Gibbs 1981 | | | <i>Index 7</i> |
| Fiber Type: | Crocidolite | | | |
| Industry: | Mining and Milling | | | |
| Operation: | Mining, storage, crushing, bagging | | | |
| | | L<5 | L5-10 | L>10 |
| w<0.25 | 0.8840 | 0.0292 | 0.0049 | PCME 0.0139 |
| 0.25<w<0.4 | 0.0594 | 0.0091 | 0.0011 | |
| w<0.4 | 0.9434 | 0.0383 | 0.0060 | |
| w>0.4 | 0.0086 | 0.0028 | 0.0009 | |

NOTE: Factor for splitting width bins = 0.07875.

| | | | | | | | | |
|----------------------|--|------------------|------------------|-------------------|--------------------|------------------|-------|-------|
| Reference: | Hwang and Gibbs 1981 (Table 3a) | | | | | | Total | 1.000 |
| Fiber Type: | Crocidolite | | | | | | | |
| Industry: | Cement Manufacturing | | | | | | | |
| Operation: | Preparation (Dumping/Mixing) | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.10 | 0.5561 | 0.0403 | 0.0059 | 0.0014 | 0.0017 | 0.0003 | | |
| 0.11-0.20 | 0.2397 | 0.0431 | 0.0073 | 0.0014 | 0.0011 | 0 | | |
| 0.21-0.40 | 0.0509 | 0.0294 | 0.005 | 0.0031 | 0.0014 | 0 | | |
| >0.40 | 0.0028 | 0.007 | 0.0006 | 0.0003 | 0.0012 | 0 | | |

| | | | | |
|--------------------|--|---------------|--------------|----------------|
| Reference: | Hwang and Gibbs 1981 (Table 3a) | | | <i>Index 8</i> |
| Fiber Type: | Crocidolite | | | |
| Industry: | Cement Manufacturing | | | |
| Operation: | Preparation (Dumping/Mixing) | | | |
| | | L<5 | L5-10 | L>10 |
| w<0.25 | 0.8855 | 0.0166 | 0.0032 | PCME 0.0109 |
| 0.25<w<0.4 | 0.0740 | 0.0075 | 0.0013 | |
| w<0.4 | 0.9595 | 0.0241 | 0.0045 | |
| w>0.4 | 0.0098 | 0.0009 | 0.0012 | |

NOTE: Factor for splitting width bins = 0.07875.

| | | | | | | | | |
|----------------------|--|------------------|------------------|-------------------|--------------------|------------------|-------|-------|
| Reference: | Hwang and Gibbs 1981 (Table 3a) | | | | | | Total | 1.000 |
| Fiber Type: | Crocidolite and Chrysotile | | | | | | | |
| Industry: | Cement Manufacturing | | | | | | | |
| Operation: | Finishing (Cutting) | | | | | | | |
| | Length (um) | | | | | | | |
| Diameter (um) | <=2.50 | 2.51-5.00 | 5.01-7.50 | 7.51-10.00 | 10.01-20.00 | >20.00 | | |
| <=0.10 | 0.93031394 | 0.03129374 | 0.0029994 | 0.0014997 | 0 | 0 | | |
| 0.11-0.20 | 0.02089582 | 0.004999 | 0.0019996 | 0 | 0 | 0 | | |
| 0.21-0.40 | 0.0019996 | 0 | 0.0019996 | 0 | 0.0009998 | 0 | | |
| >0.40 | 0 | 0.0004999 | 0 | 0 | 0.0004999 | 0 | | |

| | | | | |
|--------------------|--|---------------|--------------|----------------|
| Reference: | Hwang and Gibbs 1981 (Table 3a) | | | <i>Index 9</i> |
| Fiber Type: | Crocidolite and Chrysotile | | | |
| Industry: | Cement Manufacturing | | | |
| Operation: | Finishing (Cutting) | | | |
| | | L<5 | L5-10 | L>10 |
| w<0.25 | 0.9877 | 0.0067 | 0.0001 | PCME 0.0033 |
| 0.25<w<0.4 | 0.0018 | 0.0018 | 0.0009 | |
| w<0.4 | 0.9895 | 0.0085 | 0.0010 | |
| w>0.4 | 0.0005 | 0.0000 | 0.0005 | |

NOTE: Factor for splitting width bins = 0.07875.

BINS OF INTEREST ACROSS OPERATIONS

| | | | | |
|--------------------|---|--------|--------|---------------|
| Reference: | Hwang and Gibbs 1981 | | | <i>Index</i> |
| Fiber Type: | Crocidolite | | | <i>10, 11</i> |
| Industry: | Mining and Milling | | | |
| Operation: | Combined Operations (Mining & Bagging) | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9039 | 0.0384 | 0.0077 | 0.0096 |
| 0.25<w<0.4 | 0.0338 | 0.0061 | 0.0007 | |
| w<0.4 | 0.9377 | 0.0444 | 0.0084 | |
| w>0.4 | 0.0066 | 0.0022 | 0.0006 | |

NOTE: Factor for splitting width bins = 0.5.

| | | | | |
|--------------------|--|--------|--------|------------------|
| Reference: | Hwang and Gibbs 1981 | | | <i>Index</i> |
| Fiber Type: | Crocidolite | | | <i>7, 10, 11</i> |
| Industry: | Mining and Milling | | | |
| Operation: | Combined (Mining, crushing, storing, bagging) | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.8973 | 0.0353 | 0.0068 | 0.0111 |
| 0.25<w<0.4 | 0.0424 | 0.0071 | 0.0009 | |
| w<0.4 | 0.9396 | 0.0424 | 0.0076 | |
| w>0.4 | 0.0073 | 0.0024 | 0.0007 | |

| | | | | |
|--------------------|------------------------------------|--------|--------|--------------|
| Reference: | Hwang and Gibbs 1981 | | | <i>Index</i> |
| Fiber Type: | Crocidolite | | | 8, 9, 12 |
| Industry: | Cement Manufacturing | | | |
| Operation: | Preparation & Finishing | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9358 | 0.0120 | 0.0016 | 0.0062 |
| 0.25<w<0.4 | 0.0392 | 0.0044 | 0.0009 | |
| w<0.4 | 0.9750 | 0.0163 | 0.0025 | |
| w>0.4 | 0.0053 | 0.0003 | 0.0006 | |

Factor 0.07875

Source: Sebastien 1983

| | Approx. Length | Approx. Diameter | PCME? | Width bin | length bin | Comb |
|----|-------------------|---------------------|-------|-----------|------------|------|
| 1 | 1.16 | 0.18 | 0 | 1 | 1 | 11 |
| 2 | 1.4 | 0.18 | 0 | 1 | 1 | 11 |
| 3 | 1.63 | 0.18 | 0 | 1 | 1 | 11 |
| 4 | 1.63 | 0.28 | 0 | 1 | 1 | 11 |
| 5 | 1.63 | 0.36 | 0 | 1 | 1 | 11 |
| 6 | 1.95 | 0.18 | 0 | 1 | 1 | 11 |
| 7 | 2.15 | 0.28 | 0 | 1 | 1 | 11 |
| 8 | 2.25 | 0.18 | 0 | 1 | 1 | 11 |
| 9 | 2.32 | 0.28 | 0 | 1 | 1 | 11 |
| 10 | 2.32 | 0.46 | 0 | 2 | 1 | 21 |
| 11 | 2.35 | 0.18 | 0 | 1 | 1 | 11 |
| 12 | 2.35 | 0.28 | 0 | 1 | 1 | 11 |
| 13 | 2.55 | 0.18 | 0 | 1 | 1 | 11 |
| 14 | 2.8 | 0.18 | 0 | 1 | 1 | 11 |
| 15 | 3.1 | 0.18 | 0 | 1 | 1 | 11 |
| 16 | 3.1 | 0.36 | 0 | 1 | 1 | 11 |
| 17 | 3.13 | 0.18 | 0 | 1 | 1 | 11 |
| 18 | 3.2 | 0.28 | 0 | 1 | 1 | 11 |
| 19 | 3.25 | 0.18 | 0 | 1 | 1 | 11 |
| 20 | 3.25 | 0.36 | 0 | 1 | 1 | 11 |
| 21 | 3.32 | 0.28 | 0 | 1 | 1 | 11 |
| 22 | 3.5 | 0.18 | 0 | 1 | 1 | 11 |
| 23 | 3.5 | 0.28 | 0 | 1 | 1 | 11 |
| 24 | 3.63 | 0.093 | 0 | 1 | 1 | 11 |
| 25 | 3.8 | 0.18 | 0 | 1 | 1 | 11 |
| 26 | 4 | 0.28 | 0 | 1 | 1 | 11 |
| 27 | 4 | 0.36 | 0 | 1 | 1 | 11 |
| 28 | 4.16 | 0.28 | 0 | 1 | 1 | 11 |
| 29 | 4.25 | 0.36 | 0 | 1 | 1 | 11 |
| 30 | 4.4 | 0.56 | 0 | 2 | 1 | 21 |
| 31 | 4.63 | 0.28 | 0 | 1 | 1 | 11 |
| 32 | 5 | 0.18 | 0 | 1 | 2 | 12 |
| 33 | 5 | 0.28 | 0 | 1 | 2 | 12 |
| 34 | 5.16 | 0.28 | 1 | 1 | 2 | 12 |
| 35 | 5.2 | 0.28 | 1 | 1 | 2 | 12 |
| 36 | 5.2 | 1.35 | 1 | 2 | 2 | 22 |
| 37 | 5.5 | 0.36 | 1 | 1 | 2 | 12 |
| 38 | 5.5 | 0.75 | 1 | 2 | 2 | 22 |
| 39 | 6 | 0.56 | 1 | 2 | 2 | 22 |
| 40 | 6.2 | 0.18 | 0 | 1 | 2 | 12 |
| 41 | 6.32 | 0.18 | 0 | 1 | 2 | 12 |
| 42 | 6.5 | 0.18 | 0 | 1 | 2 | 12 |
| 43 | 6.5 | 0.36 | 1 | 1 | 2 | 12 |
| 44 | 6.8 | 0.93 | 1 | 2 | 2 | 22 |
| 45 | 7 | 0.28 | 1 | 1 | 2 | 12 |
| 46 | 7.13 | 0.18 | 0 | 1 | 2 | 12 |
| 47 | 7.16 | 0.18 | 0 | 1 | 2 | 12 |
| 48 | 7.63 | 0.28 | 1 | 1 | 2 | 12 |
| 49 | 7.8 | 0.56 | 1 | 2 | 2 | 22 |
| 50 | 8 | 0.36 | 1 | 1 | 2 | 12 |
| 51 | 8.3 | 0.36 | 1 | 1 | 2 | 12 |
| 52 | 8.4 | 0.36 | 1 | 1 | 2 | 12 |
| 53 | 9 | 0.28 | 1 | 1 | 2 | 12 |
| 54 | 9.16 | 0.66 | 1 | 2 | 2 | 22 |
| 55 | 9.16 | 1.9 | 1 | 2 | 2 | 22 |
| 56 | 9.7 | 0.28 | 1 | 1 | 2 | 12 |
| 57 | 9.7 | 0.66 | 1 | 2 | 2 | 22 |
| 58 | 11 | 0.28 | 1 | 1 | 3 | 13 |
| 59 | 11 | 0.75 | 1 | 2 | 3 | 23 |
| 60 | 11 | 1.2 | 1 | 2 | 3 | 23 |

| | | | | | | |
|-----|------|------|---|---|---|----|
| 61 | 11.3 | 0.66 | 1 | 2 | 3 | 23 |
| 62 | 11.5 | 0.36 | 1 | 1 | 3 | 13 |
| 63 | 11.6 | 0.28 | 1 | 1 | 3 | 13 |
| 64 | 11.6 | 0.46 | 1 | 2 | 3 | 23 |
| 65 | 11.8 | 0.28 | 1 | 1 | 3 | 13 |
| 66 | 12.1 | 0.66 | 1 | 2 | 3 | 23 |
| 67 | 12.2 | 0.28 | 1 | 1 | 3 | 13 |
| 68 | 12.2 | 0.56 | 1 | 2 | 3 | 23 |
| 69 | 12.4 | 0.28 | 1 | 1 | 3 | 13 |
| 70 | 12.5 | 0.46 | 1 | 2 | 3 | 23 |
| 71 | 12.5 | 0.75 | 1 | 2 | 3 | 23 |
| 72 | 14.2 | 1.13 | 1 | 2 | 3 | 23 |
| 73 | 14.8 | 0.75 | 1 | 2 | 3 | 23 |
| 74 | 15.4 | 0.93 | 1 | 2 | 3 | 23 |
| 75 | 16 | 0.36 | 1 | 1 | 3 | 13 |
| 76 | 16 | 0.56 | 1 | 2 | 3 | 23 |
| 77 | 16.3 | 0.18 | 0 | 1 | 3 | 13 |
| 78 | 19 | 0.46 | 1 | 2 | 3 | 23 |
| 79 | 21.4 | 0.46 | 1 | 2 | 3 | 23 |
| 80 | 22.5 | 0.75 | 1 | 2 | 3 | 23 |
| 81 | 26.3 | 0.75 | 1 | 2 | 3 | 23 |
| 82 | 30 | 0.46 | 1 | 2 | 3 | 23 |
| 83 | 32.2 | 1.27 | 1 | 2 | 3 | 23 |
| 84 | 33.6 | 0.56 | 1 | 2 | 3 | 23 |
| 85 | 34 | 1.16 | 1 | 2 | 3 | 23 |
| 86 | 68 | 0.28 | 1 | 1 | 3 | 13 |
| 87 | 3.63 | 0.28 | 0 | 1 | 1 | 11 |
| 88 | 3.63 | 0.36 | 0 | 1 | 1 | 11 |
| 89 | 1.33 | 0.28 | 0 | 1 | 1 | 11 |
| 90 | 1.63 | 0.28 | 0 | 1 | 1 | 11 |
| 91 | 1.85 | 0.18 | 0 | 1 | 1 | 11 |
| 92 | 2.25 | 0.18 | 0 | 1 | 1 | 11 |
| 93 | 2.28 | 0.28 | 0 | 1 | 1 | 11 |
| 94 | 2.55 | 0.28 | 0 | 1 | 1 | 11 |
| 95 | 3.25 | 0.18 | 0 | 1 | 1 | 11 |
| 96 | 3.5 | 0.28 | 0 | 1 | 1 | 11 |
| 97 | 4.25 | 0.36 | 0 | 1 | 1 | 11 |
| 98 | 4.63 | 0.18 | 0 | 1 | 1 | 11 |
| 99 | 4.63 | 0.46 | 0 | 2 | 1 | 21 |
| 100 | 5 | 0.28 | 0 | 1 | 2 | 12 |
| 101 | 5.16 | 0.66 | 1 | 2 | 2 | 22 |
| 102 | 5.16 | 0.18 | 0 | 1 | 2 | 12 |
| 103 | 5.2 | 0.46 | 1 | 2 | 2 | 22 |
| 104 | 5.22 | 0.93 | 1 | 2 | 2 | 22 |
| 105 | 5.32 | 0.28 | 1 | 1 | 2 | 12 |
| 106 | 5.63 | 1.16 | 1 | 2 | 2 | 22 |
| 107 | 6 | 0.18 | 0 | 1 | 2 | 12 |
| 108 | 6.5 | 0.18 | 0 | 1 | 2 | 12 |
| 109 | 6.5 | 0.28 | 1 | 1 | 2 | 12 |
| 110 | 6.5 | 0.75 | 1 | 2 | 2 | 22 |
| 111 | 7.25 | 0.18 | 0 | 1 | 2 | 12 |
| 112 | 7.4 | 0.46 | 1 | 2 | 2 | 22 |
| 113 | 8.16 | 0.28 | 1 | 1 | 2 | 12 |
| 114 | 8.6 | 0.28 | 1 | 1 | 2 | 12 |
| 115 | 9 | 0.66 | 1 | 2 | 2 | 22 |
| 116 | 9.15 | 0.36 | 1 | 1 | 2 | 12 |
| 117 | 9.15 | 1.16 | 1 | 2 | 2 | 22 |
| 118 | 9.32 | 0.66 | 1 | 2 | 2 | 22 |
| 119 | 9.6 | 0.28 | 1 | 1 | 2 | 12 |
| 120 | 9.6 | 1.13 | 1 | 2 | 2 | 22 |

| | | | | | | |
|-----|------|-------|---|---|---|----|
| 121 | 10.1 | 1.27 | 1 | 2 | 3 | 23 |
| 122 | 10.1 | 1.9 | 1 | 2 | 3 | 23 |
| 123 | 10.4 | 0.28 | 1 | 1 | 3 | 13 |
| 124 | 11.6 | 0.56 | 1 | 2 | 3 | 23 |
| 125 | 11.8 | 0.46 | 1 | 2 | 3 | 23 |
| 126 | 12 | 0.56 | 1 | 2 | 3 | 23 |
| 127 | 12 | 1.16 | 1 | 2 | 3 | 23 |
| 128 | 12.1 | 0.66 | 1 | 2 | 3 | 23 |
| 129 | 15 | 1.9 | 1 | 2 | 3 | 23 |
| 130 | 18 | 1.16 | 1 | 2 | 3 | 23 |
| 131 | 22.5 | 0.28 | 1 | 1 | 3 | 13 |
| 132 | 27.5 | 0.66 | 1 | 2 | 3 | 23 |
| 133 | 29 | 0.66 | 1 | 2 | 3 | 23 |
| 134 | 34 | 0.75 | 1 | 2 | 3 | 23 |
| 135 | 1.13 | 0.18 | 0 | 1 | 1 | 11 |
| 136 | 1.32 | 0.18 | 0 | 1 | 1 | 11 |
| 137 | 1.32 | 0.28 | 0 | 1 | 1 | 11 |
| 138 | 1.6 | 0.18 | 0 | 1 | 1 | 11 |
| 139 | 1.6 | 0.28 | 0 | 1 | 1 | 11 |
| 140 | 1.85 | 0.093 | 0 | 1 | 1 | 11 |
| 141 | 1.85 | 0.18 | 0 | 1 | 1 | 11 |
| 142 | 2.16 | 0.18 | 0 | 1 | 1 | 11 |
| 143 | 2.16 | 0.36 | 0 | 1 | 1 | 11 |
| 144 | 2.25 | 0.18 | 0 | 1 | 1 | 11 |
| 145 | 2.35 | 0.28 | 0 | 1 | 1 | 11 |
| 146 | 2.55 | 0.28 | 0 | 1 | 1 | 11 |
| 147 | 2.8 | 0.18 | 0 | 1 | 1 | 11 |
| 148 | 2.8 | 0.28 | 0 | 1 | 1 | 11 |
| 149 | 2.8 | 0.36 | 0 | 1 | 1 | 11 |
| 150 | 2.8 | 0.46 | 0 | 2 | 1 | 21 |
| 151 | 2.9 | 0.18 | 0 | 1 | 1 | 11 |
| 152 | 3.1 | 0.93 | 0 | 2 | 1 | 21 |
| 153 | 3.16 | 0.28 | 0 | 1 | 1 | 11 |
| 154 | 3.16 | 0.75 | 0 | 2 | 1 | 21 |
| 155 | 3.25 | 0.28 | 0 | 1 | 1 | 11 |
| 156 | 3.32 | 0.28 | 0 | 1 | 1 | 11 |
| 157 | 3.32 | 0.36 | 0 | 1 | 1 | 11 |
| 158 | 3.5 | 0.66 | 0 | 2 | 1 | 21 |
| 159 | 3.63 | 0.18 | 0 | 1 | 1 | 11 |
| 160 | 3.63 | 0.28 | 0 | 1 | 1 | 11 |
| 161 | 4 | 0.18 | 0 | 1 | 1 | 11 |
| 162 | 4.16 | 0.28 | 0 | 1 | 1 | 11 |
| 163 | 4.25 | 0.28 | 0 | 1 | 1 | 11 |
| 164 | 4.35 | 0.18 | 0 | 1 | 1 | 11 |
| 165 | 4.4 | 0.18 | 0 | 1 | 1 | 11 |
| 166 | 4.63 | 0.18 | 0 | 1 | 1 | 11 |
| 167 | 5 | 0.18 | 0 | 1 | 2 | 12 |
| 168 | 4.63 | 0.46 | 0 | 2 | 1 | 21 |
| 169 | 5 | 0.36 | 0 | 1 | 2 | 12 |
| 170 | 5.2 | 0.36 | 1 | 1 | 2 | 12 |
| 171 | 5.25 | 0.18 | 0 | 1 | 2 | 12 |
| 172 | 5.4 | 0.18 | 0 | 1 | 2 | 12 |
| 173 | 5.5 | 0.18 | 0 | 1 | 2 | 12 |
| 174 | 5.5 | 0.46 | 1 | 2 | 2 | 22 |
| 175 | 5.8 | 0.18 | 0 | 1 | 2 | 12 |
| 176 | 6.13 | 0.66 | 1 | 2 | 2 | 22 |
| 177 | 6.35 | 0.093 | 0 | 1 | 2 | 12 |
| 178 | 6.5 | 0.13 | 0 | 1 | 2 | 12 |
| 179 | 6.5 | 0.18 | 0 | 1 | 2 | 12 |
| 180 | 6.5 | 0.23 | 0 | 1 | 2 | 12 |

| | | | | | | |
|-----|------|------|---|---|---|----|
| 181 | 6.63 | 1.35 | 1 | 2 | 2 | 22 |
| 182 | 7.15 | 0.28 | 1 | 1 | 2 | 12 |
| 183 | 7.15 | 0.32 | 1 | 1 | 2 | 12 |
| 184 | 7.15 | 0.46 | 1 | 2 | 2 | 22 |
| 185 | 7.15 | 1.2 | 1 | 2 | 2 | 22 |
| 186 | 7.16 | 0.36 | 1 | 1 | 2 | 12 |
| 187 | 7.3 | 0.28 | 1 | 1 | 2 | 12 |
| 188 | 7.9 | 0.18 | 0 | 1 | 2 | 12 |
| 189 | 8 | 0.36 | 1 | 1 | 2 | 12 |
| 190 | 8.1 | 0.18 | 0 | 1 | 2 | 12 |
| 191 | 8.1 | 0.46 | 1 | 2 | 2 | 22 |
| 192 | 8.1 | 1.63 | 1 | 2 | 2 | 22 |
| 193 | 8.3 | 0.28 | 1 | 1 | 2 | 12 |
| 194 | 8.63 | 0.28 | 1 | 1 | 2 | 12 |
| 195 | 9.32 | 0.36 | 1 | 1 | 2 | 12 |
| 196 | 9.7 | 0.46 | 1 | 2 | 2 | 22 |
| 197 | 10 | 0.18 | 0 | 1 | 2 | 12 |
| 198 | 10 | 0.28 | 1 | 1 | 2 | 12 |
| 199 | 10.3 | 0.28 | 1 | 1 | 3 | 13 |
| 200 | 10.6 | 0.36 | 1 | 1 | 3 | 13 |
| 201 | 11.1 | 0.66 | 1 | 2 | 3 | 23 |
| 202 | 11.3 | 0.36 | 1 | 1 | 3 | 13 |
| 203 | 11.6 | 0.46 | 1 | 2 | 3 | 23 |
| 204 | 11.8 | 0.28 | 1 | 1 | 3 | 13 |
| 205 | 12 | 0.46 | 1 | 2 | 3 | 23 |
| 206 | 14.2 | 0.36 | 1 | 1 | 3 | 13 |
| 207 | 15.4 | 0.56 | 1 | 2 | 3 | 23 |
| 208 | 16 | 0.28 | 1 | 1 | 3 | 13 |
| 209 | 16.3 | 0.18 | 0 | 1 | 3 | 13 |
| 210 | 16.3 | 0.23 | 0 | 1 | 3 | 13 |
| 211 | 17 | 0.56 | 1 | 2 | 3 | 23 |
| 212 | 19 | 0.18 | 0 | 1 | 3 | 13 |
| 213 | 22 | 0.18 | 0 | 1 | 3 | 13 |
| 214 | 22 | 0.28 | 1 | 1 | 3 | 13 |
| 215 | 24 | 0.28 | 1 | 1 | 3 | 13 |
| 216 | 25 | 1.16 | 1 | 2 | 3 | 23 |
| 217 | 29 | 1.63 | 1 | 2 | 3 | 23 |
| 218 | 35 | 0.36 | 1 | 1 | 3 | 13 |
| 219 | 41.3 | 1.16 | 1 | 2 | 3 | 23 |
| 220 | 45 | 0.93 | 1 | 2 | 3 | 23 |
| 221 | 65 | 1.63 | 1 | 2 | 3 | 23 |

COUNT

| width | Length | | |
|-------|--------|------|------|
| | < 5 | 5-10 | > 10 |
| < 0.4 | 69 | 52 | 24 |
| > 0.4 | 8 | 26 | 42 |

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PCME 114

FRACTION

| width | Length | | |
|-------|--------|------|------|
| | < 5 | 5-10 | > 10 |
| < 0.4 | 0.31 | 0.24 | 0.11 |
| > 0.4 | 0.04 | 0.12 | 0.19 |
| | 0.35 | 0.35 | 0.30 |

0.66

0.34

1.00

PCME 0.52

SUMMARY OF TEM MATCH TO EPIDEMIOLOGY STUDY_LUNG CANCER

British Friction Products

Chrysotile

| | | | | |
|-------------|-------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 16, 17, 18 |
| Industry: | Friction Products | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.7956 | 0.0302 | 0.0230 | 0.0642 |
| 0.25<w<0.4 | 0.0537 | 0.0088 | 0.0084 | |
| w < 0.4 | 0.8492 | 0.0390 | 0.0314 | |
| w > 0.4 | 0.0334 | 0.0155 | 0.0315 | |

Amphibole

| | | | | |
|-------------|--|--------|--------|-----------|
| Reference: | H&G 1981; G&H 1980 | | | Index |
| Fiber Type: | Crocidolite | | | 3,4,7,8,9 |
| Industry: | Cement Manufacturing Mining & Milling | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9133 | 0.0273 | 0.0052 | 0.0089 |
| 0.25<w<0.4 | 0.0392 | 0.0060 | 0.0010 | |
| w<0.4 | 0.9525 | 0.0333 | 0.0061 | |
| w>0.4 | 0.0062 | 0.0014 | 0.0005 | |

South Carolina Textiles

Chrysotile

| | | | | |
|-------------|------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 13, 14, 15 |
| Industry: | Textile Products | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.6978 | 0.0368 | 0.0334 | 0.1166 |
| 0.25<w<0.4 | 0.0687 | 0.0128 | 0.0153 | |
| w < 0.4 | 0.7665 | 0.0495 | 0.0488 | |
| w > 0.4 | 0.0467 | 0.0329 | 0.0556 | |

Amphibole

| | | | | |
|-------------|---------------------------------------|--------|--------|--------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Tremolite | | | 27 |
| Industry: | Talc Production (Mining & Milling) | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.6176 | 0.0035 | 0.0000 | 0.0318 |
| 0.25<w<0.4 | 0.1674 | 0.0077 | 0.0027 | |
| w < 0.4 | 0.7849 | 0.0112 | 0.0027 | |
| w > 0.4 | 0.1798 | 0.0177 | 0.0038 | |

U.S. Retirees (Amosite only)

Chrysotile

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

Amphibole

| | | | | |
|-------------|--|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Amosite | | | 22, 23, 24 |
| Industry: | Pipe Insulation Mfg. Mining/Milling | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.3289 | 0.0417 | 0.0119 | 0.2458 |
| 0.25<w<0.4 | 0.1852 | 0.0559 | 0.0275 | |
| w < 0.4 | 0.5141 | 0.0976 | 0.0394 | |
| w > 0.4 | 0.1865 | 0.0762 | 0.0861 | |

U.S. Retirees (Chrysotile only)

Chrysotile

| | | | | |
|-------------|--|--------|--------|--------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 5,6,13,14,15 |
| Industry: | All Industry (Mining, textiles, friction products, Cement mfg.) 16,17,18 19,20,21 | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8022 | 0.0274 | 0.0209 | 0.0638 |
| 0.25<w<0.4 | 0.0557 | 0.0097 | 0.0083 | |
| w < 0.4 | 0.8579 | 0.0371 | 0.0292 | |
| w > 0.4 | 0.0300 | 0.0171 | 0.0287 | |

Amphibole

| | | | | |
|------------|-------------------------------------|--------|--------|--------|
| Reference: | D&H 1979 | | | Index |
| Industry: | Talc Production (Mining/Milling) | | | |
| | Length | | | |
| Width | 0-5 | 5-10 | >10 | PCME |
| < 0.25 | 0.6176 | 0.0035 | 0.0000 | 0.0318 |
| 0.25-0.4 | 0.1674 | 0.0077 | 0.0027 | |
| < 0.4 | 0.7849 | 0.0112 | 0.0027 | |
| > 0.4 | 0.1798 | 0.0177 | 0.0038 | |

U.S. Retirees (Mixed - Chrysotile & crocidolite)

Chrysotile

| | | | | |
|-------------|-------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 19, 20, 21 |
| Industry: | Cement Pipe | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

Amphibole

| | | | | |
|-------------|----------------------|--------|--------|----------|
| Reference: | H&G 1981 | | | Index |
| Fiber Type: | Crocidolite | | | 8, 9, 12 |
| Industry: | Cement Manufacturing | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9358 | 0.0120 | 0.0016 | 0.0062 |
| 0.25<w<0.4 | 0.0392 | 0.0044 | 0.0009 | |
| w<0.4 | 0.9750 | 0.0163 | 0.0025 | |
| w>0.4 | 0.0053 | 0.0003 | 0.0006 | |

Ontario Cement Mfg.

Chrysotile

| | | | | |
|-------------|------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 19, 20, 21 |
| Industry: | Cement Pipe Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

Amphibole

| | | | | |
|-------------|----------------------|--------|--------|----------|
| Reference: | H&G 1981 | | | Index |
| Fiber Type: | Crocidolite | | | 8, 9, 12 |
| Industry: | Cement Manufacturing | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9358 | 0.0120 | 0.0016 | 0.0062 |
| 0.25<w<0.4 | 0.0392 | 0.0044 | 0.0009 | |
| w<0.4 | 0.9750 | 0.0163 | 0.0025 | |
| w>0.4 | 0.0053 | 0.0003 | 0.0006 | |

New Orleans (plant 1)

| Chrysotile | | | | |
|-------------------|-------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 19, 20, 21 |
| Industry: | Cement Pipe | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

| Amphibole | | | | |
|------------------|--|--------|--------|------------|
| Reference: | D&H 1979, H&G 1981 | | | Index |
| Fiber Type: | Amosite and Crocidolite | | | 22, 23, 24 |
| Industry: | Pipe Insulation Mfg. Mining/Milling, Cement Mfg | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.5565 | 0.0306 | 0.0080 | 0.1559 |
| 0.25<w<0.4 | 0.1305 | 0.0365 | 0.0176 | |
| w < 0.4 | 0.6870 | 0.0671 | 0.0256 | |
| w > 0.4 | 0.1185 | 0.0478 | 0.0541 | |

New Orleans (plant 2 chrysotile only)

| Chrysotile | | | | |
|-------------------|-------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 19, 20, 21 |
| Industry: | Cement Pipe | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

| Amphibole | | | | |
|------------------|-----------------|--------|--------|--------|
| Reference: | D&H 1979 | | | Index |
| Industry: | Talc Production | | | 27 |
| Operation: | Mining/Milling | | | |
| | Length | | | PCME |
| Width | 0-5 | 5-10 | >10 | |
| < 0.25 | 0.6176 | 0.0035 | 0.0000 | 0.0318 |
| 0.25-0.4 | 0.1674 | 0.0077 | 0.0027 | |
| < 0.4 | 0.7849 | 0.0112 | 0.0027 | |
| > 0.4 | 0.1798 | 0.0177 | 0.0038 | |

New Orleans (plant 2 chrysotile and crocidolite)

| Chrysotile | | | | |
|-------------------|------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 19, 20, 21 |
| Industry: | Cement Pipe Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

| Amphibole | | | | |
|------------------|-----------------|--------|--------|----------|
| Reference: | H&G 1981 | | | Index |
| Fiber Type: | Crocidolite | | | 8, 9, 12 |
| Industry: | Cement Pipe Mfg | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9358 | 0.0120 | 0.0016 | 0.0062 |
| 0.25<w<0.4 | 0.0392 | 0.0044 | 0.0009 | |
| w<0.4 | 0.9750 | 0.0163 | 0.0025 | |
| w>0.4 | 0.0053 | 0.0003 | 0.0006 | |

Quebec

| Chrysotile | | | | |
|-------------------|----------------|--------|------------|--------|
| G&H 1980 | | | Index 5, 6 | |
| Fiber Type: | Chrysotile | | | |
| Industry: | Mining/Milling | | | |
| | Length | | | PCME |
| Width | 0-5 | 5-10 | >10 | |
| < 0.25 | 0.9448 | 0.0104 | 0.0033 | 0.0133 |
| 0.25-0.4 | 0.0194 | 0.0058 | 0.0020 | |
| < 0.4 | 0.9642 | 0.0162 | 0.0053 | |
| > 0.4 | 0.0088 | 0.0042 | 0.0013 | |

| Amphibole | | | | |
|------------------|-----------------|--------|--------|--------|
| Reference: | D&H 1979 | | | Index |
| Industry: | Talc Production | | | 27 |
| Operation: | Mining/Milling | | | |
| | Length | | | PCME |
| Width | 0-5 | 5-10 | >10 | |
| < 0.25 | 0.6176 | 0.0035 | 0.0000 | 0.0318 |
| 0.25-0.4 | 0.1674 | 0.0077 | 0.0027 | |
| < 0.4 | 0.7849 | 0.0112 | 0.0027 | |
| > 0.4 | 0.1798 | 0.0177 | 0.0038 | |

Pennsylvania

| Chrysotile | | | | |
|-------------------|------------------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 13, 14, 15 |
| Industry: | Friction Products & Textiles | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.7467 | 0.0335 | 0.0282 | 0.0904 |
| 0.25<w<0.4 | 0.0612 | 0.0108 | 0.0119 | |
| w < 0.4 | 0.8078 | 0.0443 | 0.0401 | |
| w > 0.4 | 0.0401 | 0.0242 | 0.0435 | |

| Amphibole | | | | |
|------------------|---|--------|--------|------------|
| Reference: | D&H 1979; H&G 1981 | | | Index |
| Fiber Type: | Amosite and Crocidolite | | | 22, 23, 24 |
| Industry: | Pipe Insulation Mfg. Mining/Milling Cement Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.7247 | 0.0317 | 0.0074 | 0.0932 |
| 0.25<w<0.4 | 0.0679 | 0.0170 | 0.0082 | |
| w < 0.4 | 0.7927 | 0.0488 | 0.0156 | |
| w > 0.4 | 0.0750 | 0.0306 | 0.0374 | |

Connecticut**Chrysotile**

| | | | | |
|-------------|-------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 16, 17, 18 |
| Industry: | Friction Products | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.7956 | 0.0302 | 0.0230 | 0.0642 |
| 0.25<w<0.4 | 0.0537 | 0.0088 | 0.0084 | |
| w < 0.4 | 0.8492 | 0.0390 | 0.0314 | |
| w > 0.4 | 0.0334 | 0.0155 | 0.0315 | |

Amphibole

| | | | | |
|-------------|-------------------------------------|--------|--------|--------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Anthophyllite | | | 25, 26 |
| Industry: | Talc Production (Mining/Milling) | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.7027 | 0.0170 | 0.0031 | 0.0849 |
| 0.25<w<0.4 | 0.1182 | 0.0134 | 0.0103 | |
| w < 0.4 | 0.8209 | 0.0304 | 0.0135 | |
| w > 0.4 | 0.0741 | 0.0410 | 0.0201 | |

Rochdale, England**Chrysotile**

| | | | | |
|-------------|------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 13, 14, 15 |
| Industry: | Textile Products | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.6978 | 0.0368 | 0.0334 | 0.1166 |
| 0.25<w<0.4 | 0.0687 | 0.0128 | 0.0153 | |
| w < 0.4 | 0.7665 | 0.0495 | 0.0488 | |
| w > 0.4 | 0.0467 | 0.0329 | 0.0556 | |

Amphibole

| | | | | |
|-------------|-----------------------------|--------|--------|------------|
| Reference: | H&G 1981, G&H 1980 | | | Index |
| Fiber Type: | Crocidolite | | | 3,4,7,8,9 |
| Industry: | Mining/Milling, Cement Mfg. | | | 10, 11, 12 |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.9133 | 0.0273 | 0.0052 | 0.0089 |
| 0.25<w<0.4 | 0.0392 | 0.0060 | 0.0010 | |
| w < 0.4 | 0.9525 | 0.0333 | 0.0061 | |
| w > 0.4 | 0.0062 | 0.0014 | 0.0005 | |

Italian Miners**Chrysotile**

| | | | | |
|-------------|------------------|--------|--------|------------|
| Reference: | G&H 1980 | | | Index 5, 6 |
| Fiber Type: | Chrysotile | | | |
| Industry: | Mining & Milling | | | |
| | Length | | | PCME |
| Width | 0-5 | 5-10 | >10 | |
| < 0.25 | 0.9448 | 0.0104 | 0.0033 | 0.0133 |
| 0.25-0.4 | 0.0194 | 0.0058 | 0.0020 | |
| < 0.4 | 0.9642 | 0.0162 | 0.0053 | |
| > 0.4 | 0.0088 | 0.0042 | 0.0013 | |

Amphibole

| | | | | |
|------------|-------------------------------------|--------|--------|--------|
| Reference: | D&H 1979 | | | Index |
| Industry: | Talc Production (Mining/Milling) | | | 27 |
| | Length | | | PCME |
| Width | 0-5 | 5-10 | >10 | |
| < 0.25 | 0.6176 | 0.0035 | 0.0000 | 0.0318 |
| 0.25-0.4 | 0.1674 | 0.0077 | 0.0027 | |
| < 0.4 | 0.7849 | 0.0112 | 0.0027 | |
| > 0.4 | 0.1798 | 0.0177 | 0.0038 | |

New Jersey Insulations Mfg.**Chrysotile**

| | | | | |
|-------------|--|--------|--------|-------------------------|
| Reference: | D&H 1979, G&H 1980 | | | Index |
| Fiber Type: | Chrysotile | | | 5,6,13,14 |
| Industry: | All Industry (Mining, textiles, friction products, Cement mfg.) | | | 15,16,17 18,19,20,21 |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8022 | 0.0274 | 0.0209 | 0.0638 |
| 0.25<w<0.4 | 0.0557 | 0.0097 | 0.0083 | |
| w < 0.4 | 0.8579 | 0.0371 | 0.0292 | |
| w > 0.4 | 0.0300 | 0.0171 | 0.0287 | |

Amphibole

| | | | | |
|-------------|----------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Amosite | | | 22, 23, 24 |
| Industry: | Pipe Insulation Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.2220 | 0.0435 | 0.0134 | 0.3181 |
| 0.25<w<0.4 | 0.1446 | 0.0464 | 0.0274 | |
| w < 0.4 | 0.3666 | 0.0899 | 0.0409 | |
| w > 0.4 | 0.2584 | 0.1084 | 0.1359 | |

Swedish Cement Mfg.**Chrysotile**

| | | | | |
|-------------|------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 19, 20, 21 |
| Industry: | Cement Pipe Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

Amphibole

| | | | | |
|-------------|---|--------|--------|---------------|
| Reference: | D&H 1979, H&G 1981 | | | Index |
| Fiber Type: | Amosite and Crocidolite | | | 22, 23, 24 |
| Industry: | Pipe Insulation Mfg. Mining/Milling, Cement Mfg. | | | 1,2, 8, 9, 12 |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.5565 | 0.0306 | 0.0080 | 0.1559 |
| 0.25<w<0.4 | 0.1305 | 0.0365 | 0.0176 | |
| w < 0.4 | 0.6870 | 0.0671 | 0.0256 | |
| w > 0.4 | 0.1185 | 0.0478 | 0.0541 | |

Libby, MT Miners

Chrysotile

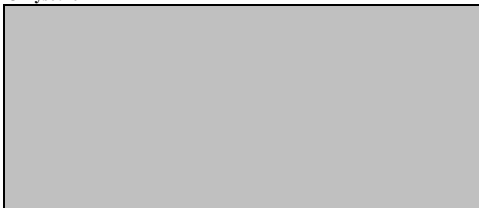


Amphibole

| width | Length | | | Index 28 PCME 0.52 |
|-------|--------|------|------|--------------------------|
| | < 5 | 5-10 | > 10 | |
| < 0.4 | 0.31 | 0.24 | 0.11 | |
| > 0.4 | 0.04 | 0.12 | 0.19 | |

Australia

Chrysotile



Amphibole

| | | | | |
|-------------|----------------------|-----------|--------|--------|
| Reference: | H&G 1981 | Index | | |
| | Gibbs and Hwang 1980 | 7, 10, 11 | | |
| Fiber Type: | Crocidolite | 3, 4 | | |
| Industry: | Mining and Milling | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.8997 | 0.0365 | 0.0073 | 0.0105 |
| 0.25<w<0.4 | 0.0392 | 0.0070 | 0.0010 | |
| w<0.4 | 0.9389 | 0.0435 | 0.0083 | |
| w>0.4 | 0.0067 | 0.0020 | 0.0005 | |

Belgium Cement Mfg.

Chrysotile

| | | | | |
|-------------|-------------|------------|--------|--------|
| Reference: | D&H 1979 | Index | | |
| Fiber Type: | Chrysotile | 19, 20, 21 | | |
| Industry: | Cement Pipe | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

Amphibole

| | | | | |
|-------------|--|------------|--------|--------|
| Reference: | D&H 1979, H&G 1981 | Index | | |
| Fiber Type: | Amosite and Crocidolite | 22, 23, 24 | | |
| Industry: | Pipe Insulation Mfg. Mining/Milling, Cement Mfg | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.5565 | 0.0306 | 0.0080 | 0.1559 |
| 0.25<w<0.4 | 0.1305 | 0.0365 | 0.0176 | |
| w < 0.4 | 0.6870 | 0.0671 | 0.0256 | |
| w > 0.4 | 0.1185 | 0.0478 | 0.0541 | |

Austrian Cement Mfg.

Chrysotile

| | | | | |
|-------------|------------------|------------|--------|--------|
| Reference: | D&H 1979 | Index | | |
| Fiber Type: | Chrysotile | 19, 20, 21 | | |
| Industry: | Cement Pipe Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

Amphibole

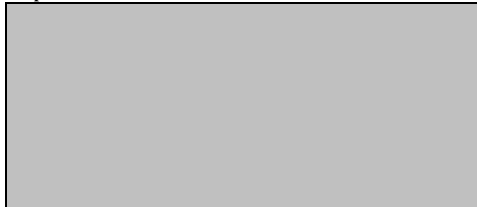
| | | | | |
|-------------|----------------------|----------|--------|--------|
| Reference: | H&G 1981 | Index | | |
| Fiber Type: | Crocidolite | 8, 9, 12 | | |
| Industry: | Cement Manufacturing | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9358 | 0.0120 | 0.0016 | 0.0062 |
| 0.25<w<0.4 | 0.0392 | 0.0044 | 0.0009 | |
| w<0.4 | 0.9750 | 0.0163 | 0.0025 | |
| w>0.4 | 0.0053 | 0.0003 | 0.0006 | |

China

Chrysotile

| | | | | |
|-------------|---|---------|--------|--------|
| Reference: | Dement and Harris 1979 | Index | | |
| Fiber Type: | Chrysotile | 13 - 21 | | |
| Industry: | Textiles, Friction Products Cement Pipe Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.7705 | 0.0312 | 0.0248 | 0.0750 |
| 0.25<w<0.4 | 0.0637 | 0.0105 | 0.0097 | |
| w < 0.4 | 0.8343 | 0.0417 | 0.0345 | |
| w > 0.4 | 0.0347 | 0.0200 | 0.0348 | |

Amphibole



SUMMARY OF TEM MATCH TO EPIDEMIOLOGY STUDY_MESOTHELIOMA

South Carolina

Chrysotile

| | | | | | |
|-------------|------------------|--------|--------|--|------------|
| Reference: | D&H 1979 | | | | Index |
| Fiber Type: | Chrysotile | | | | 13, 14 ,15 |
| Industry: | Textile Products | | | | |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.6978 | 0.0368 | 0.0334 | | 0.1166 |
| 0.25<w<0.4 | 0.0687 | 0.0128 | 0.0153 | | |
| w < 0.4 | 0.7665 | 0.0495 | 0.0488 | | |
| w > 0.4 | 0.0467 | 0.0329 | 0.0556 | | |

Amphibole

| | | | | | |
|-------------|-------------------------------------|--------|--------|--|--------|
| Reference: | H&G 1981 | | | | Index |
| Fiber Type: | Tremolite | | | | 27 |
| Industry: | Talc Production (Mining/Milling) | | | | |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.6176 | 0.0035 | 0.0000 | | 0.0318 |
| 0.25<w<0.4 | 0.1674 | 0.0077 | 0.0027 | | |
| w <0.4 | 0.7849 | 0.0112 | 0.0027 | | |
| w >0.4 | 0.1798 | 0.0177 | 0.0038 | | |

Ontario

Chrysotile

| | | | | | |
|-------------|-------------|--------|--------|--|------------|
| Reference: | D&H 1979 | | | | Index |
| Fiber Type: | Chrysotile | | | | 19, 20, 21 |
| Industry: | Cement Pipe | | | | |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | | |

Amphibole

| | | | | | |
|-------------|----------------------|--------|--------|--|----------|
| Reference: | H&G 1981 | | | | Index |
| Fiber Type: | Crocidolite | | | | 8, 9 ,12 |
| Industry: | Cement Manufacturing | | | | |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.9358 | 0.0120 | 0.0016 | | 0.0062 |
| 0.25<w<0.4 | 0.0392 | 0.0044 | 0.0009 | | |
| w <0.4 | 0.9750 | 0.0163 | 0.0025 | | |
| w >0.4 | 0.0053 | 0.0003 | 0.0006 | | |

Pennsylvania

Chrysotile

| | | | | | |
|-------------|-----------------------------|--------|--------|--|------------|
| Reference: | D&H 1979 | | | | Index |
| Fiber Type: | Chrysotile | | | | 13, 14, 15 |
| Industry: | Friction Products, Textiles | | | | 16, 17, 18 |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.7467 | 0.0335 | 0.0282 | | 0.0904 |
| 0.25<w<0.4 | 0.0612 | 0.0108 | 0.0119 | | |
| w < 0.4 | 0.8078 | 0.0443 | 0.0401 | | |
| w > 0.4 | 0.0401 | 0.0242 | 0.0435 | | |

Amphibole

| | | | | | |
|-------------|-------------------------|--------|--------|--|-----------------------|
| Reference: | D&H 1979; H&G 1981 | | | | Index |
| Fiber Type: | Amosite and Crocidolite | | | | 22, 23, 24 |
| Industry: | Pipe Insulation Mfg. | | | | 3,4,7,8,9 10,11,12 |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.7247 | 0.0317 | 0.0074 | | 0.0932 |
| 0.25<w<0.4 | 0.0679 | 0.0170 | 0.0082 | | |
| w < 0.4 | 0.7927 | 0.0488 | 0.0156 | | |
| w > 0.4 | 0.0750 | 0.0306 | 0.0374 | | |

Connecticut

Chrysotile

| | | | | | |
|-------------|-------------------|--------|--------|--|------------|
| Reference: | D&H 1979 | | | | Index |
| Fiber Type: | Chrysotile | | | | 16, 17, 18 |
| Industry: | Friction Products | | | | |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.7956 | 0.0302 | 0.0230 | | 0.0642 |
| 0.25<w<0.4 | 0.0537 | 0.0088 | 0.0084 | | |
| w < 0.4 | 0.8492 | 0.0390 | 0.0314 | | |
| w > 0.4 | 0.0334 | 0.0155 | 0.0315 | | |

Amphibole

| | | | | | |
|-------------|-------------------------------------|--------|--------|--|--------|
| Reference: | D&H 1979 | | | | Index |
| Fiber Type: | Anthophyllite | | | | 25, 26 |
| Industry: | Talc Production (Mining/Milling) | | | | |
| | L<5 | L5-10 | L>10 | | PCME |
| w <0.25 | 0.7027 | 0.0170 | 0.0031 | | 0.0849 |
| 0.25<w<0.4 | 0.1182 | 0.0134 | 0.0103 | | |
| w < 0.4 | 0.8209 | 0.0304 | 0.0135 | | |
| w > 0.4 | 0.0741 | 0.0410 | 0.0201 | | |

Rochdale, England**Chrysotile**

| | | | | |
|-------------|------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 13, 14 ,15 |
| Industry: | Textile Products | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.6978 | 0.0368 | 0.0334 | 0.1166 |
| 0.25<w<0.4 | 0.0687 | 0.0128 | 0.0153 | |
| w < 0.4 | 0.7665 | 0.0495 | 0.0488 | |
| w > 0.4 | 0.0467 | 0.0329 | 0.0556 | |

Amphibole

| | | | | |
|-------------|-----------------------------|--------|--------|-----------|
| Reference: | H&G 1981, G&H 1980 | | | Index |
| Fiber Type: | Crocidolite | | | 3.4.7.8.9 |
| Industry: | Mining/Milling, Cement Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9133 | 0.0273 | 0.0052 | 0.0089 |
| 0.25<w<0.4 | 0.0392 | 0.0060 | 0.0010 | |
| w<0.4 | 0.9525 | 0.0333 | 0.0061 | |
| w>0.4 | 0.0062 | 0.0014 | 0.0005 | |

New Jersey**Chrysotile**

| | | | | |
|-------------|---|--------|--------|-----------|
| Reference: | D&H 1979, G&H 1980 | | | Index |
| Fiber Type: | Chrysotile | | | 5,6,13,14 |
| Industry: | All Industry (Mining, textiles, friction products, Cement mfg.) | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8022 | 0.0274 | 0.0209 | 0.0638 |
| 0.25<w<0.4 | 0.0557 | 0.0097 | 0.0083 | |
| w < 0.4 | 0.8579 | 0.0371 | 0.0292 | |
| w > 0.4 | 0.0300 | 0.0171 | 0.0287 | |

Amphibole

| | | | | |
|-------------|----------------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Amosite | | | 22, 23, 24 |
| Industry: | Pipe Insulation Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.2220 | 0.0435 | 0.0134 | 0.3181 |
| 0.25<w<0.4 | 0.1446 | 0.0464 | 0.0274 | |
| w < 0.4 | 0.3666 | 0.0899 | 0.0409 | |
| w > 0.4 | 0.2584 | 0.1084 | 0.1359 | |

Israel**Chrysotile**

| | | | | |
|-------------|----------------|--------|--------|------------|
| Reference: | D&H 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 19, 20, 21 |
| Industry: | Cement Pipe | | | |
| Operation: | All Operations | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.8182 | 0.0266 | 0.0180 | 0.0443 |
| 0.25<w<0.4 | 0.0689 | 0.0100 | 0.0053 | |
| w < 0.4 | 0.8871 | 0.0366 | 0.0233 | |
| w > 0.4 | 0.0240 | 0.0116 | 0.0174 | |

Amphibole

| | | | | |
|-------------|-------------------------|--------|--------|----------|
| Reference: | Hwang and Gibbs 1981 | | | Index |
| Fiber Type: | Crocidolite | | | 8, 9 ,12 |
| Industry: | Cement Manufacturing | | | |
| Operation: | Preparation & Finishing | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w<0.25 | 0.9358 | 0.0120 | 0.0016 | 0.0062 |
| 0.25<w<0.4 | 0.0392 | 0.0044 | 0.0009 | |
| w<0.4 | 0.9750 | 0.0163 | 0.0025 | |
| w>0.4 | 0.0053 | 0.0003 | 0.0006 | |

China**Chrysotile**

| | | | | |
|-------------|---|--------|--------|---------|
| Reference: | Dement and Harris 1979 | | | Index |
| Fiber Type: | Chrysotile | | | 13 - 21 |
| Industry: | Textiles, Friction Products Cement Pipe Mfg. | | | |
| | L<5 | L5-10 | L>10 | PCME |
| w <0.25 | 0.7705 | 0.0312 | 0.0248 | 0.0750 |
| 0.25<w<0.4 | 0.0637 | 0.0105 | 0.0097 | |
| w < 0.4 | 0.8343 | 0.0417 | 0.0345 | |
| w > 0.4 | 0.0347 | 0.0200 | 0.0348 | |

Amphibole

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