European Insulation Manufacturers Association

Thought Starter on Fibre Grouping
Mineral Wool Sector Perspective

1. Purpose and Introduction to EURIMA

Eurima members[1] manufacture and place on the market in the EU bio-soluble mineral wool fibres (glass wool, stone wool and slag wool) that are exonerated from classification pursuant to Note Q of Annex VI to the CLP Regulation[2] (the 'Note Q'). More information on EURIMA and its members and Note Q fibres are provided at the end of this document.

This document presents a research exercise by Eurima to support ongoing reflections by the German Federal Institute for Occupational Safety and Health (BAuA) on the future regulation of substances in fibre form and specifically the 'integration of the fibre pathogenicity paradigm into the EU regulatory framework'.[3]

2. Sector Context and Relevance to BAuA Priorities

BAuA's RMOA on substances in fibreform is an important effort to include fibre-specific toxicology principles especially the fibre pathogenicity paradigm into a regulatory prioritisation process to materials not all currently subject to the hazard assessment of the REACH and CLP Regulations.

The BAuA proposed approach places amongst other things an emphasis on biopersistence, respirability, and potential exposure during the lifecycle of materials.

Within this context and as previously stressed by EURIMA, man-made vitreous fibres (MMVF), particularly those covered under Note Q of the CLP Regulation, represent an illustrative example of a sub-group of fibres that

- Has been extensively studied and monitored,
- Benefits from well-established classification criteria based on biosolubility,
- Are exempted from CLP classification (and are registered as a substance under REACH under EC number 926-099-9[4]).

2.1 Fibre Taxonomy Data-Mining Project

Eurima acknowledges the importance for regulators to ground their prioritization efforts in the most current and comprehensive fibre taxonomies.

[1] The Full Eurima member list is available: https://www.eurima.org/eurima-members

[2] Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures; Consolidated Version of 01 March 2022

[3] Regulatory Management Option Analysis (RMOA) Conclusion Document, Authority: DE CA, Date: 26.05.2023. Group Name/Substance Name: Substances in Fibre Form. Source: BAUA, accessed May 2025.

[4] https://echa.europa.eu/substance-information/-/substanceinfo/100.117.636

To this end, EURIMA experts undertook a targeted data-mining exercise, reviewing scientific literature to map fibre nomenclature and groupings. This analysis aimed to distinguish between materials that have been the subject of extensive scientific scrutiny and those emerging materials for which more data may need to be generated. Based on this work, Eurima was able to fine-tune the existing fibre taxonomy in use by the sector.

Through screening over 9,900 studies The U.S. National Library of Medicine's Biomedical Literature Database (PubMed)[5] and Web of Science Core Collection by Clarivate Analytics[6]. 761 studies were retained for in-depth analysis. These were categorized by themes: fibre exposure, toxicity, epidemiology, and analytical methods and mapped to 57 fibre types.

The exercise revealed the following:

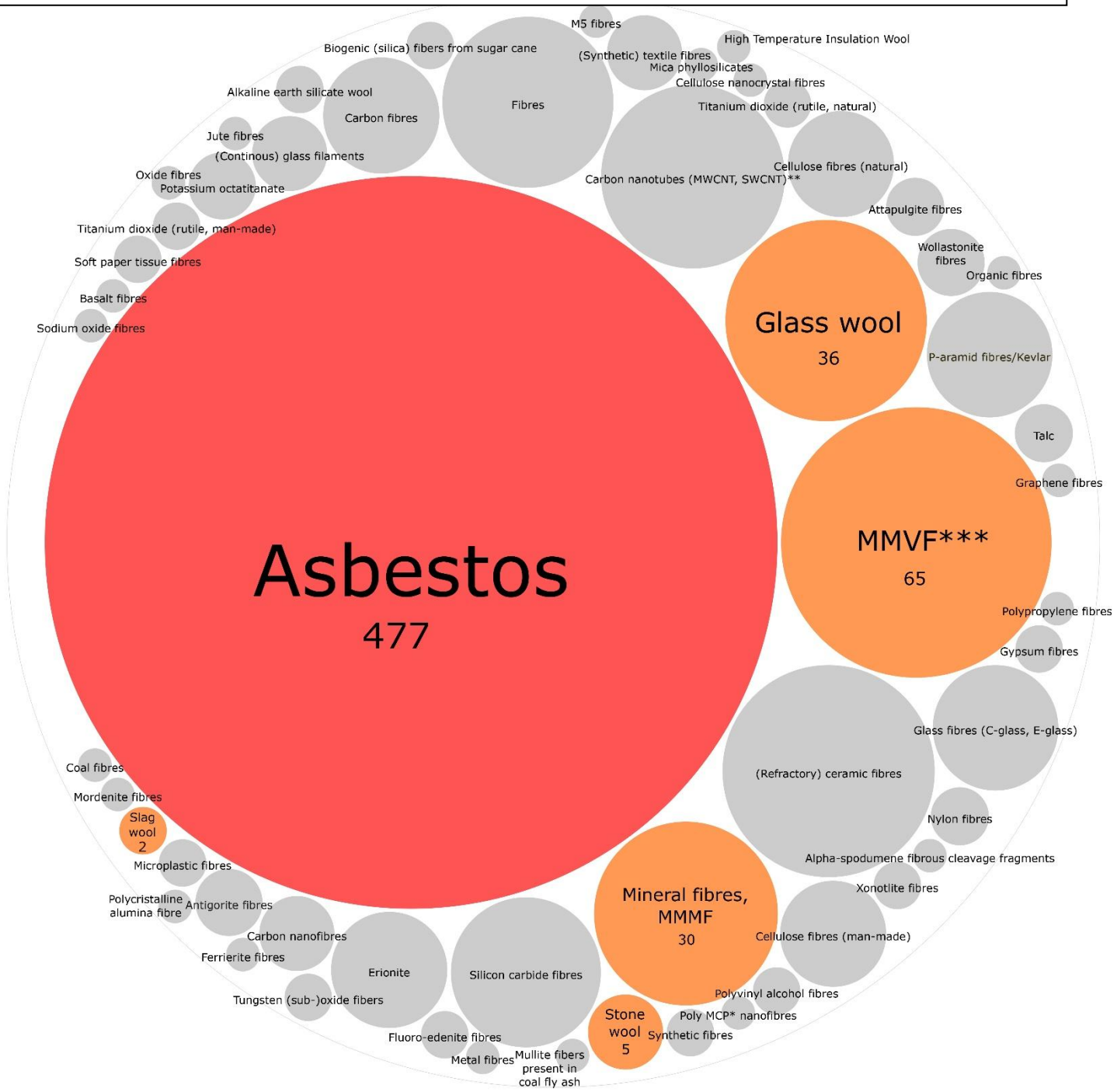
- **Updated Knowledge Base**: Several emerging fibre types not previously represented in existing taxonomies were identified and included in an updated fibre-tree taxonomy.
- **Data Gap Mapping**: Thematic categorization revealed a strong research focus on toxicity and exposure for traditional fibres. Epidemiological data and biosolubility profiles remain sparse for many newer materials.
- **Regulatory Implication**: This refined taxonomy offers a more nuanced structure that could guide future regulatory evaluations, helping to prioritize fibres that are under-represented in current research.

By charting research intensity across topic areas, the Circle Packing Plot in Figure 1 below offers insight into 57 fibre types and the total amount of studies published per type of fibre. We highlighted asbestos as the type of fibre to which the larger total number of studies exist and the relative size for MMVF fibres in orange. All other fibres are in grey. This visualisation gives a snapshot of the fibres for which a substantial body of research exists and those for which further academic research may be needed.

Figure 2 further segregates the data between the type of studies existing for each type of fibre as per the themes listed above. The large number of type of fibres does not permit to distinguish the individual numbers but give a good sense of the order of magnitude of studies per fibre according to the chosen field of research. A raw data excel chart outlining the individual numbers of studies per fibre is also attached to our communication.

[5] https://pubmed.ncbi.nlm.nih.gov/
[6] https://clarivate.com/academia-government/scientific-and-academic-research/research-discovery-and-referencing/web-of-science/

Fig. 1 – Orders of magnitude by total number of studies per fibre - The group labeled MMVF*** (man-made vitreous fibres) encompasses the materials typically regulated under Note Q. – Up to date 15 February 2024



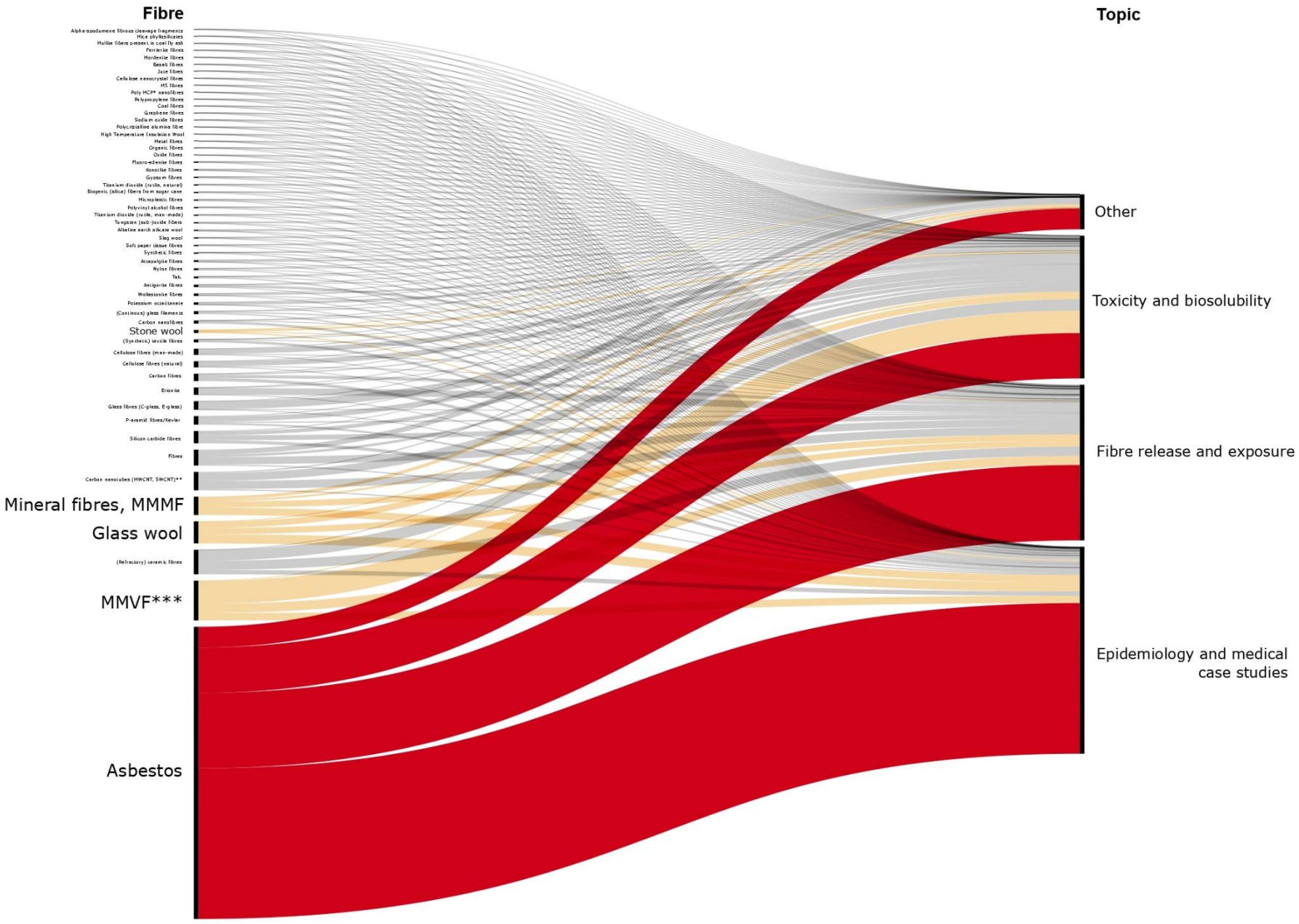


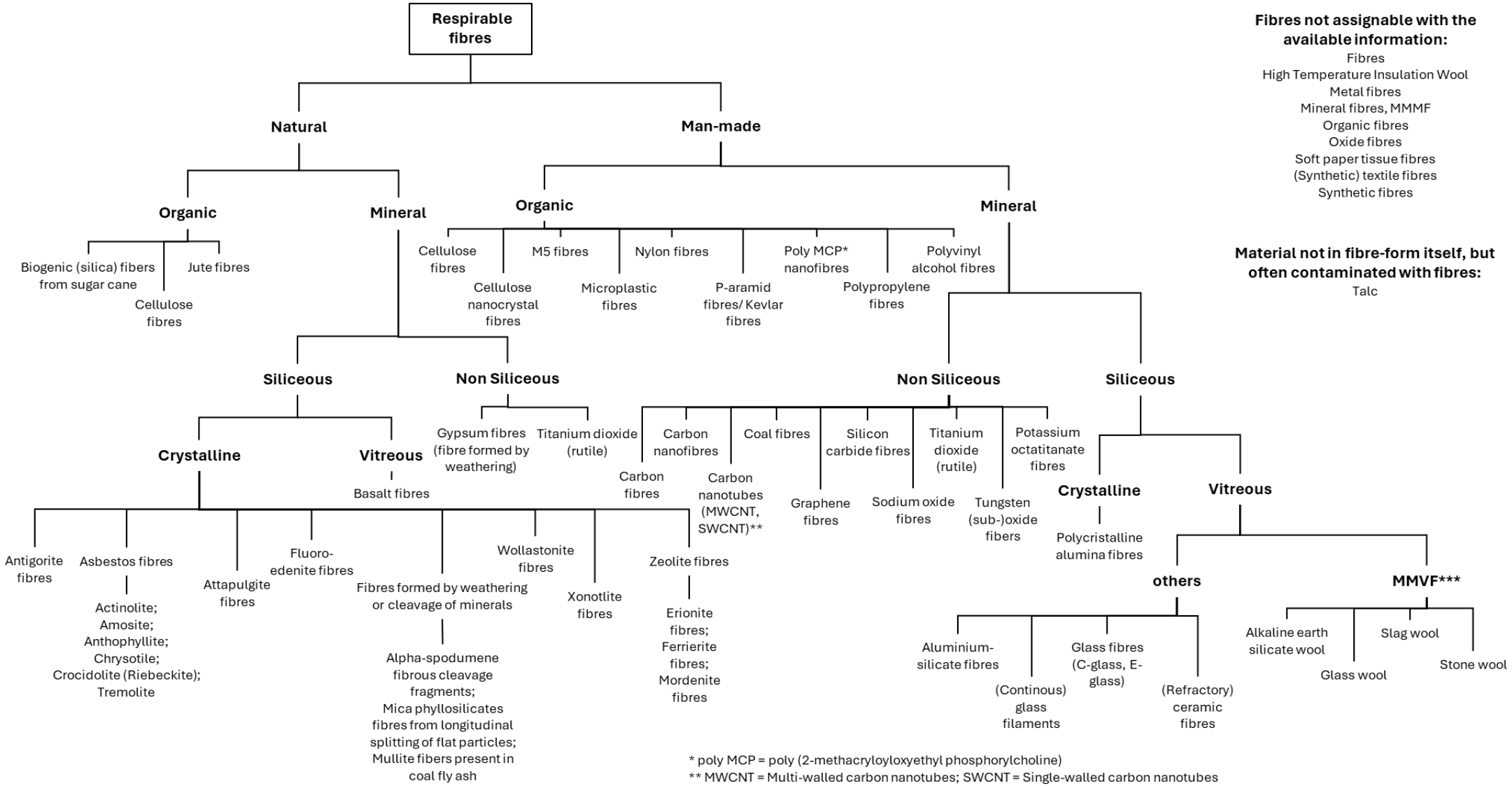
Fig. 2 - – Orders of magnitude by number of studies per fibre by theme - The group labeled MMVF*** (man-made vitreous fibres) encompasses the materials typically regulated under Note Q. – Up to date 15 February 2024

3. Visual Reference: Fibre Taxonomy Tree

To help clarify the diversity of respirable fibre materials under discussion, the following fibre taxonomy diagram was refined by EURIMA to provide input for an an update of the previously shared taxonomy of fibres types based on origin (natural vs man-made), composition (organic vs mineral), and structure (siliceous vs non-siliceous, crystalline vs vitreous).

EURIMA and its members would be glad to compare this refined taxonomy with the ones currently used or being updated at BauA for the purpose of the ongoing RMOA.

Note: The group labeled MMVF*** (man-made vitreous fibres) encompasses the materials typically regulated under Note Q. These are clearly distinct from high-aspect ratio nanomaterials (e.g. carbon nanotubes) or persistent ceramic fibres.



Fibres not assignable with the available information:

Fibres
High Temperature Insulation Wool
Metal fibres
Mineral fibres, MMMF
Organic fibres
Oxide fibres
Soft paper tissue fibres
(Synthetic) textile fibres
Synthetic fibres

Material not in fibre-form itself, but often contaminated with fibres:

Talc

* poly MCP = poly (2-methacryloyloxyethyl phosphorylcholine)
** MWCNT = Multi-walled carbon nanotubes; SWCNT = Single-walled carbon nanotubes
*** MMVF (Man-made vitreous fibres) is used as the group name. In this evaluation „mineral wools“ and „synthetic vitreous fibres“ are treated as synonyms for MMVF. The nomenclature of these fibres strongly depends on the country of origin of the study authors.

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4. Policy Alignment and Forward Strategy

The diversity and complexity of fibre materials, along with existing oversight frameworks and emerging evidence, underscore the importance of continued, focused collaboration. We value the opportunity to remain part of this conversation and to support solutions that are both practical and grounded in science.

European Insulation Manufacturers Association

About Eurima

Eurima was established in 1959 and represents European Mineral Wool Insulation Manufacturers. These bio-soluble mineral wool fibres (glass wool, stone wool and slag wool) manufactured by Eurima members are exempted under the Note Q to Annex VI to the CLP Regulation (the 'Note Q'). The Note Q was established under the Dangerous Substances Directive as recognition of the low toxicity profile of highly bio-soluble mineral fibres that manufacturers had developed, scaled up and elevated to an industry gold standard.

Parallel to this legislative development, Eurima members have made a commitment to report to the European Commission on the safe production and use of their mineral wool products in Europe via the data collected through Safe Use Instruction Sheets (SUIS). Manufacturers have also agreed to use a unified set of pictograms instructing workers and consumers on the proper use and risk management measures of mineral wool products.

Eurima members are also committed to enhancing circularity across the lifecycle of mineral wool products. This includes the use of recycled raw materials in production, the promotion of off-cut recycling practices, and the development of take-back schemes wherever feasible. Mineral wool is inherently well-suited to circular models due to its durability, recyclability, and potential for reprocessing into new insulation products without degradation of performance.

The independently certified EUCEB scheme grants a label guaranteeing the compliance of mineral products to the Note Q bio-solubility exoneration criteria. EUCEB is well known and respected in the construction industry as the proof of safety of mineral wool fibres for markets inside and outside the EU. Because the scheme is directly linked to CLP criteria, Eurima stresses the importance of safeguarding the robustness of the current framework.

Together, these efforts underscore our commitment to sustainability, safety, and the vital role that high-quality mineral wool insulation plays in Europe's energy transition. Mineral Wool Insulation Fibres aligns with the European Commission's evolving discussions on essentiality, underscoring our strategic contribution to the continent's energy transition.

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Annex I - Methodology

Methodology

1. Literature Database Search

To identify relevant literature on respirable fibres and their health and exposure impacts, a systematic search was conducted in two major bibliographic databases: Web of Science (WoS) and PubMed. The search was carried out on 15 February 2024 using a structured query string designed to capture a wide scope of publications related to fibre morphology, exposure, toxicity, and classification:

Search string:
((respirable fibr* OR respirable fiber* OR respirable wool* OR WHO-fibre* OR WHO-fiber* OR WHO fibre* OR WHO fiber*) AND (toxicolog* OR exposure* OR release* OR epidemiolog* OR classification* OR typolog* OR typ* OR group* OR hierarch* OR class* OR pulmonary OR inhalation)) NOT (muscle* OR nerve* OR dietary OR optic* OR food OR diabet*)

This search yielded 5,764 entries in Web of Science and 4,230 entries in PubMed.

2. Title Screening and Exclusion

A title-level relevance scan was conducted to eliminate publications clearly unrelated to the topic. Specific exclusion criteria were applied to both databases, as summarized in the table below:

Exclusion Criteria	WoS Titles Excluded	PubMed Titles Excluded
A. Unrelated diseases or diagnostic topics	1,498	628
B. Treatment or therapy-focused publications	1,224	558
C. Studies on general physiology, genetics, or ecology	481	84
D. Brain and nerve morphology or function	225	42
E. Engineering disciplines	363	55
F. Chemical synthesis/reactions	77	2
G. Aquatic systems and water media	94	5
H. Microorganisms, pathogens, or parasites	55	16
I. Food or dietary exposure	51	1
J. Physical forces (e.g., magnetism, radiation)	23	4

Exclusion Criteria	WoS Titles Excluded	PubMed Titles Excluded
K. Social sciences or economics	85	29
L. Burn injuries	17	9
M. Inhalation of large objects	17	10
N. Mathematics	64	0
O. Forensics	7	2
P. Astronomy or astrophysics	27	0
Q. Duplicate titles (already present in WoS)	0	358

After applying these criteria, 1,456 titles in WoS and 479 titles in PubMed were retained as potentially relevant.

3. Abstract Screening and Exclusion

The remaining publications underwent a secondary screening based on abstracts. Exclusion was based on the following criteria:

Exclusion Criteria	WoS Abstracts Excluded	PubMed Abstracts Excluded
A. No reference to respirable particles	368	45
B. No reference to respirable fibres	353	139
C. Non-research document type (e.g., reviews, editorials)	160	62
D. Treatment-oriented focus	36	8
E. Article/abstract not accessible	3	0
F. No abstract (screened via title/full article)	11	3

This resulted in 536 relevant abstracts from WoS and 225 from PubMed.

4. Categorization and Fibre List Compilation

Publications were then categorized into one of four thematic areas based on title and abstract content:

- Fibre Release and Exposure

- Epidemiology and Medical Case Studies
- Toxicity and Biosolubility
- Other

"Medical case studies" included qualitative assessments (e.g., autopsies), while "Epidemiology" was reserved for statistical population-based studies. Toxicity and biosolubility studies included in vivo, in vitro, and in chemico studies.

Fibre types mentioned in each study were extracted. If multiple fibres were assessed in one publication, each was logged individually. Synonymous fibres (e.g., MMVF and SVF, or P-aramid and Kevlar) were grouped. Fibres that could not be specifically identified due to vague descriptors (e.g., "mineral fibres") were excluded from the final fibre tree.

5. Construction of the Fibre Tree

The consolidated fibre list was reviewed in a dedicated working group meeting of the Eurima Health and Safety Committee (HSC) on 9 October 2024. Fibre classification followed the previous fibre tree developed by Eurima and shared with BAUA in its technical paper of 9 December 2022, distinguishing:

- Natural vs. Man-Made Fibres
    - Organic vs. Mineral
        - Siliceous vs. Non-siliceous (for mineral fibres)

Fibre classification was based on expert judgment and pre-existing knowledge.

The tree was constructed in Excel and visualized in RStudio (version 2022.07.2+576) using the following packages:

- data.tree (v1.1.0): for hierarchical structure
- DiagrammeR (v1.0.11): for dendrograms
- ggplot2 (v3.5.1) and ggpubr (v0.6.0): for bar charts showing publication frequency per fibre and topic

Where publications covered multiple fibres (e.g., comparative toxicity studies), they were counted under each relevant fibre category.

Finally, dendrograms and bar charts were combined via the online tool http://www.rawgraphs.io to present an integrated visual summary of the fibre classifications and associated publication data.

Annex II – type of fibres and number of studies – Raw Data

ID_No	Fibre	Topic	No_studies	Total_studies
1	Asbestos	Fibre release and exposure	123	477
1	Asbestos	Epidemiology and medical case studies	246	477
1	Asbestos	Toxicity and biosolubility	74	477
1	Asbestos	Other	34	477
2	Antigorite fibres	Fibre release and exposure	4	4
2	Antigorite fibres	Epidemiology and medical case studies	0	4
2	Antigorite fibres	Toxicity and biosolubility	0	4
2	Antigorite fibres	Other	0	4
3	Attapulgite fibres	Fibre release and exposure	0	3
3	Attapulgite fibres	Epidemiology and medical case studies	0	3
3	Attapulgite fibres	Toxicity and biosolubility	3	3
3	Attapulgite fibres	Other	0	3
4	Fluoro-edenite fibres	Fibre release and exposure	0	2
4	Fluoro-edenite fibres	Epidemiology and medical case studies	1	2
4	Fluoro-edenite fibres	Toxicity and biosolubility	1	2
4	Fluoro-edenite fibres	Other	0	2
5	Alpha-spodumene fibrous cleavage fragments	Fibre release and exposure	1	1
5	Alpha-spodumene fibrous cleavage fragments	Epidemiology and medical case studies	0	1
5	Alpha-spodumene fibrous cleavage fragments	Toxicity and biosolubility	0	1
5	Alpha-spodumene fibrous cleavage fragments	Other	0	1
6	Mica phyllosilicates	Fibre release and exposure	0	1
6	Mica phyllosilicates	Epidemiology and medical case studies	1	1
6	Mica phyllosilicates	Toxicity and biosolubility	0	1
6	Mica phyllosilicates	Other	0	1
7	Mullite fibers present in coal fly ash	Fibre release and exposure	1	1

7	Mullite fibers present in coal fly ash	Epidemiology and medical case studies	0	1
7	Mullite fibers present in coal fly ash	Toxicity and biosolubility	0	1
7	Mullite fibers present in coal fly ash	Other	0	1
8	Wollastonite fibres	Fibre release and exposure	0	4
8	Wollastonite fibres	Epidemiology and medical case studies	1	4
8	Wollastonite fibres	Toxicity and biosolubility	3	4
8	Wollastonite fibres	Other	0	4
9	Xonotlite fibres	Fibre release and exposure	0	2
9	Xonotlite fibres	Epidemiology and medical case studies	0	2
9	Xonotlite fibres	Toxicity and biosolubility	2	2
9	Xonotlite fibres	Other	0	2
10	Erionite	Fibre release and exposure	5	12
10	Erionite	Epidemiology and medical case studies	5	12
10	Erionite	Toxicity and biosolubility	2	12
10	Erionite	Other	0	12
11	Ferrierite fibres	Fibre release and exposure	1	1
11	Ferrierite fibres	Epidemiology and medical case studies	0	1
11	Ferrierite fibres	Toxicity and biosolubility	0	1
11	Ferrierite fibres	Other	0	1
12	Mordenite fibres	Fibre release and exposure	0	1
12	Mordenite fibres	Epidemiology and medical case studies	0	1
12	Mordenite fibres	Toxicity and biosolubility	1	1
12	Mordenite fibres	Other	0	1
13	Basalt fibres	Fibre release and exposure	0	1
13	Basalt fibres	Epidemiology and medical case studies	0	1
13	Basalt fibres	Toxicity and biosolubility	1	1
13	Basalt fibres	Other	0	1
14	Gypsum fibres	Fibre release and exposure	2	2
14	Gypsum fibres	Epidemiology and medical case studies	0	2
14	Gypsum fibres	Toxicity and biosolubility	0	2
14	Gypsum fibres	Other	0	2
15	Titanium dioxide (rutile, natural)	Fibre release and exposure	1	2

15	Titanium dioxide (rutile, natural)	Epidemiology and medical case studies	1	2
15	Titanium dioxide (rutile, natural)	Toxicity and biosolubility	0	2
15	Titanium dioxide (rutile, natural)	Other	0	2
16	Biogenic (silica) fibers from sugar cane	Fibre release and exposure	1	2
16	Biogenic (silica) fibers from sugar cane	Epidemiology and medical case studies	1	2
16	Biogenic (silica) fibers from sugar cane	Toxicity and biosolubility	0	2
16	Biogenic (silica) fibers from sugar cane	Other	0	2
17	Cellulose fibres (natural)	Fibre release and exposure	1	10
17	Cellulose fibres (natural)	Epidemiology and medical case studies	1	10
17	Cellulose fibres (natural)	Toxicity and biosolubility	8	10
17	Cellulose fibres (natural)	Other	0	10
18	Jute fibres	Fibre release and exposure	0	1
18	Jute fibres	Epidemiology and medical case studies	1	1
18	Jute fibres	Toxicity and biosolubility	0	1
18	Jute fibres	Other	0	1
19	Cellulose fibres (man-made)	Fibre release and exposure	1	10
19	Cellulose fibres (man-made)	Epidemiology and medical case studies	1	10
19	Cellulose fibres (man-made)	Toxicity and biosolubility	8	10
19	Cellulose fibres (man-made)	Other	0	10
20	Cellulose nanocrystal fibres	Fibre release and exposure	0	1
20	Cellulose nanocrystal fibres	Epidemiology and medical case studies	0	1
20	Cellulose nanocrystal fibres	Toxicity and biosolubility	1	1
20	Cellulose nanocrystal fibres	Other	0	1
21	M5 fibres	Fibre release and exposure	0	1
21	M5 fibres	Epidemiology and medical case studies	0	1
21	M5 fibres	Toxicity and biosolubility	1	1
21	M5 fibres	Other	0	1
22	Microplastic fibres	Fibre release and exposure	2	2
22	Microplastic fibres	Epidemiology and medical case studies	0	2
22	Microplastic fibres	Toxicity and biosolubility	0	2
22	Microplastic fibres	Other	0	2

23	Nylon fibres	Fibre release and exposure	1	3
23	Nylon fibres	Epidemiology and medical case studies	1	3
23	Nylon fibres	Toxicity and biosolubility	1	3
23	Nylon fibres	Other	0	3
24	P-aramid fibres/Kevlar	Fibre release and exposure	1	14
24	P-aramid fibres/Kevlar	Epidemiology and medical case studies	0	14
24	P-aramid fibres/Kevlar	Toxicity and biosolubility	13	14
24	P-aramid fibres/Kevlar	Other	0	14
25	Poly MCP* nanofibres	Fibre release and exposure	0	1
25	Poly MCP* nanofibres	Epidemiology and medical case studies	0	1
25	Poly MCP* nanofibres	Toxicity and biosolubility	0	1
25	Poly MCP* nanofibres	Other	1	1
26	Polypropylene fibres	Fibre release and exposure	0	1
26	Polypropylene fibres	Epidemiology and medical case studies	0	1
26	Polypropylene fibres	Toxicity and biosolubility	1	1
26	Polypropylene fibres	Other	0	1
27	Polyvinyl alcohol fibres	Fibre release and exposure	1	2
27	Polyvinyl alcohol fibres	Epidemiology and medical case studies	1	2
27	Polyvinyl alcohol fibres	Toxicity and biosolubility	0	2
27	Polyvinyl alcohol fibres	Other	0	2
28	Carbon fibres	Fibre release and exposure	11	12
28	Carbon fibres	Epidemiology and medical case studies	0	12
28	Carbon fibres	Toxicity and biosolubility	1	12
28	Carbon fibres	Other	0	12
29	Carbon nanofibres	Fibre release and exposure	2	5
29	Carbon nanofibres	Epidemiology and medical case studies	2	5
29	Carbon nanofibres	Toxicity and biosolubility	1	5
29	Carbon nanofibres	Other	0	5
30	Carbon nanotubes (MWCNT, SWCNT)**	Fibre release and exposure	13	30
30	Carbon nanotubes (MWCNT, SWCNT)**	Epidemiology and medical case studies	2	30
30	Carbon nanotubes (MWCNT, SWCNT)**	Toxicity and biosolubility	13	30

30	Carbon nanotubes (MWCNT, SWCNT)**	Other	2	30
31	Coal fibres	Fibre release and exposure	1	1
31	Coal fibres	Epidemiology and medical case studies	0	1
31	Coal fibres	Toxicity and biosolubility	0	1
31	Coal fibres	Other	0	1
32	Graphene fibres	Fibre release and exposure	1	1
32	Graphene fibres	Epidemiology and medical case studies	0	1
32	Graphene fibres	Toxicity and biosolubility	0	1
32	Graphene fibres	Other	0	1
33	Silicon carbide fibres	Fibre release and exposure	8	20
33	Silicon carbide fibres	Epidemiology and medical case studies	5	20
33	Silicon carbide fibres	Toxicity and biosolubility	6	20
33	Silicon carbide fibres	Other	1	20
34	Sodium oxide fibres	Fibre release and exposure	1	1
34	Sodium oxide fibres	Epidemiology and medical case studies	0	1
34	Sodium oxide fibres	Toxicity and biosolubility	0	1
34	Sodium oxide fibres	Other	0	1
35	Titanium dioxide (rutile, man-made)	Fibre release and exposure	1	2
35	Titanium dioxide (rutile, man-made)	Epidemiology and medical case studies	1	2
35	Titanium dioxide (rutile, man-made)	Toxicity and biosolubility	0	2
35	Titanium dioxide (rutile, man-made)	Other	0	2
36	Tungsten (sub-)oxide fibers	Fibre release and exposure	1	2
36	Tungsten (sub-)oxide fibers	Epidemiology and medical case studies	0	2
36	Tungsten (sub-)oxide fibers	Toxicity and biosolubility	1	2
36	Tungsten (sub-)oxide fibers	Other	0	2
37	Potassium octatitanate	Fibre release and exposure	0	4
37	Potassium octatitanate	Epidemiology and medical case studies	0	4
37	Potassium octatitanate	Toxicity and biosolubility	4	4
37	Potassium octatitanate	Other	0	4
38	Polycristalline alumina fibre	Fibre release and exposure	0	1

38	Polycristalline alumina fibre	Epidemiology and medical case studies	0	1
38	Polycristalline alumina fibre	Toxicity and biosolubility	1	1
38	Polycristalline alumina fibre	Other	0	1
39	(Continous) glass filaments	Fibre release and exposure	1	5
39	(Continous) glass filaments	Epidemiology and medical case studies	4	5
39	(Continous) glass filaments	Toxicity and biosolubility	0	5
39	(Continous) glass filaments	Other	0	5
40	Glass fibres (C-glass, E-glass)	Fibre release and exposure	2	14
40	Glass fibres (C-glass, E-glass)	Epidemiology and medical case studies	3	14
40	Glass fibres (C-glass, E-glass)	Toxicity and biosolubility	8	14
40	Glass fibres (C-glass, E-glass)	Other	1	14
41	(Refractory) ceramic fibres	Fibre release and exposure	15	40
41	(Refractory) ceramic fibres	Epidemiology and medical case studies	7	40
41	(Refractory) ceramic fibres	Toxicity and biosolubility	18	40
41	(Refractory) ceramic fibres	Other	0	40
42	Alkaline earth silicate wool	Fibre release and exposure	0	2
42	Alkaline earth silicate wool	Epidemiology and medical case studies	0	2
42	Alkaline earth silicate wool	Toxicity and biosolubility	2	2
42	Alkaline earth silicate wool	Other	0	2
43	Glass wool	Fibre release and exposure	10	36
43	Glass wool	Epidemiology and medical case studies	15	36
43	Glass wool	Toxicity and biosolubility	10	36
43	Glass wool	Other	1	36
44	Slag wool	Fibre release and exposure	0	2
44	Slag wool	Epidemiology and medical case studies	1	2
44	Slag wool	Toxicity and biosolubility	1	2
44	Slag wool	Other	0	2
45	Stone wool	Fibre release and exposure	0	5
45	Stone wool	Epidemiology and medical case studies	2	5
45	Stone wool	Toxicity and biosolubility	3	5
45	Stone wool	Other	0	5
46	Fibres	Fibre release and exposure	12	26

46	Fibres	Epidemiology and medical case studies	2	26
46	Fibres	Toxicity and biosolubility	4	26
46	Fibres	Other	8	26
47	High Temperature Insulation Wool	Fibre release and exposure	0	1
47	High Temperature Insulation Wool	Epidemiology and medical case studies	0	1
47	High Temperature Insulation Wool	Toxicity and biosolubility	0	1
47	High Temperature Insulation Wool	Other	1	1
48	Metal fibres	Fibre release and exposure	0	1
48	Metal fibres	Epidemiology and medical case studies	0	1
48	Metal fibres	Toxicity and biosolubility	0	1
48	Metal fibres	Other	1	1
49	Mineral fibres, MMMF	Fibre release and exposure	10	30
49	Mineral fibres, MMMF	Epidemiology and medical case studies	12	30
49	Mineral fibres, MMMF	Toxicity and biosolubility	3	30
49	Mineral fibres, MMMF	Other	5	30
51	MMVF***	Fibre release and exposure	15	65
51	MMVF***	Epidemiology and medical case studies	12	65
51	MMVF***	Toxicity and biosolubility	37	65
51	MMVF***	Other	1	65
52	Organic fibres	Fibre release and exposure	1	1
52	Organic fibres	Epidemiology and medical case studies	0	1
52	Organic fibres	Toxicity and biosolubility	0	1
52	Organic fibres	Other	0	1
53	Oxide fibres	Fibre release and exposure	0	1
53	Oxide fibres	Epidemiology and medical case studies	0	1
53	Oxide fibres	Toxicity and biosolubility	0	1
53	Oxide fibres	Other	1	1
54	Soft paper tissue fibres	Fibre release and exposure	1	2
54	Soft paper tissue fibres	Epidemiology and medical case studies	1	2
54	Soft paper tissue fibres	Toxicity and biosolubility	0	2
54	Soft paper tissue fibres	Other	0	2

55	(Synthetic) textile fibres	Fibre release and exposure	1	5
55	(Synthetic) textile fibres	Epidemiology and medical case studies	4	5
55	(Synthetic) textile fibres	Toxicity and biosolubility	0	5
55	(Synthetic) textile fibres	Other	0	5
56	Synthetic fibres	Fibre release and exposure	0	2
56	Synthetic fibres	Epidemiology and medical case studies	2	2
56	Synthetic fibres	Toxicity and biosolubility	0	2
56	Synthetic fibres	Other	0	2
57	Talc	Fibre release and exposure	1	3
57	Talc	Epidemiology and medical case studies	2	3
57	Talc	Toxicity and biosolubility	0	3
57	Talc	Other	0	3