Supplementary appendix 1 – Classification and description of chemical pollutant types

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| **Substance** | **Description** | **Examples** |
| **Dusts** | Solid particles, inhalable particle size typically 0.1 to 100µm. Generated by number of industrial processes including grinding, milling, crushing, bagging, sweeping, weighing, transporting (conveyors) and mixing operations. | Dusts can be subdivided in to mineral and biological dusts.  Mineral (inorganic) dusts: mainly oxides of Silica, Aluminium, Iron and Calcium (e.g. SiO2, Al2O3, FeO, Fe2O3, CaO, CaCO3) and also coal dust, quartz, cement, soil and metal dust (Lead, Cadmium, Nickel, Beryllium etc.).  Organic (biological dusts): originate from plant and animal sources e.g. flour, wood, cotton, grain, microbiological dust (moulds, spores). |
| **Vapours** | The gaseous phase of a volatile liquid or solid at room temperature. Commonly used in dry cleaning, paints, adhesives and thinners. | Toluene, Xylene, Benzene, Ethyl acetate, Hexane, Diethyl ether, Isocyanates, Aldehydes and Ketones |
| **Gases** | Exist as gas at room temperature | Ammonia, Carbon dioxide, Carbon monoxide, Oxides Nitrogen, Sulphur dioxide, Halothanes, Acetylene (oxy-acetylene), Ozone |
| **Fumes** | Particles (usually less than 1 µm) produced by heating solids which vaporise and then condense e.g. sublimation of molten metals. | Diesel (transport industry) , rubber, soldering (electronic industry), welding (fabrication) |
| **Fibres** | Solid particles with length several times greater than their width. Asbestos fibres are defined as having length: width ratio (aspect ratio) of more than 3:1 | Natural: wood, cotton flax, paper; Mineral: asbestos used in insulation, fire resistance, friction; and Man-made mineral fibres: glass wool, rock wool |
| **Mists** | Liquid particles suspended in air generated by spraying operations. Size range typically, 20-100 µm. | Oil mist (metal working fluids), pesticide spraying, acid mists (electroplating) |

Supplementary appendix 2 – Worked example assigning the JEM exposure values to a specific four digit SOC 2000 code; Carpenter and joiners (SOC 2000 code 5315)

**SOC code 5315 Carpenter and joiner (the major and minor groups being groups being ‘skilled trade operations’ and ‘construction trades’ respectively).**

1. **Summary of task and job title supplied by the SOC 2000 listings**

Cuts, shapes and drills using saws, planes, chisels and other power or hand tools. Fixes and prepares wood pieces by nailing and gluing. Maintains and repairs woodwork and fittings. Examples of job titles include; Boat builder, Carpenter, Shop fitter.

1. **Exposed/ non-exposed attribution**

Carpenters and joiners are regularly (daily/weekly) exposed by inhalation to wood dust, glues, adhesives (organic solvents) and fibres from insulating materials applied to woods (e.g. fireproofing); hence the SOC code 5315 is assigned as exposed to vapours, dusts and fibres. The majority of dust generated for those exposed is organic dust, of which some are known to cause asthma. Worker in this code were not considered to be exposed to mists, mineral dusts or fumes.

1. **Average daily exposure (L)**

Over a typical working shift exposure to organic vapours and fibres is likely to be intermittent and vary daily depending on the nature of job. For instance a particular job may require extensive use of adhesives or require repair of fire doors over a few days. Overall the daily/weekly exposure is considered to be low. However in the case of wood dust the exposure is likely to more regular and over a greater proportion of the working shift; but engineering controls are likely to be installed on fixed wood working machines. Typically, airborne exposure to wood dust was exposure considered to be 50% of the WEL for activities which generate wood dust.

1. **Proportion exposed (P) attribution**

The majority (>50%) of the jobs titles within SOC code 5315 (e.g. carpenters), involve regular exposure to vapours from glues, adhesive and paints and dust. Sawing of wood is not likely to expose individuals directly to fibres unless it is insulated. Boat builders may also be exposed to fibre glass. It is estimated that 20-49% of jobs titles would involve exposure to fibres.

1. **Exposure to VGDFFiM**

Since individuals in this codes are assigned as exposed to vapour, dusts and fibres the SOC code was assigned as exposed to vapours, gases dusts, fumes, fibres or mists (VGDFFiM). The average level of exposure and proportion of individual exposed is taken as the highest value for of the VGDF components.

Table S1; Details of SOC 2000 code 5315 as shown in the ACE-JEM

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| **ACE-JEM types** | Vapour | Gases | Dusts | Fumes | Fibres | Mists | M-dust | B-dust | Metals | Diesel fume | Asth. | VGDFFiM |
| Exposed | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Exposure Level (L) | L | 0 | H | 0 | L | 0 | 0 | H | 0 | 0 | H | H |
| Proportion exposed (P) | ≥50% | 0 | ≥50% | 0 | 20-49% | 0 | 0 | ≥50% | 0 | 0 | ≥50% | ≥50% |

M-dust – Mineral dusts, B-dust- biological dust, Asth. - Asthmagen