AMERICAN CHEMISTRY COUNCIL
ANTIMICROBIAL EXPOSURE ASSESSMENT TASK FORCE II

GLOSSARY of TERMS
November 28, 2006[1]

I. APPLICATION METHODS

AEROSOL SPRAY – a suspension of fine solid or liquid particles in gas that is dispensed from a pressurized container. The suspension is relatively stable, that is, the particles will remain suspended for a period of time barring an external influence. Standard-setting organizations, ISO, ACGIH, and BMRC, have established inspirable (able to enter the respiratory system) and respirable (able to enter the alveolar area of the lung) levels for aerosols. Generally, particles under 8 to 10 microns are considered respirable. One micron particles are considered 95 percent inspirable, 10 micron particles are 70 percent inspirable, and 100 micron particles are considered to be 20 percent inspirable. For example, disinfectant aerosol sprays contain less than 1% droplets 10 microns or smaller. Median size typically is 100 microns (mass median diameter or mmd), normally distributed. However, government risk assessors usually assume that all measured air levels are not only inspirable but also respirable. Thus, the only time when it would be critical to distinguish particle size would be if a particular chemical had an inhalation toxicology study that showed damage to the alveolar region of the lung.

AIRLESS SPRAY – a spray application that occurs by directly creating pressure to drive a liquid out of a nozzle for transfer through the air to a final target surface. Typical pressures for paints/coatings are in the range of 5,000 psi with orifice diameters of approximately 0.018 inches. Airless spray particles must be large enough to reach the target surface and small enough to achieve uniform deposition.

BRUSH – application of a liquid material to a surface area, such as a wall, by repeatedly inserting a brush (e.g., a paint brush) into a container for loading and then brushing it back and forth across the surface to be covered or treated.

FOGGING – an application that requires a device that generates very small liquid particulate for transfer through the air, so it can penetrate into areas difficult to physically reach. These devices require some type of mechanical pump to generate the needed pressure to drive the biocide through the nozzles. A "dry fog" has droplets ranging in size from 10-15 microns in volume. A "wet fog" or "mist" has droplets ranging in size from 30-60 microns in volume. A "fine spray" has droplets larger than 60 microns in volume.

IMMERSION/DIP/ SOAK - interchangeable terms. Differences in applicator exposure potential are attributable primarily to scale, but also may be associated with use patterns employing this application method and common industry practices.

---

[1] This document is modified and supplemented as needed to reflect accurately the use of terminology in protocols, reports, etc.

Wood treatment. The American Wood Preservers' Association (AWPA) 2001 Standards define dip as "application of a liquid preservative to a wood by immersing the wood in the liquid for a short period of time," typically 3 to 20 minutes. Soaking involves leaving the lumber in the solution for a longer period of time (for example, 12-48 hours) in an attempt to get the chemical to go below the surface. Typically, these operations are large scale, highly automated processes where stacks of wood are mechanically lowered into baths. The stacks are inserted, removed and stacked in an automated manner with very little human exposure.

Sanitizer/Disinfectant. Items requiring disinfection or sanitization may be submerged in an antimicrobial solution. Examples include flatware, glassware, barber and hair salon articles, etc. The length of time immersed has no impact on the amount of absorption by non-porous articles. For example, a non-porous material soaked in an antimicrobial chemical does not retain the chemical or have any residual antimicrobial activity. A good example would be dishes sanitized in sodium hypochlorite by soaking. The dishes are sanitized but retain no parent chemical or antimicrobial activity once dry.

MOP – application of a liquid material to a large surface area, such as a floor, by repeatedly inserting an implement made of absorbent material fastened to a handle into a bucket and wiping it back and forth across the surface to be treated. This transfers the antimicrobial product from the liquid to the surface.

PLACE SOLID – application of a solid biocide material into a container or final application that is accomplished in a single action. The form of the solid may be water-soluble packets, water-permeable containers, tablets, single dose delivery containers, or other solid permeable or soluble delivery forms. The application occurs in a single step without a continuous flow from one container to another.

POUR LIQUID – a biocide in a liquid form is poured from a container, either manually or with some equipment, into another container or mixing apparatus. This is accomplished without the use of devices that create a vacuum or pressure (i.e. pumps) to facilitate or force the transfer of the liquid.

POUR SOLID – a solid biocide material (flake, pellet, powder, etc.) is transferred in a continuous flow from one container to another, either manually or with the aid of equipment.

PRESSURE TREATMENT – This is a special application method using vacuum and/or external pressure to drive a biocide product deep into a product matrix. Wood preservation is the one area where this method is known to occur. The process involves sealing product within a pressurized container for various lengths of time, with the container filled during the process to drive the biocides into the treated product.

PUMP - transfer of a liquid antimicrobial from the original container to another by pumping as part of the transfer for (1) subsequent use to formulate other pesticides or for industrial use or (2) end use applications, such as recirculating water treatment, paper mill slimicide application, metalworking fluid preservation, etc. Gravity or hand pumps and automated metering pumps are

used. This type of application is anticipated to use hoses and various connection devices to facilitate the transfer in most situations.

ROLL – application of a liquid material to a surface area, such as a wall, by repeatedly inserting cylindrical device, covered with an absorbent material (e.g., a paint roller), into a container and rolling the cylinder back and forth across the surface to be covered or treated.

SPRAY – a spray application occurs when a liquid is forced through an orifice under pressure for dispersal to a target object or surface. There is no accepted standard for biocide applications that distinguishes between high pressure and low pressure sprays. Pressure and orifice size are the variables that impact particle size, which is important depending on the specific application. Following are some typical examples of spray applications.

> Industrial Use. High pressure sprays are delivered by electric pumps at pressures ranging from 500 to 50,000 psi. Droplet size may be less than 10 microns.
>
> Industrial Use. Low pressure sprays used in industrial applications may be either manual or electric at pressures ranging from 1 to 500 psi. Droplet size is usually above 10 microns.
>
> Wood Preservation. A high pressure spray nozzle delivers a wide range of particle sizes, depending on liquid pressure and nozzle opening. For example, to generate a “fog,” typical liquid pressures are 500-1500 psi and nozzle orifices are 0.005 inch or smaller. High pressure spray delivers low volume of liquid using a higher concentration of the chemical. The equipment creates a "fog" or "mist" (low particle size) that the lumber passes through. Treated lumber is almost dry to the touch immediately after the spray process; there is no dripping. Generally high-pressure systems have a vacuum that returns overspray to a holding tank for re-use. This method of application results in low exposures via inhalation when a vacuum is used and low exposures for dermal contact because lumber is almost dry to touch with a lower opportunity for transfer than a wet surface. This method is growing in popularity.
>
> Wood preservation. Low pressure spray delivers higher volumes of liquid and actually "floods" the surface of the wood with a solution that is lower in concentration of chemical through larger sized nozzles than a high pressure spray. This results in a board that drips as though it were dipped in a bulk dip vat.
>
> Sanitizer/Food Processing. Low pressure sprays are commonly used for sanitizer applications. There are a number of different application devices including: (1) hand pressurized (garden type) sprayers. (2) trigger spray bottles; (3) low pressure spray or foam devices (typically connected to the water system in the plant and operate at 20 -100 psi; antimicrobial is injected into the water stream and sprayed; either hose-end devices or dispensed through a centralized system within a facility); (4) “Cleaning in Place” or CIP (automated cleaning/sanitization procedures conducted in large food processing establishments; cleaning equipment is actually built in to the food handling equipment itself; a complete cycle of pre-cleaning, cleaning, rinsing and finally sanitizing is conducted automatically through all areas of the food processing line; typically, these

operations are completely enclosed; for example, pipes are flushed with the cleaning solution; tanks are cleaned and sanitized using a dishwasher type spray arm at the top of the tank which sprays the chemical solution onto the tank walls.)

Textile Treatment. Antimicrobial formulation used in a fabric treatment in which it is essentially dispensed in a series of small streams at low pressure onto the surface of the fabric, with the excess running off. Aerosol formation is typically low.

WIPE -- application of a liquid material to a surface area, such as a counter or wall, by use of a small hand held piece of absorbent material (e.g., a sponge or woven or non-woven fabric) pre-wetted, sprayed or dipped into a container and wiping it back and forth across the surface to be treated. Industrial uses of wipes include in-factory kiss rolls, dry-wipe lines, doctor bars, or consumer-like wipes used by building restoration and maintenance personnel.

II. ANTIMICROBIAL USE PATTERNS

AGRICULTURAL PREMISES AND EQUIPMENT - covers *only* application of disinfectants, sanitizers, fungicides, etc. to reduce or eliminate infectious or other undesired microorganisms on inanimate surfaces in farm and livestock premises. (e.g., pens, parlors, stalls, barns, etc.), and on equipment, (e.g., forks, shovels, halters, feeders, troughs, milking equipment, etc.)

ANTIFOULANT COATINGS - antifoulant paints for underwater structures and underwater equipment including ship and boat bottoms and hulls, crab and lobster pots, and structures and equipment used on fish farms.

AQUATIC AREAS - application of antimicrobials to control slime-forming bacteria, fungi and algae in lakes, ponds, streams, drainage ditches and other bodies of water.

COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL PREMISES AND EQUIPMENT - covers *only* application of disinfectants, sanitizers, fungicides, etc. to reduce or eliminate infectious or other undesired microorganisms, on inanimate surfaces, in commercial (e.g., hotels, motels, theaters, office buildings, airports, etc.), industrial (factories, mills, plants, etc.), and institutional (schools, camps, public offices, prisons, etc.) premises. Equipment includes ceilings, doors, doorknobs, fixtures, floors, woodwork, walls, and windows.

FOOD HANDLING/STORAGE PREMISES AND EQUIPMENT - covers *only* application of disinfectants, sanitizers, fungicides, etc. to reduce or eliminate infectious or other undesired microorganisms, on inanimate surfaces, as part of good housekeeping or good manufacturing practice programs, in food/feed processing plants (e.g., meat, poultry, diary, seafood, beverage, etc.); eating establishments and food storage and transportation facilities (e.g., stores, markets, vending machines, trucks, shipping containers, etc.)

HUMAN DRINKING WATER SYSTEMS - includes application of disinfectants to public water systems, including water supplies and components (e.g., pipes, casings, reservoir surfaces, filter sands, etc.); individual water systems (homes, farms, institutions, camps, industrial facilities, etc.); emergency water systems and water purifier systems (e.g., campers, travelers, military, etc.).

INDUSTRIAL WATER SYSTEMS - application to commercial and industrial systems (e.g., cooling towers, evaporative condensers, air washers, heat exchangers), pulp and paper mill systems, gas/oil recovery systems, drainage, wastewater and sewage systems, and specialized uses (e.g., immersion ultrasonic tank water, laboratory equipment water baths, photo processing water, electrodeposition systems, etc.)

MATERIAL PRESERVATIVES - bacteriostats, microbiostats, and fungistats added to industrial process intermediate materials (e.g., dispersions, slurries, emulsions, solutions, etc.) and resulting products (e.g., paints, coatings, adhesives, textiles, paper, etc.) to control growth of slime-forming microorganisms (e.g., papermaking) and prevent deterioration or spoilage of material during storage and/or in-use life.

EPA makes no distinction for purposes of exposure assessment between preserved materials (in-can) and exempt treated articles, that is, articles that make a claim of protection for the articles themselves. EPA regards all exposures associated with the application of a pesticide to be applicator exposures. As a result, EPA regards the application of a preserved material, whether or not it makes a pesticidal claim, as secondary application for which it requires exposure data. For example, painter studies are required, but EPA does not care whether the paint used in the study make pesticidal claims, because it considers use of all paints that contain antimicrobials, even if only for in-can preservation, to be secondary pesticide application. As a result, all applications of paints and coatings, other than those specific to antifoulants and wood preservatives, are included in this category. (However, for purposes of exposure monitoring, there may be some possibility of combining replicates from these three use patterns.) Similarly, machine operators in contact with metalworking fluids are considered to be secondary applicators.

When exposure to the preserved article occurs following application of the pesticide, as is the case with most preserved articles, EPA is interested in obtaining post-application exposure data.

MEDICAL PREMISES AND EQUIPMENT - covers only application of disinfectants, sanitizers, fungicides, etc. to reduce or eliminate infectious or other undesired microorganisms, on inanimate surfaces in medical environments. Premises include hospitals, clinics, dental and medical offices, veterinaries, nursing homes, "sick rooms," etc. Equipment is limited to non-critical care equipment, that is, equipment that does not contact the patient or contacts the patient's intact skin (e.g., furniture, carts, bedpans, telephones, etc.) It is not clear from the EPA definition whether residential "sick rooms" are included within this use pattern or the preceding use pattern.

RECREATIONAL WATER - antimicrobial treatment of "hydrologically isolated and contained manmade bodies of water," including swimming pools, jacuzzis and hot tubs.

RESIDENTIAL AND PUBLIC ACCESS PREMISES - covers *only* application of disinfectants, sanitizers, fungicides, etc. to reduce or eliminate infectious or other undesired microorganisms, on inanimate surfaces in private residences and public access areas. (There is no clear distinction between EPA's use of the terms institutional premises and public access premises.)

SWIMMING POOLS -- see Recreational Water

WOOD PRESERVATIVES - preservative treatments for all types of wood, applied by pressure or vacuum treatment, remedial applications, non-pressure treatments (e.g., joinery and millwork), anti-sapstain treatments and ready-to-use coatings.