

A STUDY BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC), RELEASED MAY 29th, 2009, CONFIRMS LEAD CONTENT IN CRUMB RUBBER INFILL, AS WELL AS OTHER POTENTIAL PROBLEMS WITH ELEVATED HEAT AND PHENOL LEACHATE.

The referenced study has been misconstrued, by less than objective observers, as demonstrating that there are “no health concerns at synthetic turf fields”. Such misrepresentations not only disguise the study’s true findings but also potentially endanger the public health. Therefore, it is necessary to correct this distortion by highlighting the significant concerns relating to artificial turf revealed in the NYSDEC study, as follows:

Lead Content:

The recent NYSDEC study reports lead content in crumb rubber as follows: *“The lead concentrations range from 5.6 — 116 ppm with an average of 30.8 ppm.”*

These results are consistent with additional testing we commissioned through Alpha Analytical, Westbrough MA. Therefore, it is reasonable to conclude from these combined results that virtually all recycled-tire rubber crumb contains some detectable level of lead (conversely, no lead-free field sample of artificial turf rubber infill has yet to be found).

The NYSDEC study goes on to say, *“In the absence of an applicable lead standard for crumb rubber (used as an infill material in artificial turf), a comparison of the results to the USEPA hazard standard for lead in bare residential soil (400ppm) (USEPA 2001) was conducted. All results were below the hazard standard of 400 ppm.”*

Unfortunately, recent learning* with regard to deleterious cognitive effects of bodily lead concentrations in children have rendered this ‘400 ppm’ hazard standard virtually obsolete. The 2008 Consumer Products Safety Improvement Act (CPSIA) lowers the hazard standard (for products on which children younger than 12 years old might play) to **100 ppm** as of August 2011. Also, the California EPA is lowering the hazard standard for residential soil (which is the standard used for artificial turf) to **80 ppm, primarily because of concern raised by recent scientific information regarding blood lead levels on IQ in children.****

* From the CA EPA OEHHA review draft (Revised California Human Health Screening Level, May 14, 2009): The proposed CHHSLs for lead consider two sources of uncertainty: the relationship between blood lead level and cognitive ability, and the relationship between lead levels in the environment and blood lead levels. The first source of uncertainty involves the fitting of a model to the blood lead and IQ data in the meta-analysis of Lanphear et al. (2005) that was used to determine the relationship between blood lead and IQ. To be conservative OEHHA (2007) used a 97.5% upper confidence limit on the slope of the IQ versus Pb_B curve.

The other source of uncertainty is the relationship between environmental lead levels and blood lead levels. Both Leadsread and the ALM account for this by predicting a distribution of blood lead values for any given set of environmental inputs. The percentiles of the Pb_B versus soil Pb curve reflect physiological and behavioral variability in individual responses to similar environmental concentrations. Although the previous CHHSL for lead was based on the 99th percentile of that distribution, the revised CHHSL is based on the 90th percentile of the distribution. The reason for this change is that the benchmark change in blood lead concentration is a health-protective estimate, based on risk to children, **whereas the previous target blood lead level was based on a "level of concern" that did not incorporate recent scientific information and focused on individual - rather than population - risks.**

The overall approach to accommodating the two sources of uncertainty can be summarized as follows: the CHHSLs represent concentrations in soil that have no more than a 2.5% probability of decreasing IQ by more than 1 point in a 90th percentile child or fetus.

** (Washington Post, 10/8/08) The Environmental Protection Agency yesterday tightened the regulatory limit on airborne lead for the first time in 30 years, **lowering the legal maximum to a tenth of what it was on the grounds that it poses a more serious threat to young children than officials had realized.** Since 1990, 6,000 scientific studies have shown that young **children suffer harm at much lower blood lead levels than was recognized when the old standard was set in 1978.** The American Academy of Pediatrics issued a statement yesterday praising the EPA for the new standard, adding, **"There is no safe level of lead exposure for children."**

It is also known that the chemical recipe, including lead content, of rubber crumb varies dramatically from tire source to tire source and, therefore, the lead content of rubber infill installed in a particular field is not predictable. The NYSDEC study confirms that there is a distinct probability that a discrete crumb rubber infill source, installed in an artificial turf, will exceed the impending hazard standards (80 to 100 ppm) just as some of the samples in the NYSDEC study did exceed the future CPSIA standards (standards which the turf industry has voluntarily agreed to meet). **The hazard of concern is diminished cognitive function manifested in reduced IQ in children.**

In summary:

- 1) The NYSDEC study confirms that crumb rubber typically contains lead.
- 2) Recent scientific learning has led to an impending reduction of the hazard standard to less than 100 ppm.
- 3) The chemical recipe of recycled-tire rubber is highly variable rendering the lead content of any particular installation unpredictable as to compliance with the new hazard standards.
- 4) No "safe level of lead exposure in children" has yet been established, so any exposure of children to lead, which raises blood level concentrations, even minutely, must be considered a risk to diminish cognitive function and reduce IQ.

Elevated Temperature:

The NYSDEC study also confirms a potential problem with elevated temperatures when reporting the following: *"The results of the temperature survey show significantly*

higher surface temperatures for synthetic turf fields as compared to the measurements obtained on nearby grass and sand surfaces. The average synthetic turf surface was 42°F higher than the grass surface temperature and 40°F higher than the sand surface temperature.”

“The surface temperature measurements were compared to a guideline value issued by Brigham Young University (BYU). BYU has set a surface temperature guideline of 120°F (Williams, 2002) as the limit for conducting activities on synthetic ... At least one location on the turf field was above 120°F guideline for 12 out of 17 dates of measurements (70%), while the comparison areas never exceeded 110°F.”

“The synthetic turf surface temperatures were much higher and prolonged contact with the hotter surfaces may have the potential to create discomfort, cause thermal injury and contribute to heat-related illnesses...the surface temperatures recorded were much higher for the synthetic turf suggesting a greater potential for heat stress might exist since the body could be in prolonged contact with a surface of elevated temperature. Additionally, high metabolic activity generated during active play, in addition to the heat input from the surfaces, could produce a situation leading to greater potential for heat stress on these surfaces.”

It should be noted that these results were achieved at the more northern latitude of NYC, in relatively more moist conditions and also averaged readings in intermittently cloudy conditions. In southern latitudes, where insolation is greater; dryer climates where less moisture is trapped in the infill and less cloud cover persists, also increases insolation and reduces evaporative cooling. Tests performed in these more southern latitudes and dryer climates would yield even more exaggerated temperature levels on the synthetic turf, thereby greatly exacerbating the reported hazard in such locations.

In Summary:

- 1) The NYSDEC study was consistent with most previous studies which show a much higher surface temperature, due to insolation, as compared to natural surfaces.
- 2) The results were mitigated by the August/Sept time of testing; the northern latitude; intermittent cloud cover; plus moisture and humidity.
- 3) Despite the mitigating test protocols, the study found a greater potential for heat related illness on synthetic surfaces; a potential for thermal injury by contact; and one surface exceeded the BYU 120°F surface temperature guideline during 70% of the testing days.

Phenols and Zinc in Leachate:

The NYSDEC study also confirms a problem with phenol and zinc concentrations, in specific types of crumb rubber, as determined by laboratory testing. The study states the following:
“The cryogenic crumb generated the highest phenol concentration in the leachate — approximately 20 times the groundwater standard. All types of crumb rubber had phenol levels exceeding the groundwater

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standard of 1 pg /L... The combined concentration for all phenols is approximately 18 times higher than the groundwater standard...phenol and zinc (for samples derived solely from truck tires) were found above groundwater standards or guidance values.”

The World Health Organization cautions:

Phenol is not expected to bioaccumulate significantly. It is toxic for aquatic organisms, and an environmental concern level of 0.02 µg/litre is suggested for water. Adequate data on plants and terrestrial organisms are lacking.

Intercompartmental transport of phenol mainly occurs by wet deposition and by leaching through soil. Generally, the compound is not likely to persist in the environment. Because exposure data are scarce, firm conclusions cannot be drawn with regard to the extent of the risk for either aquatic or terrestrial ecosystems. However, in view of the derived environmental concern level for water, it is reasonable to assume that aquatic organisms may be at risk in any surface or sea waters that are contaminated with phenol.

“Crumb rubber from truck tires ... produced the highest concentration of zinc in the leachate (approximately three times higher than the groundwater zinc guidance value (NYSDEC 1998a)... this figure illustrates that the release of zinc is not uniform and is highly dependent on the type of crumb rubber.”

Furthermore, with regard to the groundwater impact evaluation, the study cautions: *“The study also included a field sampling component for potential surface and groundwater impacts. This work has not been fully completed at the time of this report...this finding should not be considered as conclusive due to the limited amount of data available. Additional sampling of surface and groundwater at crumb-rubber infill synthetic turf fields will be conducted by NYSDEC. The results will be summarized in a separate report.”*

In summary:

- 1) The cryogenically produced rubber crumb generated phenol concentrations in leachate 20 times higher than the groundwater standard.
- 2) The truck tire rubber generated zinc in the leachate at 3 times the groundwater samples.
- 3) The NYSDEC study assumes dilution of these concentrations to safe levels by applying standard mathematical dilution models.
- 4) Since the models used are not site-specific, on site testing must be performed to determine actual site-specific outcomes.
- 5) Such data is too limited, at the time of the report, to draw any conclusions, but the concentration of phenols and zinc established by laboratory testing raises concerns.

COMMENT

The Synthetic Turf Council (STC) is a trade organization for the artificial turf industry. As such its rightful purpose is to promote and market the acceptance of artificial turf. In this

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capacity, it issued a press release on 6/3/09 which stated, **“Tests Show No Health Concerns At Synthetic Turf Fields” and “NY Studies Validate Safety of Crumb Rubber Infilled Synthetic Turf.”**

There is a thin line between hyperbolic marketing and deceptive practices or misleading disinformation and the STC’s misrepresentations of the NYSDEC study crossed that line. However, when dealing with information about serious public health risks, such deception can have severe consequences for the public.

By characterizing the NYSDEC report as a statement that there are, “no health concerns at synthetic turf fields” not only misrepresents and ignores what the study found but also deceptively and erroneously extends these false conclusions beyond the two fields tested - to all synthetic turf fields - contrary to the intention and correctly stated limitations of the report authors.

Unfortunately, the continued efforts to blunt a free, open and valid consideration of all the concerns relating to artificial turf will eventually prove counterproductive for turf purveyors by short-circuiting development of less risk-laden products.

Viable, safe alternatives which can eliminate the risks highlighted by the NYSDEC study are available, today. The STC should spend as much time and effort investigating and promoting these alternatives as it does stretching the truth to defend the hazard-bound status quo.

Finally, it should be noted that the STC raced to declare artificial turf completely safe based on a study which did not investigate phthalates, recently banned under the CPSIA, or toxic respirable particulate generated from silica sand and used as an infill material in a majority of turf installations – two potential hazards that the STC is loath to recognize .

Given the NYSDEC findings and the STC declaration of the complete lack of health concerns with synthetic turf fields, the STC should have no reservations about aggressively recommending comprehensive field testing of each new turf installation - for lead content in the infill; phthalate content; and respirable particles generation from rubber and/or sand, utilizing appropriate testing protocols .

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