

### **Focus on Safety: Indoor Air Quality**

The National Institute for Occupational Safety and Health (NIOSH) and the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) have established health guidelines for office environments. This includes no more than 800 ppm of CO<sub>2</sub> and at least 20 cubic feet per minute per person of fresh air. When these levels are not met, building maintenance needs to readjust or balance the HVAC system. In addition to CO<sub>2</sub>, odors from perfumes and colognes may also accumulate and trigger or exacerbate the allergies or sensitivities of fellow-employees. By the 1980's indoor air quality (IAQ) became a major issue that resulted in employee complaints, absenteeism, as well as law-suits. As a result, today there are many office environments that have established "fragrant-free environment" policies. Many times, industrial hygienists were brought in to perform formal investigations so that the source of an employee concern could be properly addressed. In many cases, the solution involved increased air flow as well as ensuring the office temperatures were within employee comfort levels. Obviously comfort is a very subjective matter, whereby what one employee may consider acceptable, another may not. Another concern can be odors from furniture and carpets. For furniture, specifically wood (including particle board or press board), formaldehyde is an issue. In such cases, formaldehyde is used in the fabrication process as an adhesive and would result in "off-gassing" over a period of time. Naturally, due to the newly established energy-saving recycled process, accumulation of formaldehyde became a potential concern. Once again, by applying proper ventilation, formaldehyde off-gassing can be controlled. Carpet is one type of floor covering that is commonly used in homes, commercial buildings, schools, cars, and public facilities. IAQ issues often associated with carpet range from odor and off-gassing of organic vapors from the carpet backing or adhesive, to retention of allergens from dust mites and pet dander. A carpet that is poorly maintained or water damaged may result in fungal contamination. Like many other household products and furnishings, new carpet can be a source of chemical emissions. Most carpet used in residential, public, and commercial settings consists of synthetic pile, usually nylon or olefin, cut pile or nylon tufted through a primary backing with a back coating of solvent-based adhesive. The loop of the tufted pile is set into a styrene-butadiene rubber (SBR) latex base, which is sandwiched between backings made of woven polypropylene or jute. Other common carpet types in schools and office buildings include carpet tiles usually made with a hard backing of polyvinyl chloride (PVC) or hydrocarbon resin. The new carpet odor that people may smell after carpet is installed is usually 4-phenylcyclohexene (4-PCH), which is a by-product of the styrene butadiene latex binder, used to hold the fibers to the backing. This chemical has a very low odor threshold, which means it can be in the air at very trace levels and still be detected by the human nose. Toxicology studies have shown that 4-PC is not a health hazard at the levels experienced from carpet, but that it does contribute an odor. Generally, the

emissions from new carpet are at very low levels one week after installation and odors should go away within a short time. Through vacuuming and ventilation, employee concerns due to VOC off-gassing from carpets can be mitigated.

*Robert Brounstein, Corporate Director Safety & Health, TerranearPMC*