



January 17, 2007

To Whom It May Concern

RE: LEED Issues With Off-gassing of Volatile Organic Compounds (VOCs) from cemented PVC, CPVC and ABS plastic pipe joints used in construction

We are aware that many buildings across North America are being constructed under LEED (Leadership in Energy and Environmental Design) building criteria that rewards the use of construction materials that have less potential for environmental damage or human irritation or harm than other equivalent products. The use of PVC, CPVC and ABS plastic piping is consistent with this worthy goal. Solvent welding is accomplished by the softening of the surfaces of two substrates by wetting them with solvents, primers and/or adhesives, and joining them together through chemical and/or physical reaction(s) to form a fused union. These solvents, primers and adhesives are considered "reactive diluents" which the SCAQMD defines as "a liquid which is a VOC during application and one in which, through chemical and/or physical reactions, such as polymerization, 20 per cent or more of the VOC becomes an integral part of a finished material."

To the best of our knowledge no empirical studies have been made to quantify the extent of VOC emissions other than those done by the South Coast and Bay Area Air Quality Management Districts (SCAQMD and BAAQMD) in California to regulate plastic adhesive emissions. SCAQMD Rule 1168, Test Method 316A and BAAQMD Method 40 were derived to measure actual emissions since, unlike VOC emitting surface coatings where all VOCs are emitted to the air, most plastic pipe joint VOCs are actually retained within the joint as the solvent-welding process takes place. For these joints the test procedure allows PVC and CPVC joints to dry/cure for 24 hours at temperatures between 70° to 85° F (ABS joints are cured for 48 hours) then the assemblies are heated for one hour at 110° C. The VOC retained and the VOC emitted is then determined using an analytical balance.

It is unlikely that the testing protocol can be duplicated in real life and the 110° C heating accomplished after installation to effectively drive out all VOCs. But, laboratory and field trials validate our consensus that a couple of weeks after a joint is made there would be no more than trace VOC emissions, if any, no matter the temperature conditions or size of pipe. We would therefore suggest that Low VOC cements compliant with applicable ASTM standards and applicable SCAQMD Rule 1168 and BAAQMD Regulation 8, Rule 51 emission limits meet the intent of the LEED criteria for reduced environmental impact. The current Low VOC emission limits are: PVC Cements, 510 grams/liter, CPVC Cements, 490 grams/liter, ABS Cements, 325 grams/liter, PVC/CPVC Primers, 550 grams/liter.

Sincerely,

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