

Tile and Molding Volatiles

Using the Dynatherm Thermal Desorption Autosampler

Many of the manufactured floor and base molding products that are produced today come with an adhesive backing. This would include items such as resilient rubber backed flooring, linoleum tile, milled molding and polymer based molding products. These adhesive backed products are a common source of volatile organic compounds (VOC'S) in an indoor air environment.

Common VOC's from adhesives and sealants include acetone, toluene, formaldehyde, butyl ether, vinyl cyclohexane, acrylic acid, and propylene glycol. Many other volatile compounds may find their way into the indoor air environment.

Thermal desorption involves the trapping of volatiles onto a suitable adsorbent matrix (Tenax, Carbosieve, Carbotrap, etc). The trapped volatiles are thermally desorbed, usually onto a GC/MS system. A piece of adhesive backed floor tile (7.5 cm x 7.5 cm) was placed in an 800 ml sealed dynamic headspace vessel through which an air flow is established. An exterior vent port containing a Tenax sampling tube collected tile volatiles for thirty minutes. After collecting the volatiles, the sampling tube was thermally desorbed using the TDA, interfaced to an ACEM 9300 containing a Tenax focussing trap. The trap was then desorbed to a GC/MS. This sampling protocol was repeated for a piece of polymer cove molding.

Mass Spectrum analysis of the tile self-adhesive product shows a significant amount of the solvent toluene present. A large amount of acetone is

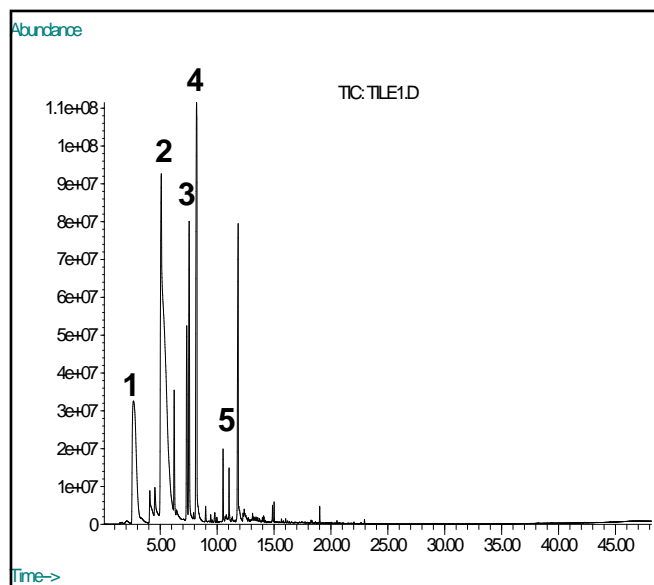


Figure 1. Self Stick Tile Adhesive.

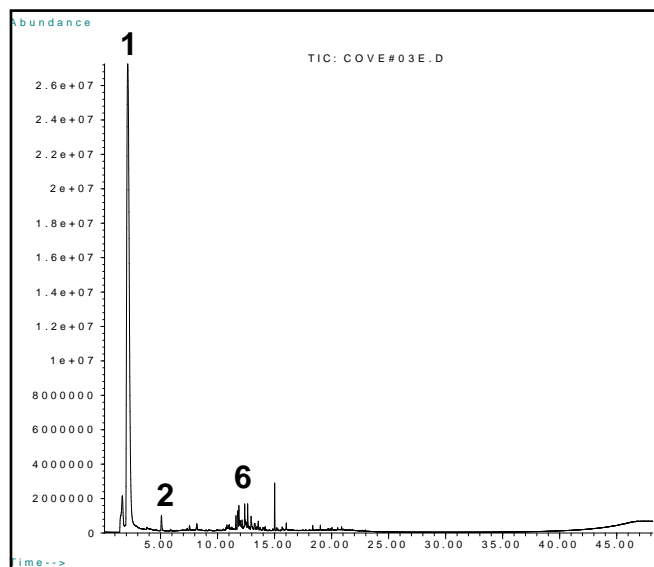


Figure 2. Self Stick Cove Molding Adhesive.

noted in the molding adhesive. Other aliphatic and aromatic hydrocarbons, including 2-ethyl hexanol were also observed.

Equipment

These samples were analyzed using the CDS 800ml Dynamic Headspace Vessel (modified). The carpet volatiles were thermally desorbed using the TDA 9300 interfaced to an ACEM 9300. This instrument in turn was interfaced to an Agilent 6850 Network GC/MS System.

CDS 800ml DHS Vessel Conditions

Purge Flow (He): 50ml/min
Purge Time: 30 minutes

TDA 9300/ACEM 9300 Conditions

Valve Oven: 300°C
Transfer Line: 260°C
Dry Tube: 100°C/5min
Tube Heat: 350°C/7min
Trap Heat 300°C/7min
Aux 1 350°C

GC Conditions:

Carrier: Helium
Column: HP-5MS (30m x 0.25mm x 0.25µm)
Detector: MSD
GC Program:
Initial: 40°C/2min
Ramp: 15°C/min
Final: 210°C

Peak Identification

1. Acetone
2. Toluene
3. Butyl acetate
4. Xylene
5. 2-Ethyl hexanol
6. Aliphatic hydrocarbons



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