



**Volatile Organic Compound testing was conducted by Alpha Environmental, Inc. Emerson, NJ, a member of “Alpha” the association of Medical Doctors for Reproductive Science. The test was to determine the effectiveness of the Ultra-Sun Technologies PCOC patented photo-catalytic / ultraviolet process for the destruction of various classes of organic hydrocarbons that can be found in indoor environments.**

**Executive Summary:**

The revised test bed is complete and in use. Twice we installed fan motors and initiated testing to find an unacceptable level of mineral oil contamination from the sealed motor. A third fan and motor was installed at the end of April 2010 and testing was resumed. It was used previously in tracer gas work and laboratory ventilation tests. It was found to be free of mineral oil leakage.

The new motor and fan is capable of producing an air flow from 0 to 600 plus CFM within a range of static conditions. For this report, the air velocity was arranged at 141 ft/min delivering 423 cfm. The static pressure drop across the PCOCS was 0.15-0.25 inches of water under the conditions of test. The relative humidity ranged from 32-48% and temperatures ranged from 68-83 deg F.

The sample VOC's were generated in our “bubbler” and added to the test bed. The unit was sealed aggressively, with tape, “C” clamps applied to seams and connections and screw closures to compress the gaskets fully.

The measurement technique is based on the difference between the start and finish over time, with an adjustment for any test bed leakage. The rate of reduction was followed over time. The rate of leakage was determined by running the sulfur hexafluoride and following its decrease and ascribing this to leakage. For testing, VOC are introduced and analyzed by gas chromatography mass spectroscopy (GC/MS) as outline in US EPA TO-15 protocol. The sampling is done on an instantaneous (grab sample) basis. For aldehyde samples containing formaldehyde, concentrations were determined by High Performance Liquid Chromatography (HPLC) as outlined in US EPA TO-11 protocol.

The table below lists the materials injected and their concentrations as the PCOCS test bed was run for approximately 24 hrs. All concentrations are expressed as micrograms/cubic meter or  $\mu\text{g}/\text{m}^3$ .

| Materials         | In PCOCS before VOC | Time 0    | Time 4hrs | Time 7.75 hrs | Time 16.3 hrs | Time 24.5 hrs |
|-------------------|---------------------|-----------|-----------|---------------|---------------|---------------|
| Ethanol           | 320                 | 310,000   | 11,000    | 2,200         | 890           | 330           |
| Isopropanol       | 180                 | 150,000   | 5,400     | 1,500         | 390           | 160           |
| Hexane            | 100                 | 810,000   | 29,000    | 4,200         | 740           | 180           |
| Benzene           | 83                  | 410,000   | 19,000    | 3,300         | 770           | 260           |
| Toluene           | 89                  | 67,000    | 6,700     | 2,000         | 670           | 280           |
| Ethyl benzene     | 440                 | 6,000     | 1,600     | 790           | 450           | 220           |
| Xylenes           | 1,300               | ND        | 1,000     | 870           | 830           | 410           |
| Acetone           | 2,800               | 730,000   | 22,000    | 3,500         | 1,500         | 680           |
| Styrene           | 160                 | ND        | 380       | 320           | 190           | 130           |
| Total VOC's       | 6695                | 2,511,000 | 97,480    | 18,906        | 7,602         | 3,397         |
| Percent reduction | N/A                 | 0         | 96.12%    | 99.25%        | 99.70%        | 99.86%        |