

CosaTron - A Cleaner Environment with Benefits – “Radon Reduction”

Michael D Orcutt, PE

Abstract:

CosaTron’s Excitation Technology has always provided a Cleaner Environment in which to live and work. The process of increasing the amount of contaminants that reach the filters; lessens the amount that can stay within the space being either inhaled by the occupants or coating surfaces. CosaTron has been effective in reducing gaseous and aerosol contaminants as well as submicron particulate. Recent testing in homes with high concentrations of radon showed that excitation technology can reduce levels of radon as well.

Introduction:

CosaTron’s Excitation increases the rate of conglomeration; which is a naturally occurring phenomena, through which particles collide and stick together growing in size. Larger particles are more easily entrained into the controlled return airstream and removed at the filters. The process works on very small particles, including gaseous molecules, reducing the contaminants of concern. This study was performed to evaluate the effect of excitation technology on one specific and common contaminate of concern, radon gas.

Forward:

CosaTron has historical data showing the reduction of gases such as Carbon Dioxide, Sulfur Dioxide, Ammonia and Formaldehyde. Where the listed gases are of concern, CosaTron has recently conducted (2) in-situ tests showing the impact of the technology on Radon.

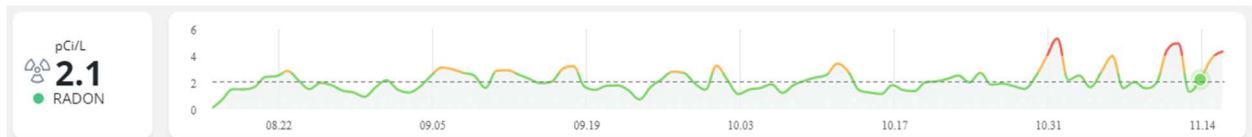
Radon is a radioactive, colourless, odorless, tasteless noble gas that is a worldwide health issue. Radon is a difficult gas to measure in in-situ environments as it’s generation rate varies based on several factors including but not limited to Atmospheric Pressure, Exposure Surface, Source Potential, Temperature and Humidity. The test results showed a correlation between using CosaTron’s technology and having a lower average Radon level over an extended period of time.

Exposure to Radon Gas is a worldwide issue. Radon Gas exposure is the second highest cause of lung cancer following smoking. Increased exposure to levels higher than 2.7 pCi/L increases lung cancer risk by 16% as shown at www.airthings.com.

Experiment:

CosaTron used two residential locations in proximity to each other which had varying foundation characteristics; crawl space, and a crawl space abutting a walkout basement and varying elevations. The source Radon emissions varied a great deal between the properties which helped support the variability of the emission factors. Radon measurements were taken using an Airthings Home Monitor with levels delineated as GREEN 0-2.69 pCi/L, YELLOW 2.70 pCi/L – 3.99 pCi/L and RED 4.00 pCi/L and above.

Location “A – Home with Crawlspace”

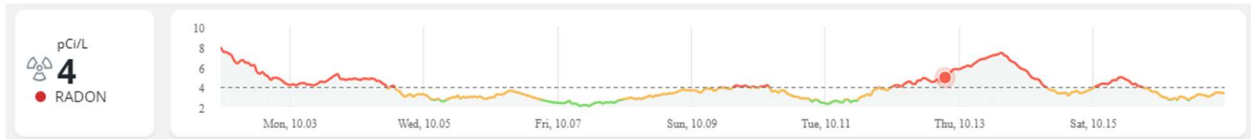


Graph 1 – 08/16/2022 – 11/15/2022

1. CosaTron installed an Airthings Radon Monitor in location A in the living space above the crawl space; readings were consistently in the 2.0 to 3.0 range; averaging 2.66 pCi/L. CosaTron added the “Home

Monitor” on 16 August 2022 to have data access and installed a portable unit; RV750 in the main space. The portable unit was replaced on 28 August 2022 with a whole house unit with radon readings continuously monitored. The readings averaged 2.1 pCi/L through 15 November 2022. The overall average, since the whole house equipment was installed is 21% less than the initial average and has shown continuous and sustainable improvement.

Location “B – Home with Walkout Basement”



Graph 2 – 10/2/2022 – 10/16/2022



Graph 3 – 10/17/2022 – 11/15/2022

CosaTron installed an Airthings “Home Monitor” in location B in the living space in the walkout basement on 2 October 2022 and measured Radon Levels until 16 October 2022 without using CosaTron Equipment; the baseline average was 4.0 pCi/L; see Graph 1. CosaTron added a portable RV750 Unit to the space and the average current average is 3.8 pCi/L; see Graph 2.

Conclusion:

Testing at the two locations, as described, showed reduction rates in Radon. Location A showed an average reduction in Radon of 21% over a 90-day duration. Location B showed an average reduction in Radon of 5% over a 30-day duration. The two houses had different foundation structures, one with an enclosed crawl space that provided a level of conditioning and the highest reduction rate, and one with a crawl space with natural ventilation abutting a walkout basement with the lowest rate of reduction.

Results showed that CosaTron excitation technology is effective in reducing radon to safe levels in houses that have some level of ventilation between the ground surface and the occupied space above. Houses with unventilated basements, that retain the radon gas, affect the floors above. While the radon level was reduced in the house with an unventilated basement, radon concentration level was significantly higher and the sustainable level at time exceeded the safe level.

CosaTron’s Excitation technology has historically cleaned the air by increasing the amount of contaminants that reach the filters from the occupied space. Where CosaTron has tested for gaseous contaminant removal and has published results; it is important to continue to evaluate the systems potential to remove current contaminants of concern such as Radon. The in-situ application that is currently being documented has shown positive results.

Based on the test results, CosaTron may be able to assist with lowering the levels within the occupied space while cleaning the air and protecting the occupants.