

Active Soil Depressurization (ASD) Field Study – Radon Reduction Data

Active soil depressurization (ASD) is the most effective radon mitigation technique for reducing high levels of radon, with reductions of 80% or higher being typical. The ASD technique relies on installing a fan in-line along with suction piping which exhausts radon containing soil gas from underneath the home to the outdoors where it is rapidly diluted and not a health concern.

The data in the accompanying table is furnished from a field study conducted by National Radon Laboratory staff under Health Canada's National Radon Program. The results from the study are for 52 homes in the Ottawa-Gatineau area which were all previously mitigated by the ASD technique where the mitigation fan was mounted indoors in the basement and the discharge pipe exhausted perpendicular to the side-wall of the home near ground level. This technique is often referred to as side-wall discharge and was pioneered by Arthur Scott, generally accepted as the inventor of the ASD technique. It is important to note that the discharge should be at right angles to the wall.

The results in the data table are sorted from the lowest to the highest post-mitigation radon concentration (column 3) for the 52 homes (column 1). The pre-mitigation radon concentration values (column 2) were obtained directly from the study participants, and the post-mitigation radon concentration values (column 3) were the result of 3-month long-term alpha track radon tests analyzed by the National Radon Laboratory. The average post-mitigation test duration for the 52 homes was 92.5 days.

The percent radon reductions obtained (column 4) were calculated using the pre-mitigation and post-mitigation radon results according to the following formula:

$$\% \text{ Radon Reduction} = \left[\frac{(\text{PreMitigation Radon Concentration} - \text{PostMitigation Radon Concentration})}{\text{PreMitigation Radon Concentration}} \right] \times 100$$

For the post-mitigation radon results (column 3), the calculated results from the alpha track measurement system were used to enable a percentage radon reduction to be calculated for each home despite the fact that the detection limit for this system is approximately 15 Bq/m³ for a 3 month test duration. Any value below 15 Bq/m³ was reported to participants as <15 Bq/m³, but the values shown in the table were used to enable some statistics to be calculated for the set of homes.

The average percentage radon reduction for the 52 homes was 90.7%, the median percentage radon reduction was 93.5%, and the maximum and minimum percentage reductions were 99.6% and 47.2% respectively.

As can be seen from the data, the study shows that ASD with side-wall discharge near ground level is an effective technique for reducing indoor radon levels. The side-wall discharge technique is cheaper to install as a retrofit in an existing home compared to an above the roof discharge with the fan mounted in the attic, and is less prone to icing of the discharge outlet in winter.

More information about Health Canada's National Radon Program can be found here: <http://www.hc-sc.gc.ca/ewh-semt/radiation/radon/index-eng.php>