

## **Radiation: It's All Around Us**

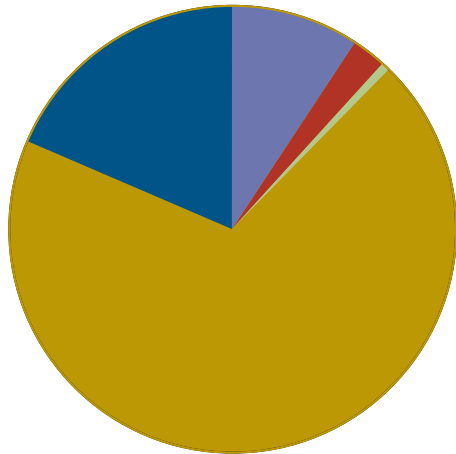
It's in the air we breathe, in the water we drink, in the soil and rock we stand on, and in the sun's rays we like to bask in! Added to this is the radiation we get from man-made sources, such as x-rays, medical treatments, building materials, etc.

## **Radiation in Granite is Not Dangerous**

From what we know, there are two ways in which countertops, tiles and other finishes made of granite might emit any level of radiation. The first is by the release of tiny amounts of the radioactive gas radon which can be inhaled. The second is by direct radiation from the surface itself to the homeowner. In both cases, the radiation emitted is from the same process – natural radioactive decay of one element into another.

Compared to other radiation sources in the home and outside, the risk to the homeowner from radioactivity emitted from a granite countertop or tiles is practically non-existent. In fact, the amount of radon gas emitted by a granite countertop is less than one millionth of that already present in the household air from other sources.

## **Typical Contributions to Radon Content of Indoor Air (pCi/L)**



- 69.3% Soil around house
- 18.5% Well water
- 9.2% Outdoor air
- 2.5% Building materials
- .5% Public water supplies



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# The Truth About Granite and Radon/Radiation



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Over the past few years there has been some consumer confusion about rumored radiation levels occurring in natural granites used for residential countertops, floors, tiles, etc. Unfortunately, the origin of these concerns are advertisements and other communications from the manufacturers of radon detection devices and the producers of competing materials. Levels of radiation from granite products, which technically are measurable, are in fact, small fractional values of established thresholds for environmental safety.

The truth of the matter is that granite is a safe product. It's been used for thousands of years and the relationship between granite and radon has been studied for years and years. How safe is granite? There have been mathematical models developed that show that one could live in an all-granite home or building, including sleeping on granite, for an entire year and still be within very safe levels of exposure.

Nonetheless, the Marble Institute of America has produced this brochure to help you understand granites, radioactivity and natural stone.

## **Radioactivity in Granite: It's Natural**

All rocks have a small amount of radioactivity in them due to the presence of minerals that contain radioactive elements uranium (U), thorium (Th) and potassium-40 (40K). Because granite typically contains more of these elements than most other rocks, it will be more radioactive than a slate or marble. All of the minerals in granite contain some radioelements; the white or pink feldspars contain 40K, the black biotites and horn-blendes contain 40K, U and Th, and the small inclusions of minerals such as zircon, apatite, sphene, etc. contain the most U and Th.

## **Some Frequently Asked Questions and the Answers**

### **Q. What is radiation?**

A. Radiation is energy that is transported as waves or particles. This includes visible light, infrared, ultraviolet and microwaves.

### **Q. What are the sources of nuclear radiation?**

A. There are natural and man-made forms of radiation. Natural radiation includes cosmic radiation and emissions from radioactive elements in the earth, radon gas in your home, some foods and well water. Man-made radiation comes from dental x-rays, medical diagnostics and treatment, the remains of nuclear bomb testing, emissions from nuclear reactors, radioactive elements in drywall and concrete and cigarette smoke. The pie chart included in this brochure shows the approximate contribution of each of these to your annual radiation dose.

### **Q. How much radon is given off by a granite countertop, and how does this compare with other household materials?**

A. Calculations show that, for an average countertop, containing an average uranium concentration of four ppm (parts per million), the concentration of radon that is given off by the countertop into the household air is 270,000 times less than the level of radon in the outside air. The maximum contact level that you would receive over one year if you were to sit on a countertop all of the time would be about one quarter of the annual radiation from all sources. If you

were just a few inches away from the granite (such as when doing the dishes), the dose would be too low to measure.

### **Q. What about food that is prepared directly on the granite surface? Is there a chance that it could absorb radioactive energy, which later would be ingested by those eating the food?**

A. The only way that radioactive elements such as uranium can get into the food is if they became dissolved in water and absorbed in the food. However, granite is one of the most insoluble materials known to man and the amount that could be dissolved is miniscule in comparison to the radioactive elements that are already in the food (in meat or from uptake by soil or air-borne particles during growth). Radioactive energy given off at the granite surface will enter food that is directly in contact with the surface but, like all energetic rays, it changes into heat and/or non-radioactive particles. These processes happen quickly so the radiation does not remain in the food.



If you have further questions about radon and granite, contact the Marble Institute of America at 440-250-9222, send an email to [miainfo@marble-institute.com](mailto:miainfo@marble-institute.com), or visit [www.marble-institute.com](http://www.marble-institute.com)

## **About the Marble Institute of America**

For over 60 years the Marble Institute of America (MIA) has been the world's leading information resource and advocate for the natural stone industry. MIA members include marble, granite, limestone, sandstone and other natural stone producers and quarriers, fabricators, installers, distributors and contractors around the world.