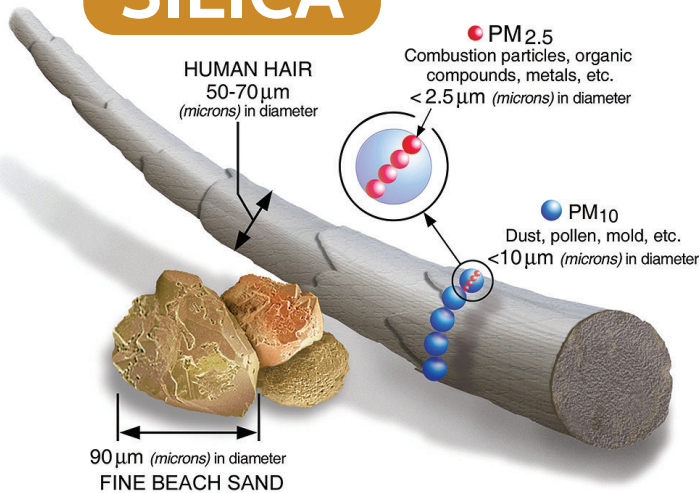


# SILICA IN THE AGGREGATE INDUSTRY

## SILICA



- **Silica** in the form of quartz (“crystalline **silica**” or “**silica**”) is the second most common material in the earth, making up about 12% of the earth’s crust.
- **Silica** is a very hard mineral and is very difficult to break down into particles that are small enough to be considered respirable.
- Respirable **silica** refers to particles that are 4 microns and smaller and when present in ambient air can be inhaled and reach the deepest part of the lung (the alveoli). This is also referred to as microcrystalline **silica**.
- The US EPA estimates that aggregate operations contribute to 1% of overall ambient **silica**, far less than others sources.

## TYPES OF SILICA



**MICROCRYSTALLINE SILICA**



**SAND & GRAVEL**

- Microcrystalline **silica**/ industrial sand deposits vs. Construction sand & gravel.

- Construction sand & gravel has far less microcrystalline **silica** content than industrial sand or microcrystalline **silica** ore.

Figure 1: Microcrystalline **Silica** Ore (left) vs. Construction Sand & Gravel (right)

The exposure to respirable **silica** is limited due to the production processes in the majority of mining operations, including industrial **silica** sand, which produce materials where the majority of size fractions are greater than 4 microns and therefore, not respirable.

- The potential to emit Particulate Matter (PM), including PM that may contain respirable **silica**, is minimized through the use of engineering and administrative controls which are required in regulatory permits.
- The vast majority of aggregate mining operations include wet processing or water application which limits the potential to create dust from sorting and screening of rock, sand and gravel.
  - For example, EPA and EGLE require air quality Permits to Install (PTI) for aggregate production equipment, which handle crushed sand and gravel
  - The conditions of these permits not only limit the potential for fugitive dust and **silica** emissions but also require the operators to perform testing and record-keeping to ensure compliance with the regulatory limits and effectiveness of dust control practices, such as wet suppression.

The Mine Safety & Health Administration (MSHA) requires worker exposure monitoring to be conducted periodically at aggregate operations that may contain crystalline **silica** that could present a potential health risk to workers.

- OSHA and MSHA set exposure limits for respirable **silica** in the workplace and aggregate operations are designed to ensure exposure levels in the mine are below exposure standards.
- Testing evaluates if workers are exposed to concentrations that would require controls or the use of respirators during operations.

Testing has indicated that in almost all cases, the engineering controls required by the air permit are adequate to maintain respirable **silica** levels well below employee exposure thresholds, which indicates that offsite impacts are much lower.