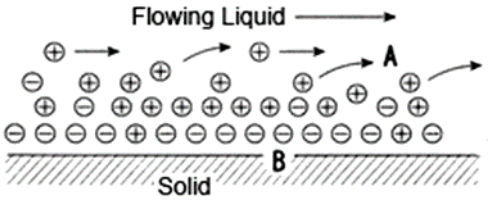
UNDERSTANDING STATIC CHARGE, EMBEDDING AND OEI MAGNETIC FILTRATION

One of OEI's most frequently asked questions is:

How does OEI's Magnetic Filtration capture non-ferrous materials?

Static Charge is one of the forces in play which aids OEI magnetic filtration technology in capturing non-ferrous material. Firstly, a force directly related to static electricity is **friction.** Friction can separate positive and negative charges ultimately generating static fields (flow electrification). The ***triboelectric*** effect (also known as *triboelectric* charging) is a type of contact electrification in which certain materials become electrically charged after they come into frictional contact with a different material. Secondly, if **air bubbles** are present in the flow matter, they amplify the static electricity. Thirdly, liquid and gases which **flow over a solid** (pipelines, holding tanks, etc.) create a static charge as well.



"The overshadowing menace of all liquid organics (especially hydrocarbons) is the physical fact that they generate static electricity when in flow."

Source: http://www.machinerylubrication.com/Read/809/electrostatic-charge-hydrauli

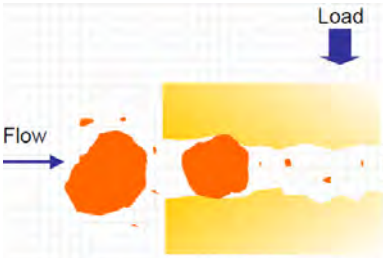
Other factors which create and effect static charge are:

- **High fluid velocities**
- **Flow through filter elements and other microporous materials**
- **Turbulence created by pumps, especially centrifugal pumps**
- **Discharging onto the free surface of a reservoir.**

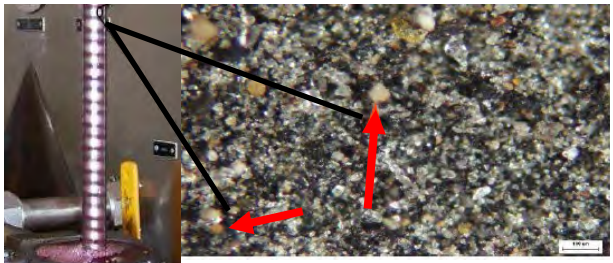
Embedding

Another way non-ferrous material is captured by magnetic filtration is through the process of embedding. This occurs in more than one way. It occurs when particles of ferrous contamination get embedded into the non-ferrous particles within a system, i.e. a pipeline. Sulfur contamination in a pipeline can make contact with ferrous micron and submicron particles (the most dangerous particles); these then become a single contaminate. Also, ferrous material wears non-ferrous material (abrasive wear); for example, when oil is flowing through the bearings, micron and submicron ferrous particles gouge or score material such as copper or brass. These particles marry up and are trapped by the magnetic filter.

"The generation of ferrous contaminants in most hydraulic and lube systems due to both normal and abnormal wear is a fact of life." Christian Bauer, Pall Corporation



ABRASIVE WEAR



NON-FERROUS MATERIAL CAPTURED BY OEI'S MAGNETIC FILTER ROD