

Thermoreact® - An innovative remediation product for In Situ neutralization of halogens and sulphur during Thermal Desorption

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Abstract

During In Situ Thermal Desorption, polluted soil (generally with TPH, PAH, Mercury, chlorinated solvents, etc.) is heated until the vaporization of the pollutants, which are then drawn through perforated steel tubes, called vapor tubes, surrounded by gravel acting as a draining medium preventing the clogging of the tube perforations (by fine particles, sludge, etc.). These recovered vapors are then either treated in a vapor treatment unit or re-injected into the flame (in case of hydrocarbon pollution and heating with Smart Burners).

In many cases, the pollutants to be treated in the soil are accompanied by other process-disturbing elements (such as phosphorus, sulfur or halogenated compounds like chlorine). The heat causes the vaporization of many chemical compounds, including those corrosion agents that are conducted through the porous medium to the extraction wells. The problem with these agents is that, in some cases, they become very corrosive and therefore tend to destroy equipment and make remediation technology less effective. Additionally, if not treated, they can cause non-compliant air emissions as well.

Thermoreact[®] is an innovative and patented (Haemers, 2022) product that replaces the conventional gravel around vapor tubes. The product allows for in-situ neutralization of the vapors before exiting the soil pack, reducing the treatment requirements, and saving substantial treatment costs overall. Its composition varies, depending on the nature and concentration of the pollutants present in the soil in order to always obtain the best neutralization reaction while keeping permeability at the required level for proper vapor extraction. The products of said neutralization are inert minerals that can be left in the soil, making In Situ Thermal Desorption a truly zero-waste treatment for many other contaminants than is currently the case.

This paper presents the performance results of the in-situ thermal desorption treatment using **Thermoreact**[®] as a sulfur neutralization filter media around the vapor tubes.

This study shows that:

- Haemers Technologies' patented **Thermoreact**[®] technology is effective in neutralizing sulfur-containing vapors.
- The effectiveness of **Thermoreact**[®] in neutralizing sulfur is not affected by the presence of other pollutants.
- There is no change in the appearance of the soil or **Thermoreact**[®] after treatment. Leaving the neutralization products in the soil, inert after reaction, is therefore possible without impacting the visual aspect of the site.
- The composition of **Thermoreact**[®] can be tailored to specific site parameters such as moisture, sulfur, hydrocarbon and halogen concentrations, and other soil chemicals.



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