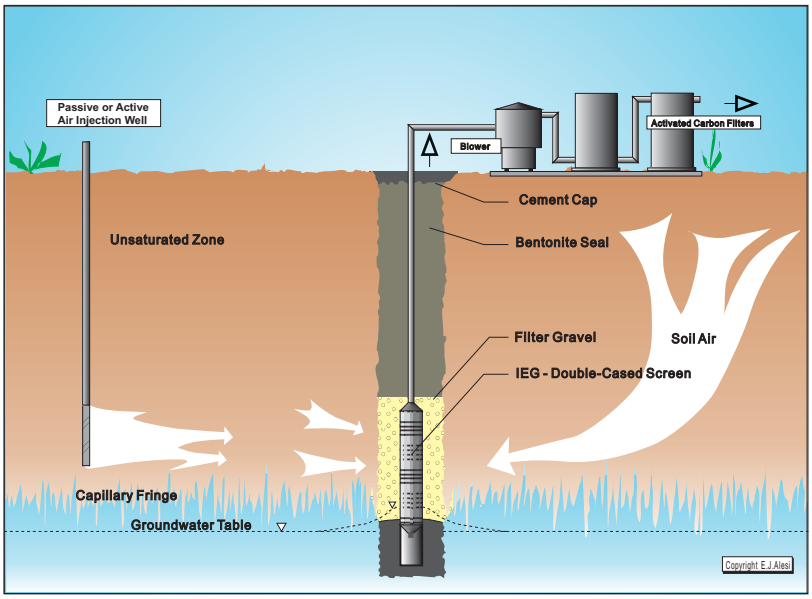
IEG Technical Briefing Note No. 2

Vacuum Vapour Extraction - IEG VVE

The conventional technique of Soil Vapour Extraction has proven to be a practical and inexpensive method for the removal of volatile and semi-volatile hydrocarbons from the unsaturated zone. Soil Vapour Extraction is conventionally carried out using small-sized boreholes which extend to just under the groundwater table and are outfitted with screens of diameters up to 50 mm. Depending on the size of the equipment and the properties of the soil, blowers are usually operated at pressure differences of 100 to 300 millibars. This high negative pressure draws perched or capillary water into the venting system.

Conventional Soil Vapour Extraction Systems also generate turbulence in the vicinity of the screened section of the well which leads to a significant reduction in ventilation capacity. The ventilation of turbulent air under high negative pressure also results in excessive heating of the blower used to operate the system.

To overcome such difficulties, IEG uses an innovative type of **Vacuum Vapour Extraction** system using a specially-engineered and patented **Double-Cased Screen** (DMF) in combination with a very low negative pressure blower. The double-cased screen consists of fine-grained filter granules sandwiched between two layers of metal sieve web with an open screened area of over 50%. The metal web is constructed such that an artificial well pack cannot significantly reduce the open screened area.



IEG Vacuum Vapour Extraction System Using the Double-Cased Screen (DMF) (IEG VVE Process)

Advantages

- The **IEG VVE** system can be operated in clay and silt with a low hydraulic conductivity
- The system needs less energy and less maintenance
- Maximum utilisation of the adsorptive capacity of the **IEG GAC-Sorb** Granular Activated Carbon filter
- Increase in the percentage removal of vapour-phase pollutants from the subsoil
- Inclusion of the often highly-contaminated capillary fringe zone in the remediation process
- Larger effective radius of treatment
- Lower number of ventilation wells required for the remediation of a specific area
- Reduction in the total remediation time

Air/water phase separation takes place in the DMF in order to avoid drying of the subsurface. By accurately positioning the DMF it is possible to obtain the necessary air-lift velocity to remove dense soil air charged with contaminants from the bottom of the well. Since contaminant concentrations often reach a maximum within the capillary zone, the Double-Cased Screen is normally placed within this area.

Due to laminar flow generated when extracting soil air via a DMF, this venting process can also be applied in less permeable soil using negative pressures between 40 and 80 millibars within the screened segment. In practice, the use of Double-Cased Screens as part of a **Vacuum Vapour Extraction** system results in a significant increase in the effectiveness and efficiency of the soil air ventilation process.

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