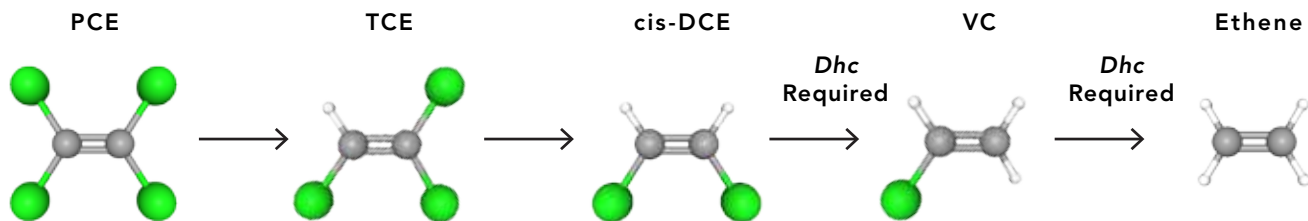


SDC-9+

Bioaugmentation Culture for Groundwater Remediation

SDC-9+ is a 50/50 blend of the SDC-9 and TCA-20B cultures. SDC-9+ is a highly effective consortium of microorganisms for *in situ* bioremediation of chlorinated solvents supporting the complete dechlorination of chloroethanes to ethane and chloroethenes to ethene. SDC-9+ contains multiple strains of *Dehalococcoides mccartyi* (Dhc), the primary species known to completely dechlorinate PCE and TCE to non-toxic ethene, as well as *Dehalobacter spp.* (DHBt) and several other halo-respiring genera that consistently dechlorinate 1,1,1-TCA to ethane without the accumulation of 1,1 DCA or chloroethane daughter products. For sites with both chloroethanes and chloroethenes where Dhc are absent or present at low concentrations, bioaugmentation with SDC-9+ provides the necessary bacteria for complete dechlorination to ethane and ethene. Even when native microbes are present, bioaugmentation can provide substantial benefits by using electron donor more efficiently and by increasing dechlorination rates.



Benefits - Higher Dechlorination Rates

Trihalogenated chloroethanes and fluoroethanes can inhibit Dhc activity preventing effective chloroethene reduction to non-toxic ethene. By combining the SDC-9 chloroethene culture with the TCA-20B chloroethane culture we ensure rapid dechlorination of both chloroethenes and chloroethanes. SDC-9+ contains a natural consortium of bacteria that includes not only dechlorinating microbes but other beneficial bacteria that support microbial growth by supplying required substrates and growth factors. "Dhc in mixed cultures exhibit shorter lag times following transfers, grow faster and exhibit higher dechlorination rates than pure Dhc cultures" (Bioaugmentation for Groundwater Remediation, 2013).

Benefits - Complex Plumes

The presence of 1,1,1 trichloroethane, chloroform, and 1,1,2 trifluoroethane (Freon 113) may inhibit the complete degradation of chlorinated ethenes to ethene. SDC-9+ contains microbes suitable to degrade both chlorinated ethenes as well as chlorinated ethanes. The mixed culture rapidly dechlorinates chloroethanes and prevents inhibition of chloroethene reduction at sites with both chloroethenes and trihalogenated chloroethenes and fluoroethenes.

Contaminants Treated by SDC-9+:

Tetrachloroethene (PCE)	1,2-Dichloroethane (DCA)
Trichloroethene (TCE)	Carbon Tetrachloride (CT)
cis-Dichloroethene (cDCE)	Chloroform (CF)
trans-Dichloroethene (tDCE)	Dichloromethane (DCM)
1,1-Dichloroethene (DCE)	Hydrochlorofluorocarbon (HCFC)
Vinyl Chloride (VC)	Tetrafluoroethene (TFE)
Freon 11	1,1,1-Trichloroethane (TCA)
Freon 113	1,1-Dichloroethane (1,1-DCA)
1,1,2,2-Tetrachloroethane (TeCA)	Chloroethane (CA)

SDC-9+ Contains:

Dehalococcoides (DHC)
Dehalobacter spp. (DHBt)
Desulfitobacterium spp. (DSB)
Dehalobium chlorocoercia (DECO)
Desulfuromonas spp. (DSM)
Desulfovibrio spp.
Sulfate Reducing Bacteria
Methanogenic Bacteria

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Product Characteristics

Parameter	Unit	Specification
Density	g/cm ³	0.9 - 1.1
pH	Standard Units	6.0 - 8.0
Appearance		Light Greenish, Murky Liquid
Odor		Musty



Application

Preparing anaerobic water with our Newman Zone OS product will prevent exposing anaerobic bacteria to free chlorine or oxygen. SDC-9+ may be injected with electron donors and other amendments when mixed with OS treated water or injected directly into wells or DPT points followed by OS treated chase water. Recommended dosing for SDC-9+ is 10 million Dhc cells per liter or more in the injection fluid - a good reference for Dhc cell density vs. dechlorination rates is Lu et al., 2006.

Packaging

SDC-9+ is shipped in 19L (5-gallon) stainless steel kegs. The consortium can also be concentrated up to 10X and shipped in 1.75, 2.5, or 3-gallon kegs. Kegs are pressurized with Nitrogen and stored in chilled coolers. Calibrated delivery system (1, 2 or 3.5 L) and fittings are provided. Users will need to provide an inert gas cylinder (Nitrogen or Argon) and regulator.

Storage

SDC-9+ may be stored in the kegs for up to 3 weeks at 2-4° C. Avoid freezing conditions and keep the kegs chilled in a refrigerator or in a cooler with fresh ice or ice packs.

Safety

SDC-9+ is a non-toxic, non-pathogenic, non-genetically modified, naturally occurring consortium of microbes. No known hazards are associated with exposure to this product. Nevertheless, appropriate Personal Protective Equipment is recommended when handling this product.