



TSI TCA (DHB) *Dehalobacter* Bioaugmentation Culture[®] *Containing >1 x 10¹¹ Dehalobacter*

Terra Systems TSI TCA *Dehalobacter* (TSI TCA) Bioaugmentation Cultures[®] is added to the groundwater at sites where the native microorganisms of *Dehalobacter* are not present, not in sufficient quantity or when the client wants to decrease the remediation time frame for the biodegradation of chlorinated solvents such as 1,1,1-trichloroethane (1,1,1-TCA) and 1,1,2-trichloroethane (1,1,2-TCA).

Key Communication Points

- TSI TCA *Dehalobacter* Bioaugmentation Culture[®] is an enriched natural bacteria culture that contains *Dehalobacter* species for bioaugmentation.
- TSI TCA contains >1 x 10¹¹ *Dehalobacter cells/L*.
- This culture biodegrades 1,1,1-trichloroethane to 1,1-dichloroethene, 1,1-dichloroethane, and chloroethane.
- It can be used at sites where bacteria capable of complete reductive dechlorination are not present or there is a need to decrease the remediation time frame. It is estimated that *Dehalobacter* are not present in 10 to 40 percent of chlorinated solvent contaminated sites.

Key Benefits of TSI TCA *Dehalobacter* Bioaugmentation Culture[®]

- The TSI-TCA *Dehalobacter* Bioaugmentation Cultures[®] has been proven to be effective with a growing body of laboratory and field data.
- TSI TCA biodegrades 1,1,1-trichloroethane to 1,1-dichloroethene, 1,1-dichloroethane, and chloroethane and contains >1 x 10¹¹ *Dehalobacter cells/L*

Composition

Ingredient	Synonyms	CAS #	Percent	Hazardous
Non-hazardous ingredients	DHB	Not applicable	100%	No

Terra Systems QA/QC

With every shipment, we include a QA/QC sheet for the actual batch that the customer receives. Included are the date manufactured, batch# and DHB concentration (cells/L).

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**Manufacturing Quality Control Checklist for TSI TCA (DHB)
Bioaugmentation Culture**

I. Product Information

Parameter	Value
Product manufactured	TSI TCA (DHB)
Date manufactured	7/3/2018
Batch#	765-45/36
Customer packaging	Keg
Customer	Environmental Assessment & Remediations
Volume of Culture	18 L
Date shipped	7/10/2018
Date delivered	7/11/2018
Site location	Glen Cove, NY 11542

II. Ingredients Information

Test	Results	Acceptable Range	Date	Method
DHB content of pre-concentrated culture TSI TCA (copies/L)	2.1E11	≥5E10	7/6/2018	qPCR

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7/5/2018
Date

The TSI-TCA[®] Bioaugmentation Culture is cost effective and is typically a minor component of the total remediation project cost. At sites where the *Dehalobacter* are present, but at low numbers or poorly distributed, bioaugmentation can be used to reduce the treatment time. Bioaugmentation can also reduce the time required to grow the *Dehalobacter* populations to effective cell densities. Therefore, future costs can be reduced.

- The TSI-TCA[®] works with all commonly used electron donors.
- The TSI-TCA[®] Bioaugmentation Culture is not genetically modified or engineered.
- The TSI-TCA[®] Bioaugmentation Culture is certified to be free of known human pathogens.
- Each purchase comes with free technical phone support from an experienced Terra Systems microbiologist.



- The TSI-TCA[®] Bioaugmentation Culture has rigorous quality control procedures in place to ensure that each shipment is of the highest quality, stable, safe, effective and free of chlorinated volatile organic compounds.
- The TSI-TCA[®] Bioaugmentation Culture is shipped overnight in specially designed stainless-steel containers that prevent exposure to air and are safe & easy to handle.
- A senior level microbiologist is also available to be on-site to support the successful application at \$1,200 per day plus travel expenses.

