

## Available Gene-Trac® Tests

Contaminant Class	Redox	Gene-Trac® Test	Target	Relevance
Chlorinated Ethenes	Anaerobic	Dhc	<i>Dehalococcoides</i>	Reductively dechlorinates PCE, TCE, all DCE isomers, VC
		Dhb	<i>Dehalobacter</i>	Partial dechlorination of PCE and TCE to cDCE
		Dsm	<i>Desulfuromonas</i>	Partial dechlorination of PCE and TCE to cDCE
		Dsb	<i>Desulfitobacterium</i>	Partial dechlorination of PCE and TCE to cDCE
		Geo	<i>Geobacter</i>	Reductive dechlorination of PCE to cDCE, regenerates reduced iron species in biogeochemical degradation
		Dhg	<i>Dehalogenimonas</i>	Dechlorination of tDCE to VC and VC to ethene
	Chloroethene FGA	Vinyl Chloride Reductase ( <i>vcrA</i> )	Dechlorination of cDCE and VC to ethene	
		BAV1 Reductase ( <i>bvcA</i> )	Dechlorination of cDCE and VC to ethene	
		Trichloroethene Reductase ( <i>tceA</i> )	Dechlorination of PCE and TCE to cDCE and VC	
Aerobic Energy yielding	Polaromonas	<i>Polaromonas</i>	Aerobic dechlorination of cDCE	
	etn	Epoxyalkane: coenzyme M transferase ( <i>etnE</i> )	Aerobic degradation of VC	
	Aerobic Co-metabolism			
Chlorinated Ethanes	Anaerobic	Dhb	<i>Dehalobacter</i>	Dechlorination of 1,1,1-TCA/1,1-DCA to chloroethane; 1,2-DCA /1,1,2-TCA to VC/ethene; 1,1,2,2-TeCA to tDCE
		Dhg	<i>Dehalogenimonas</i>	Dechlorination of 1,2- DCA to ethene; 1,1,2,2-TeCA to c/tDCE; 1,1,2-TCA to VC
		Dhc	<i>Dehalococcoides</i>	Dechlorination of 1,2-DCA to ethene; dechlorination of VC produced from 1,1,2-TCA dechlorination
		Dsb	<i>Desulfitobacterium</i>	Dechlorination of 1,1,2-TCA and 1,2-DCA
	cfrA/dcrA	Chloroform reductase ( <i>cfrA</i> ), Dichloroethane dehalogenase ( <i>dcrA</i> )	<i>cfrA</i> dechlorinates 1,1,1-TCA to 1,1-DCA; <i>dcrA</i> dechlorinates 1,1-DCA to chloroethane	
	Aerobic Co-metabolism	sMMO	soluble Methane monooxygenase (sMMO)	Co-metabolism of 1,1,1-TCA and 1,1- DCA
PMO		Propane monooxygenase (PMO)	Co-metabolism of chlorinated ethanes (e.g., 1,1,1-TCA) by propane utilizing bacteria	
Chlorinated Methanes	Anaerobic	Dhb	<i>Dehalobacter</i>	Reductive dechlorination of chloroform to DCM; fermentation of DCM to acetate
		cfrA/dcrA	Chloroform Reductase ( <i>cfrA</i> ), Dichloroethane dehalogenase ( <i>dcrA</i> )	<i>cfrA</i> converts chloroform to dichloromethane
	Aerobic	sMMO	Soluble Methane Monooxygenase (sMMO)	Co-metabolism of chloroform and dichloromethane
Chlorinated Propanes	Anaerobic	Dhg	<i>Dehalogenimonas</i>	Converts TCP to allyl chloride; DCP to propene
		Dhc	<i>Dehalococcoides</i>	Converts DCP to propene
		Dhb	<i>Dehalobacter</i>	Converts DCP to propene
		Dsb	<i>Desulfitobacterium</i>	Dechlorination of TCP and DCP
BTEX	Anaerobic	SRB	Sulfate reducing bacteria via dissimilatory sulfate reductase ( <i>dsrA</i> )	SRB are symbiotic partners to ORM-2 in anaerobic benzene degradation
		ORM-2	<i>Deltaproteobacterium ORM-2</i>	ORM-2 anaerobic benzene degrader under sulfate reducing or methanogenic conditions
		Pepto-ben	Benzene degrading Peptococcaceae	Anaerobic benzene degradation under nitrate reducing conditions
		abcA	Benzene Carboxylase ( <i>abcA</i> )	Functional gene involved in benzene ring cleavage
		bssA	Benzyl Succinate Synthase ( <i>bssA</i> )	Functional gene for toluene biodegradation by addition of fumerate onto methyl group
	Aerobic	TMO	Toluene Monooxygenase	aerobic oxidation of toluene
		TDO	Toluene Dioxygenase	
		PhMO	Phenol Monooxygenase	
		XMO	Xylene Monooxygenase	
Naphthalene	Aerobic	NDO	Naphthalene Dioxygenase ( <i>nahAc</i> )	Catalyzes the first step in the aerobic degradation of naphthalene reported activity for other polycyclic compounds with less than 3 rings

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Chlorinated Benzenes	Anaerobic	Dhc	<i>Dehalococcoides</i>	Partial dechlorination of hexachlorobenzene, pentachlorobenzene, tetrachlorobenzene
		Dhb	<i>Dehalobacter</i>	Reductive dechlorination of dichlorobenzenes, monochlorobenzene
Chlorinated Phenols	Anaerobic	Dhc	<i>Dehalococcoides</i>	Converts 2,3-dichlorophenol, trichlorophenols and pentachlorophenol to less chlorinated phenols
Chlorinated Biphenyls	Anaerobic	Dhc	<i>Dehalococcoides</i>	Dechlorinates select Aroclor 1260 congeners
		Dhb	<i>Dehalobacter</i>	Activity for select congeners including 2,3,4-trichlorobiphenyl; 2,3,4,5-tetrachlorobiphenyl
		Dhg	<i>Dehalogenimonas</i>	Dechlorinates select Aroclor 1260 congeners
1,4-Dioxane	Aerobic metabolism	1,4-dioxane	Dioxane monoxygenase ( <i>dxmb</i> )	Energy yielding 1,4-dioxane degradation
		1,4-dioxane	Aldehyde dehydrogenase (ALDH)	Energy yielding 1,4-dioxane degradation
	Aerobic Co-metabolism	pMMO	particulate Methane monoxygenase (pMMO)	Than
		sMMO	soluble Methane monoxygenase (sMMO)	Co-oxidation of 1,4-dioxane
		PMO	Propane monoxygenase (PMO)	Co-oxidation of 1,4-dioxane in presence of propane
Perchlorate	Anoxic	Perchlorate	Perchlorate Reductase ( <i>pcrA</i> )	Reduces perchlorate to chlorate and chlorite -diagnostic for perchlorate degrading bacteria
Nitrate /Ammonium	Anaerobic	Anammox	<i>Brocadia, Kuenenia, Scalindua, Anammoxoglobus, Jettenia</i>	Major anammox genera (anaerobic co-removal of ammonium and nitrite)
		nirS/nirK	<i>denitrification functional (nirS/nirK)</i>	functions in pathway that converts nitrate to nitrogen
Prokaryotic Groups	Variable	Universal	<i>Bacteria</i>	Quantifies <i>Bacteria</i> - measure of total biomass
		Arch	<i>Archaea</i>	Quantifies <i>Archaea</i> biomass, in highly anaerobic systems proxy for methanogens
		SRB	Sulfate reducing bacteria via <i>dissimilatory sulfate reductase (dsrA)</i>	Anaerobic hydrocarbon oxidation/biogeochemical reduction/ microbially induced corrosion
		NGS	<i>Bacteria/Archaea</i>	Provides comprehensive characterization of microbial communities

#### Abbreviations:

SRB-sulfate reducing bacteria, PCE-tetrachloroethene, TCE-trichloroethene, c-cis, t-trans, DCE-dichloroethene, VC-vinyl chloride, 1,1,1-TCA-1,1,1-trichloroethane, 1,1-DCA-1,1-dichloroethane, 1,2-DCA-1,2-dichloroethane, 1,1,2-TCA -1,1,2-trichloroethane, TeCA- 1,1,2,2-tetrachloroethane, DCM-dichloromethane, DCP-dichloropropane, TCP-trichloropropane