TO-15/TO-14A GC/MS Selected Ion Monitoring (SIM)

This method is similar to the TO-15 method described above, except the mass spectrometer is operated in the selected ion-monitoring mode (SIM), which gives a lower detection limit for a select group of compounds. SIM is best used for a short list of compounds that need low MDL's, and is often run in combined mode with TO-15 Full Scan (TO-15 Full Scan-SIM combined). SIM works by selecting a limited group of ions to monitor, rather than scanning all ions. When the SIM list is longer and many ions are scanned the sensitivity advantage over full scan is lost.

The EAS modifications to the method include the target list and the QC criteria. A lower concentration internal standard (by a factor of 10) is used for the SIM analysis. Table 13.8b shows the compounds that are routinely run by TO-15 SIM; but, to get the best sensitivity, a subset of this list should be requested.

Table 13.8a
Summary of QC Criteria for EPA TO-15/ TO-14A SIM

Parameter	EAS TO-15/TO-14A SIM Modified
BFB Tune	Not Applicable to SIM Run if Specified in Project QC Criteria
Tuning Criteria with BFB	TO-15 Tune Criteria
Initial Calibration	See Table 13.8b 90% of compounds meet criteria
Calibration Check Sample (CCS)	After Initial Calibration
Continuing Calibration Verification (CCV)	See Table 13.8b 90% of compounds meet criteria
Internal Standard (IS)	Chlorobenzene d5 Response 50% to 150%
Surrogate	Toluene-d8 70-130% recovery
Method Blank	Dry Nitrogen <LOQ
Laboratory Control Spike	1 per Daily Batch See Table 13.8b 90% of compounds meet criteria
Duplicate Lab Control Dup Sample Dup	Duplicate with each 20 samples See Table 13.8b 90% of compounds meet criteria

Table 13.8b
MethodTO-15 SIM/TO-14A SIM QC Criteria

Component	MDL ppbv	Initial Calibration %D	CCV %D	LCS %R	Precision %D
Freon 12	0.005	<30	<30	70-130	<25
Chloromethane	0.005	<30	<30	70-130	<25
Freon 114	0.005	<30	<30	70-130	<25
Vinyl chloride	0.005	<30	<30	70-130	<25
Bromomethane	0.005	<30	<30	70-130	<25
Chloroethane	0.005	<30	<30	70-130	<25
Trichlorofluoromethane	0.005	<30	<30	70-130	<25
1,1-Dichloroethene	0.005	<30	<30	70-130	<25
Dichloromethane	0.005	<30	<30	70-130	<25
Freon 113	0.005	<30	<30	70-130	<25
1,1-Dichloroethane	0.005	<30	<30	70-130	<25
c-1,2-Dichloroethene	0.005	<30	<30	70-130	<25
Chloroform	0.005	<30	<30	70-130	<25
1,2-Dichloroethane	0.005	<30	<30	70-130	<25
1,1,1-Trichloroethane	0.005	<30	<30	70-130	<25
Benzene	0.005	<30	<30	70-130	<25
Carbon Tetrachloride	0.005	<30	<30	70-130	<25
1,2-Dichloropropane	0.005	<30	<30	70-130	<25
Trichloroethene	0.005	<30	<30	70-130	<25
c-1,3-Dichloropropene	0.005	<30	<30	70-130	<25
t-1,3-Dichloropropene	0.005	<30	<30	70-130	<25
1,1,2-Trichloroethane	0.005	<30	<30	70-130	<25
Toluene	0.005	<30	<30	70-130	<25
1,2-Dibromoethane	0.005	<30	<30	70-130	<25
Tetrachloroethene	0.005	<30	<30	70-130	<25
Chlorobenzene	0.005	<30	<30	70-130	<25
Ethylbenzene	0.005	<30	<30	70-130	<25
m &p-Xylenes	0.005	<30	<30	70-130	<25
Styrene	0.005	<30	<30	70-130	<25
o-Xylene	0.005	<30	<30	70-130	<25
1,1,2,2- Tetrachloroethane	0.010	<30	<30	70-130	<25
1,3,5-Trimethylbenzene	0.010	<30	<30	70-130	<25
1,2,4-Trimethylbenzene	0.010	<30	<30	70-130	<25
1,3-Dichlorobenzene	0.010	<30	<30	70-130	<25
1,4-Dichlorobenzene	0.010	<30	<30	70-130	<25
1,2-Dichlorobenzene	0.010	<30	<30	70-130	<25
1,2,4-Trichlorobenzene	0.010	<50	<50	50-150	<50
Hexachlorobutadiene	0.010	<50	<50	50-150	<50
t-1,2-Dichloroethene	0.010	<40	<40	60-140	<40
Methyl t-butyl ether	0.010	<40	<40	60-140	<40
Naphthalene	0.010	<50	<50	50-150	<50
Methanol	0.100	<50	<50	50-150	<50