

# APPLICATIONS

## Reproducible Dioxin GC-HRMS Analysis with Zebron™ ZB-Dioxin GC Columns

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### Overview

Dioxin analysis involves accurate identification and quantification of substituted dioxin and furan isomers. Specifically, tetra dioxin and tetra furan isomer separation is very critical as many regulations including EPA-1613 has method suitability based on these compounds. It is very important to get consistent and reproducible retention and resolution of these critical pairs. ZB-Dioxin GC columns are tailored for polarity and selectivity to give the highest resolution of critical dioxin isomers like 2,3,7,8-TCDD and 2,3,7,8-TCDF, unlike traditional 5% phenyl or phenyl arylene phases that are designed for general applications. Presented in **Figure 1** is the comparison of TCDF isomer separation from column-to-column. **Table 1** represents the reproducible relative retention time of tetra through octa furans with low %RSD, indicating reproducible profile. In summary, ZB-Dioxin GC column provides reproducible retention, peak profile, selectivity and resolution from column-to-column.

### GC-HRMS Conditions

- Column:** Zebron ZB-Dioxin
- Dimension:** 60 meter x 0.25 mm x 0.20 µm
- Part No.:** [7KG-G045-10](#)
- Recommended Z-Guard™:** [7AG-G000-00-GZK](#)
- Injection:** Splitless (hold 1.0 min) @ 280 °C, 2 µL
- Recommended Liner:** Zebron PLUS Single Taper
- Liner Part No.:** [AG2-0A10-05](#) (for Agilent® systems)
- Carrier Gas:** Helium @ 1.3 mL/min (constant flow)
- Oven Program:** 190 °C for 3.2 min, 230 °C @ 8 °C/min for 15 min, 290 °C @ 6.7 °C/min for 5 min, 315 °C @ 21 °C/min for 9 min
- Detector:** GC-HRMS
- Transfer Line Temperature:** 300 °C
- Sample:**
  1. 2,3,4,8- TCDF
  2. 2,3,7,8-TCDF
  3. 3,4,6,7/2,3,6,7- TCDF
  4. 13C 2,3,7,8-TCDF

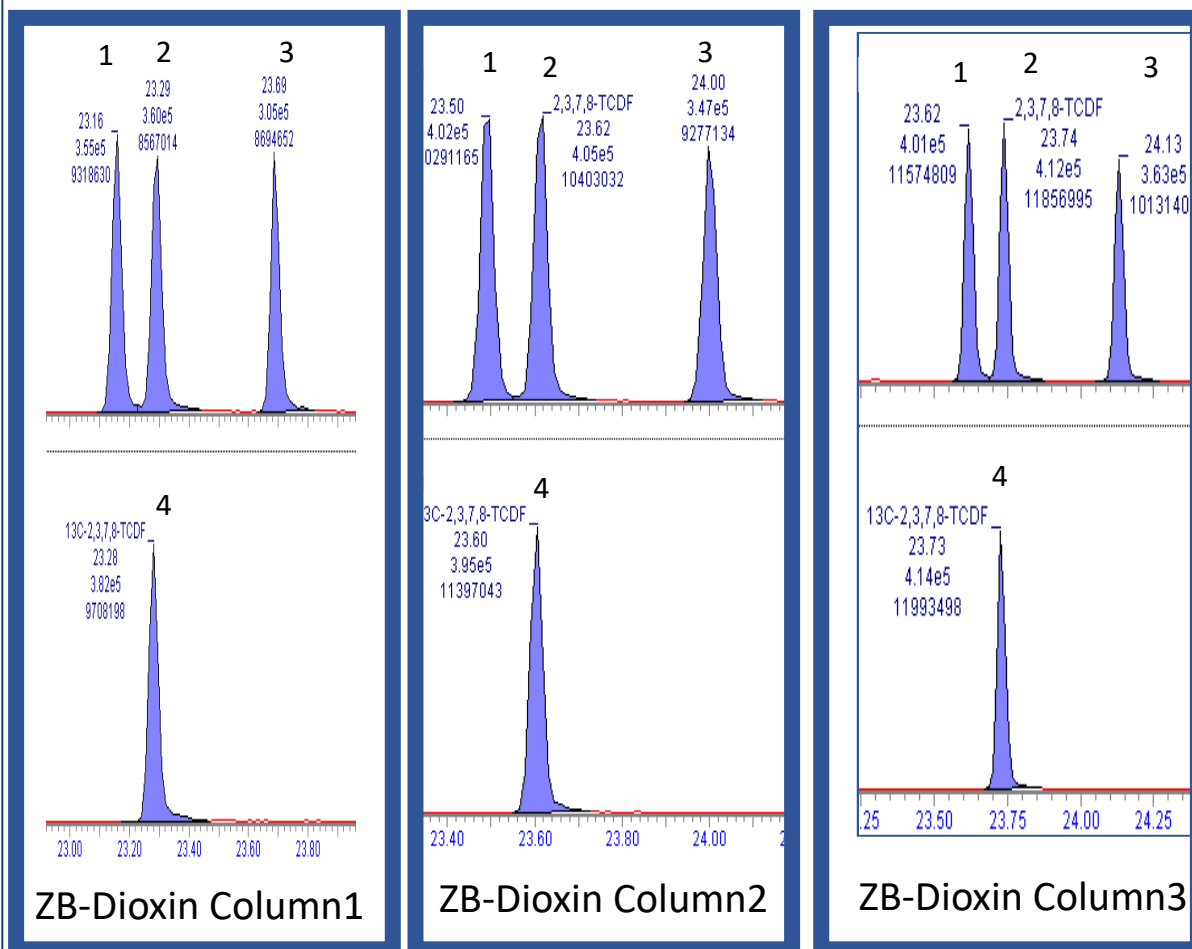
**Table 1: Column-to-Column Reproducibility of Tetra through Octa Furans on ZB-Dioxin GC columns**

Compound	Relative Retention Time (RRT)			% RSD
	Column 1	Column 2	Column 3	
2,3,7,8-TCDF	1.000	1.000	1.000	-
1,2,3,7,8-PeCDF	1.098	1.097	1.097	0.05
2,3,4,7,8-PeCDF	1.127	1.127	1.128	0.05
1,2,3,4,7,8-HxCDF	1.220	1.223	1.223	0.14
1,2,3,6,7,8-HxCDF	1.225	1.227	1.228	0.12
2,3,4,6,7,8-HxCDF	1.248	1.249	1.248	0.05
1,2,3,7,8,9-HxCDF	1.280	1.277	1.277	0.14
1,2,3,4,6,7,8-HpCDF	1.321	1.319	1.319	0.09
1,2,3,4,7,8,9-HpCDF	1.382	1.381	1.381	0.04
OCDF	1.482	1.485	1.485	0.12

Low % RSD =  
Reproducible results

Data Courtesy of Eurofins Environmental Testing, West Sacramento, USA. Phenomenex is not affiliated with Eurofins.

**Figure 1: Column-to-Column Reproducibility of TCDF isomers on ZB-Dioxin GC columns**



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**Detector:** GC-HRMS

**Transfer Line Temperature:** 300 °C

**Sample:** 1. 2,3,4,8- TCDF

2. 2,3,7,8-TCDF

3. 3,4,6,7/2,3,6,7- TCDF

4. 13C 2,3,7,8-TCDF

# APPLICATIONS

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