Simplify GC Analysis of Dioxins and Furans

Successfully monitoring chlorinated dioxins and furans requires the unbiased determination of toxic 2,3,7,8-chlorine substituted congeners. The problem is that other congeners and sample matrix–related compounds often complicate the reliable separation of highly toxic 2,3,7,8-TCDD and 2,3,7,8-TCDF—even when using high-resolution GC/high-resolution MS. Fortunately, Restek offers proven solutions for both initial and confirmatory analyses to help you confidently resolve these problematic substances from other coeluting congeners.

Initial Analysis — Rxi®-5Sil MS Column

• Provides isomer specificity for 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 1,2,3,7,8-PeCDD with one column!

• Resolves 15 of the 17 tetra- through octa-chlorinated 2,3,7,8-substituted dioxins and furans.

• Known elution orders for all tetra- through octa-chlorinated dioxin and furan congeners.

• Low bleed and high thermal stability up to 350 °C for long life and reproducible retention times.

The 5% diphenyl DB-5 columns conventionally used for initial dioxin and furan analysis can identify the *presence* of furan, but they are incapable of determining *concentration*. The Restek Rxi®-5Sil MS column's increased selectivity provides isomer specificity for 2,3,7,8-TCDD and 2,3,7,8-TCDF, thereby eliminating the need for a confirmatory analysis.
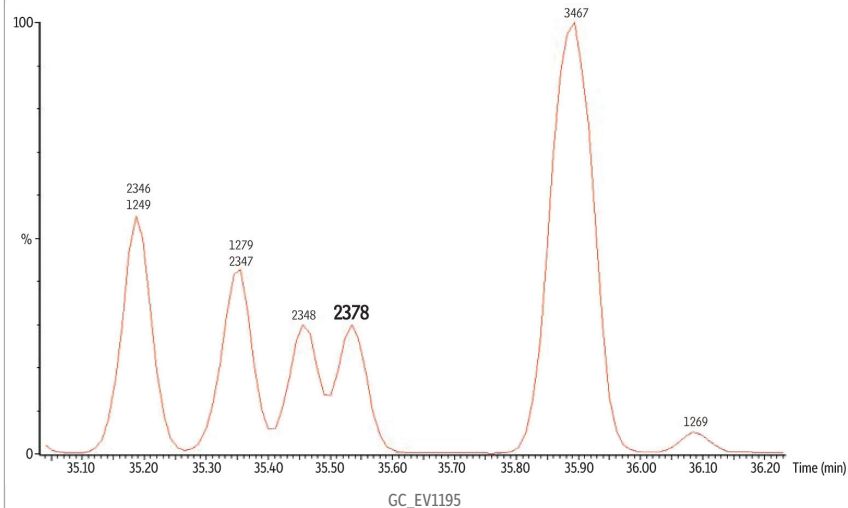

Figure 1 You can achieve excellent separation of TCDDs *and* TCDFs on a single Rxi®-5Sil MS column!

Dioxins (TCDDs) in Fly Ash on Rxi®-5Sil MS column

GC_EV1194
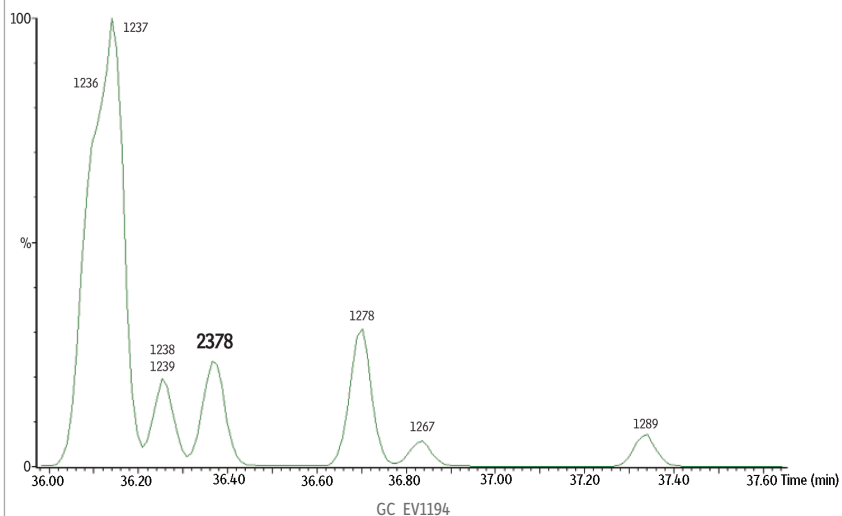
Furans (TCDFs) in Fly Ash on Rxi®-5Sil MS

GC_EV1195

* For full analysis conditions, visit www.restek.com and search for the numbers listed under each chromatogram. Chromatograms courtesy of Karen MacPherson, Li Shen, Terry Kolic, and Eric Reiner at the Ontario Ministry of the Environment.

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RESTEK®   Pure Chromatography   **www.restek.com**

Confirmatory Analysis — Rtx®-Dioxin2 Column

- Low bleed and high thermal stability up to 340 °C for far greater longevity and reproducibility over cyano columns like DB-225, SP-2330, and SP-2331.

- Provides isomer specificity for 2,3,7,8-TCDD and 2,3,7,8-TCDF with one column.

- Resolves 14 of the 17 tetra- through octa-chlorinated 2,3,7,8-substituted dioxins and furans.

- Known elution orders for all tetra- through octa-chlorinated dioxin and furan congeners.

Because standard 5% diphenyl DB-5 columns are incapable of providing isomer specificity for 2,3,7,8-TCDF, analysts who use them must also perform a confirmatory concentration analysis whenever furans are identified. A cyano-based column is the traditional choice for reanalyzing samples, but the Restek Rtx®-Dioxin2 column is a much better solution. Not only does it offer isomer specificity for 2,3,7,8-TCDF, but the Rtx®-Dioxin2 column also determines 2,3,7,8-TCDD and is thermally stable up to 340 °C—far exceeding the capabilities of cyano-based columns!

Figure 2 The Rtx®-Dioxin2 column offers excellent resolution of 2,3,7,8-TCDF from other TCDFs and is thermally stable up to 340 °C!
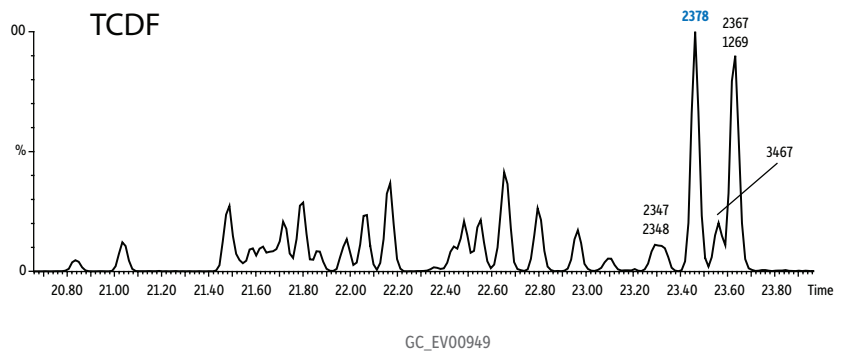
GC_EV00949

* For full analysis conditions, visit www.restek.com and search for the numbers listed under each chromatogram. Chromatograms courtesy of Karen MacPherson, Li Shen, Terry Kolic, and Eric Reiner at the Ontario Ministry of the Environment.

Rxi®-5Sil MS Columns (fused silica)
(low polarity Crossbond® silarylene phase; similar to 5% phenyl/95% dimethyl polysiloxane)

Description	temp. limits	cat.#
60m, 0.18mm ID, 0.10µm	-60 to 320/350°C	43607
60m, 0.25mm ID, 0.25µm	-60 to 330/350°C	13626

Rtx®-Dioxin2 Columns (fused silica)
(proprietary Crossbond® phase)

Description	temp. limits	cat.#
40m, 0.18mm ID, 0.18µm	20°C to 340°C	10759
60m, 0.25mm ID, 0.25µm	20°C to 340°C	10758

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Lit. Cat.# GNTS1429-UNV