



# Supelco SLB®-IL60 Ionic Liquid GC Columns

## Stability to Loss of Carrier Gas Flow

Hydroxyl (-OH) functional groups are abundant in polyethylene glycol (PEG) stationary phases. These active moieties can be oxidized when exposed to low levels of moisture and/or oxygen, contributing to degradation of the phase. The rate of phase degradation is accelerated with elevated temperatures. These phenomena have a direct impact on the maximum temperature limits of commercially available PEG columns.

The SLB-IL60 column is stable to 300 °C for both programmed and isothermal use. Compared to PEG columns, it exhibits both lower FID bleed, and better high temperature stability. These features are possible because the structure of the ionic liquid stationary phase does not contain any hydroxyl groups. Complete specifications of SLB-IL60 columns are shown in **Table 1**.

### Table 1. SLB-IL60 Column Specifications

- Application: The SLB-IL60 polar ionic liquid column has a polarity/selectivity similar to that of polyethylene glycol (PEG) columns (usually have 'wax' in the product name), but different enough to provide a unique elution pattern. It also has a higher maximum temperature of 300 °C, compared to 250-280 °C for most PEG columns. These features make it an excellent alternative to existing 'wax' columns. The combination of a high thermal limit and an orthogonal selectivity to non-polar columns also makes it a good GCxGC column choice. Launched in 2012.
- USP Code: None
- Phase: Non-bonded; proprietary
- Temp. Limits: 35 °C to 300 °C (isothermal or programmed)

## Carrier Gas Stop Flow Test

To illustrate the robust nature of the SLB-IL60 column, it was subjected to a brutal carrier gas stop-flow test. A polar column test mix was analyzed to establish initial chromatographic performance. This mix contains several analyte types, and can be used to measure key attributes of polar columns.

- The normal alkanes (pentadecane, hexadecane, heptadecane, octadecane, and eicosane) are used to measure column efficiency
- The alcohol (1-octanol) and ketone (2-octanone) are used to measure the presence of hydrogen-bonding sites (exposed silanols)
- The acid/base pair (2,6-dimethylphenol/2,6-dimethylaniline) are used to measure the acid/base characteristic of the phase surface

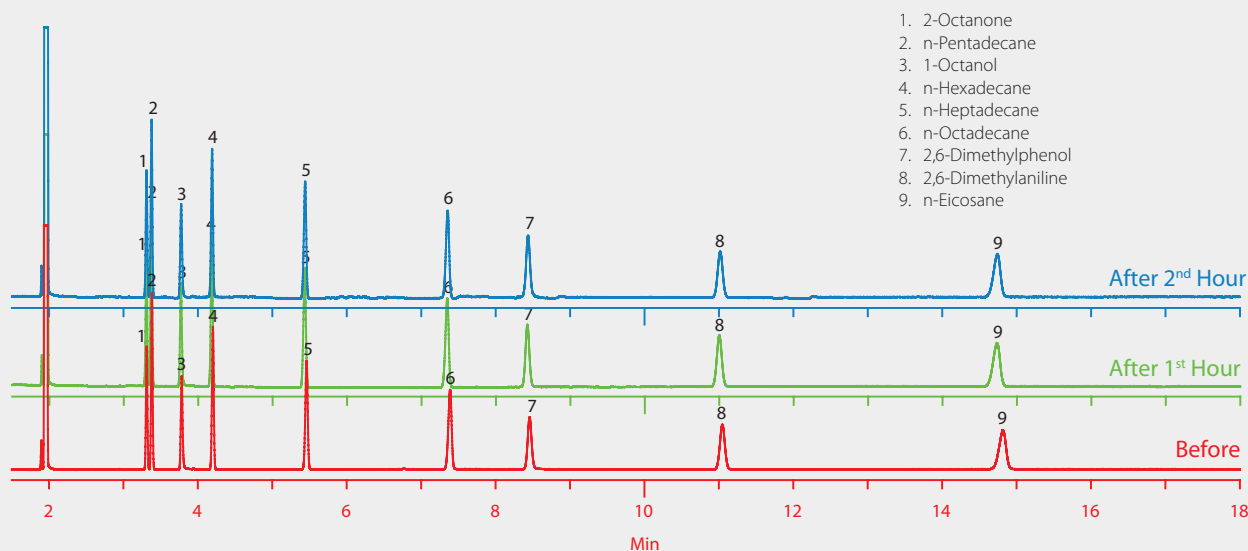
The carrier gas flow was then turned off, and the oven heated to 250 °C. After 1 hour, carrier gas flow was re-established, followed by the analysis of the polar column test mix. This cycle was then repeated a second time. The degree that column performance changed was determined by comparing the resulting chromatography from the three polar column test mix runs, which are shown in **Figure 1** (see back page). No significant change in chromatographic performance was observed, even after the column was held at 250 °C for a total of 2 hours with no carrier gas flow. Peak shapes, absolute retention times, and relative retention times are virtually identical for all three chromatograms. This is impressive.

## Conclusion

Columns based on polyethylene glycol phase chemistry are widely used for a variety of applications (such as solvents and FAMES), but are limited to use below 260-280 °C oven temperature. The SLB-IL60 column is similar in selectivity to PEG columns, but can be used to 300 °C without degradation of chromatographic performance. This column also exhibits substantial robustness, able to withstand the temporary loss of carrier gas flow without damaging the stationary phase.

**Figure 1. Performance Before/After Stop Flow Test**

column: SLB-IL60, 30 m x 0.25 mm I.D., 0.20 µm (29505-U)  
 oven: 130 °C (25 min)  
 inj. temp.: 250 °C  
 carrier gas: helium, 25 cm/sec  
 detector: FID, 250 °C  
 injection: 1 µL, 100:1 split  
 liner: 4 mm I.D., split/splitless type, single taper wool packed FocusLiner™ design  
 sample: polar column test mix (47302), 9 analytes, each at 500 µg/mL in methylene chloride



G005777-5779

## Featured Products

Description	Cat. No.
SLB-IL60, 15 m x 0.10 mm I.D., 0.08 µm	29503-U*
SLB-IL60, 30 m x 0.25 mm I.D., 0.20 µm	29505-U
SLB-IL60, 60 m x 0.25 mm I.D., 0.20 µm	29506-U*
SLB-IL60, 30 m x 0.32 mm I.D., 0.26 µm	29508-U*
SLB-IL60, 60 m x 0.32 mm I.D., 0.26 µm	29509-U*

\*Products will be available soon.

For updates, visit [sigma-aldrich.com/il-gc](http://sigma-aldrich.com/il-gc)

## Related Information

For more information on the SLB-IL60 and other ionic liquid columns, visit [sigma-aldrich.com/il-gc](http://sigma-aldrich.com/il-gc)

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