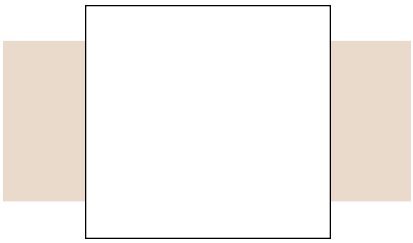
Petrochemical

Applications note

cat.# 59566

Analyze Fixed Gases Using the New Rt-Msieve™ 13X PLOT Column



After ten minutes of aggressive sonication, the molecular sieve particles remain intact.

- *Unique selectivity of Rt-Msieve™ 13X improves overall analysis.*
- *Immobilized to eliminate particle generation.*
- *Columns can be reactivated after water contamination.*
- *Guaranteed column-to-column reproducibility.*
- *Available in 0.53mm and 0.32mm IDs.*

Until recently, the only way to achieve rapid separations of fixed gases was the use of molecular sieve packed and micropacked columns. Traditional Molecular Sieve 5Å Porous Layer Open Tubular (PLOT) columns have been useful, but the extended retention and broadened peak width of carbon monoxide has been unavoidable. Restek has developed the Rt-Msieve™ 13X PLOT column to improve the analysis of fixed gases.

Fast and efficient analysis of fixed gases

The Rt-Msieve™ 13X combines the efficiency of traditional molecular sieve PLOT columns with the unique selectivity of 13X molecular sieve. **Figure 1** shows the rapid and efficient analysis of the permanent gases on the 30m, 0.32mm ID Rt-Msieve™ 13X. Baseline separation of all compounds is achieved in just over 2 minutes. **Figure 2** shows the same analysis using the 15m, 0.32mm ID Rt-Msieve™ 13X PLOT column with complete resolution in 1.5 minutes.

Unique selectivity of Molecular Sieve 13X material

Until now, only Molecular Sieve 5Å PLOT columns have been available. With the Rt-Msieve™ 13X PLOT columns, the separation of nitrogen and methane is increased while overall analysis time is decreased by reducing the retention of carbon monoxide.[1] The 13X molecular sieve also produces a narrower peak shape for carbon monoxide allowing for lower levels of detection. **Figure 3** shows the analysis of the permanent gases on a Molecular Sieve 5Å PLOT column. While the 5Å PLOT column provides good resolution, the peak shapes are broadened, thus decreasing the minimum detection limit approximately ten-fold.

Resists particle generation

PLOT columns are prepared by coating a thick film of very small particles on the inside column wall. A major drawback of PLOT columns is particle generation caused by vibration or pressure surges. The material in the Rt-Msieve™ 13X has been immobilized by a process unique to Restek to minimize any particle generation. This immobilization is stable for applications where column flow rates are disrupted during valve switching or backflushing operations. Non-immobilized PLOT columns will damage or clog valves, causing expensive repairs and down time.

Available in 0.53 and 0.32mm IDs

The Rt-Msieve™ 13X is available in two configurations to satisfy a wide variety of applications. Use the 30m, 0.53mm ID Rt-Msieve™ 13X for most applications and when using on-line analyzers. The 0.53mm ID Rt-Msieve™ 13X PLOT columns offer the flexibility and increased capacity many analysts require. For increased efficiency and low flow applications, Restek offers the 30m, 0.32mm ID Rt-Msieve™ 13X. The 0.32mm ID Rt-Msieve™ 13X PLOT is ideal for portable analyzers having limited gas supplies where low carrier gas flow is essential. For decreased analysis times, 15-meter versions are available for both IDs.

Columns can be reactivated

Molecular sieves are very hydrophilic and will adsorb any water present in the sample. Water contamination will have detrimental affects on separations causing, 1) the carbon monoxide peak shape to deteriorate and, 2) a reduction in overall resolution. Rt-Msieve™ 13X PLOT columns can be reactivated after water contamination by conditioning at 300°C under dry carrier gas flow, thus extending column lifetime.

Column-to-column reproducibility guaranteed

All Rt-Msieve™ 13X PLOT columns are tested with a mixture of permanent gases. Columns must pass rigorous specifications for efficiency and strict retention time criteria. This stringent testing insures analysts of column-to-column and run-to-run reproducibility.

The resolution of permanent gases can be improved and the overall analysis time can be reduced using the new Rt-Msieve™

Questions?
Call Restek's technical service staff at
800-356-1688, ext. 4.

13X PLOT columns. The immobilized particles minimize potential damage to valves and reduce detector noise. These columns are available in 0.53mm ID for increased capacity or in 0.32mm ID for reduced carrier gas consumption. Rigorous testing guarantees the performance of all Rt-Msieve™ 13X columns.

1. Cowper, C.J., DeRose, A.J., *The Analysis of Gases by Chromatography*, Pergamon Press, 1983.

Product Listing

Rt-Msieve™ 13X Columns	15m (cat.#)	30m (cat.#)
0.32mm ID	19707	19705
0.53mm ID	19708	19706

MXT®-Msieve 13X Columns (Silcosteel®)	15m (cat.#)	30m (cat.#)
0.53mm ID	79708	79706

Rt-Msieve™ 5A Columns	15m (cat.#)	30m (cat.#)
0.32mm ID	19720	19722
0.53mm ID	19721	19723

Rt-S PLOT Columns (fused silica)	15m (cat.#)	30m (cat.#)
0.32mm ID	19711	19710
0.53mm ID	19713	19712

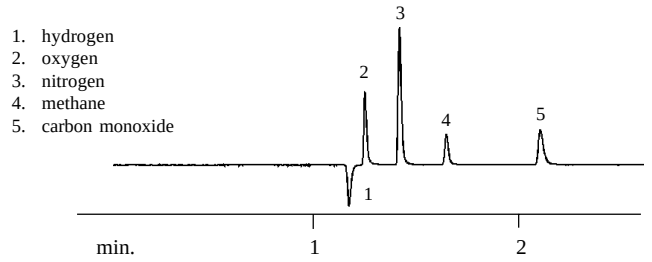
Rt-Q PLOT Columns (fused silica)	15m (cat.#)	30m (cat.#)
0.32mm ID	19717	19718
0.53mm ID	19715	19716

MXT®-Q PLOT Columns (Silcosteel®)	15m (cat.#)	30m (cat.#)
0.53mm ID	79715	79716

Rt-Alumina™ Columns (fused silica)	30m (cat.#)	50m (cat.#)
0.53mm ID	19700	19701
	30m (cat.#)	**60m (cat.#)**
0.32mm ID	19702	19703

Figure 1

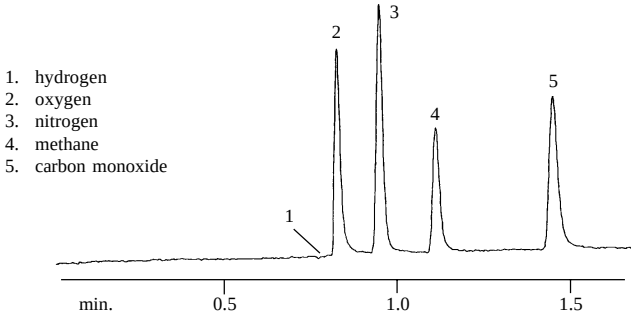
Resolve permanent gases in just over 2 minutes with a 30-meter Rt-Msieve™ 13X PLOT column.



30m, 0.32mm ID Rt-Msieve™ 13X PLOT column (cat.#19705). 15µl split injection of permanent gases (hydrogen spiked). **Oven temp:** 40°C isothermal; **Inj./det. temp:** 200°C/200°C; **Detector:** microcell TCD; **Carrier gas:** helium; **Linear velocity:** 44cm/sec. set @ 40°C (2cc/min.); **Det. sensitivity:** 50m V full scale; **Split ratio:** 15:1.

Figure 2

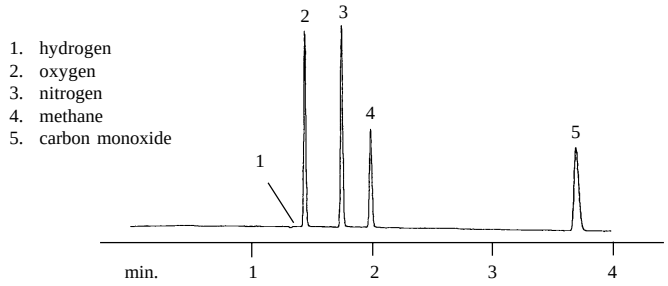
Resolve permanent gases in 1.5 minutes with a 15m Rt-Msieve™ 13X PLOT column.



15m, 0.32mm ID Rt-Msieve™ 13X PLOT column (cat.#19707). 20µl split injection of permanent gases. **Oven temp:** 40°C isothermal; **Inj./det. temp:** 200°C/200°C; **Detector:** microcell TCD; **Carrier gas:** helium; **Linear velocity:** 32cm/sec. set @ 40°C (1.5cc/min.); **Det. sensitivity:** 50m V full scale; **Split ratio:** 15:1.

Figure 3

The Molecular Sieve 5Å column produces broader peak shapes and longer retention times for carbon monoxide than the Rt-Msieve™ 13X.



30m, 0.32mm ID Molecular Sieve 5Å PLOT column. 20µl split injection of permanent gases. **Oven temp:** 40°C isothermal; **Inj./det. temp:** 200°C/200°C; **Detector:** microcell TCD; **Carrier gas:** helium; **Linear velocity:** 39cm/sec. set @ 40°C (1.85cc/min.); **Det. sensitivity:** 50m V full scale; **Split ratio:** 15:1.

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