

INACOM INSTRUMENTS

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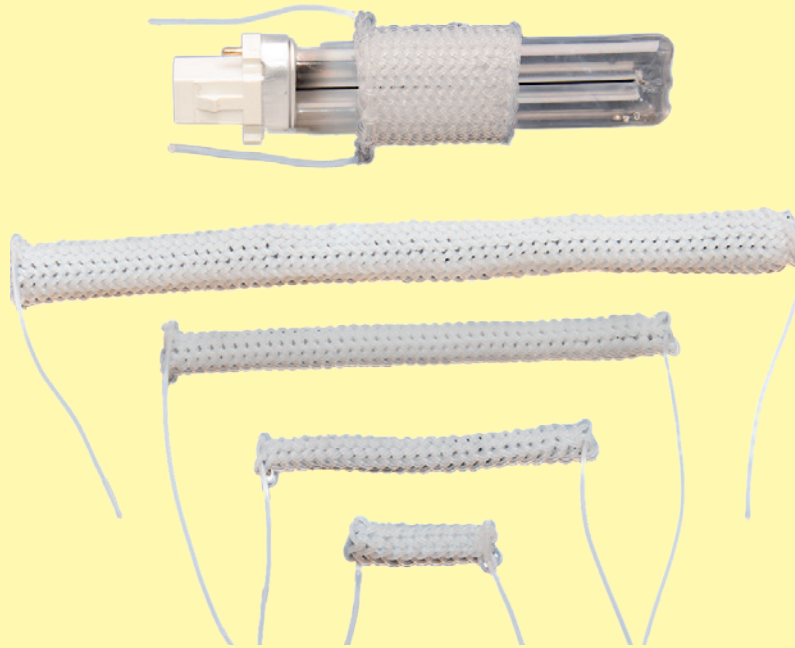
Magazine

GREAT FLUIDIC SOLUTIONS

In this issue you can read about:

- KOT - Knitted Open Tubular Reaction Delay
- IDEX RefractoMax RI Detectors
- DEGASi Prep+ vs DEGASi High Flow 1000
- Effect of inner diameter of tubing in LC

Knitted Open Tubular Reaction Delay & Mixing Coils



WHAT IS A KOT?

The KOT reactor, is a tube knitted into a winding path that forces the center of a fast flow of fluid, to mix radially with a slower moving boundary liquid layer, to minimize the axial dispersion.

WHY USE A KOT?

Preserved Chromatographic Peak Shape

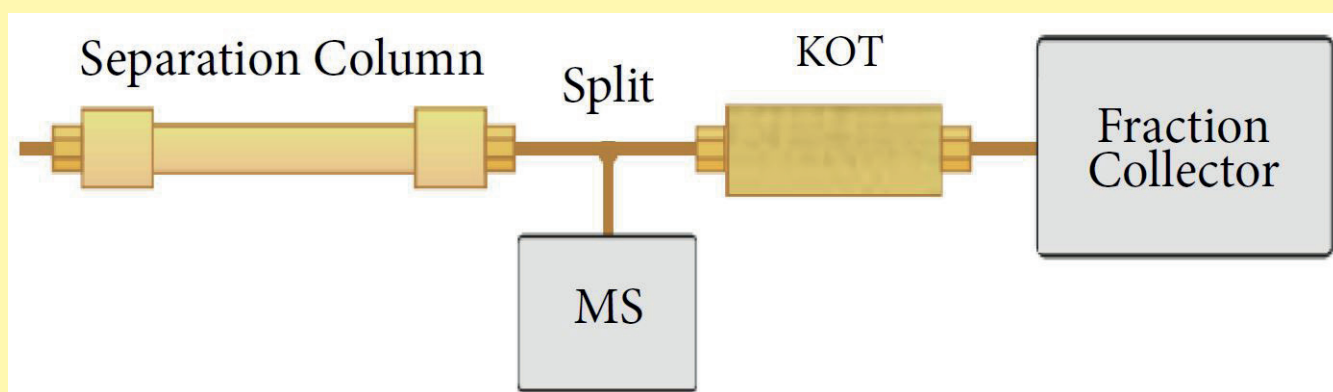
The KOT reactors are made from tubing knitted into a tortuous path to force the fast moving center of the liquid stream to mix radially with the slower moving boundary liquid layer. This technique minimizes the axial dispersion. The shape of the chromatographic peak entering the reactor is in this way preserved efficiently. The KOT reactor is the most optimal delay element for use in analytical flow systems. It is typically inserted in the flow path to create a delay line, so that a reaction that requires a certain time can take place. Different delay or reaction times are accomplished by changing the inner diameter and length of the KOT, taking the flow rate through the KOT into consideration. To ensure a stable radial mixing within the KOT, a linear flow rate of 10 cm/s or more is recommended.

“The KOT Reactor is the Most Optimal Delay Element for Use in Analytical Flow Systems”

HOW TO USE A KOT

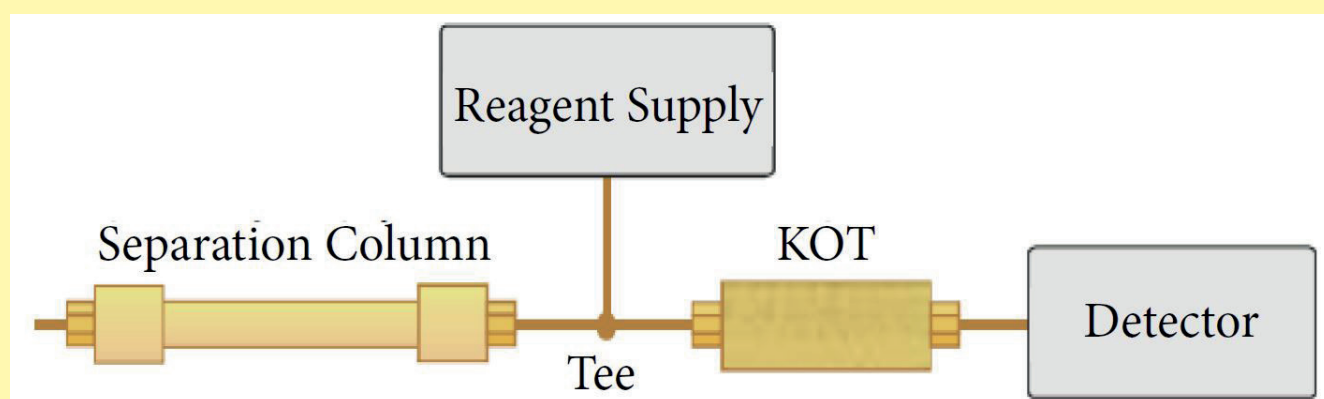
KOT reactors applied as a delay line in chromatographic separations

One example of application is the parallel coupling of a MS detector and a fraction collector in preparative separations (see figure below). The delay time induced by the KOT allows the detector to analyze the eluate and make intelligent decisions of when a new fraction is going to be initiated, without loss of chromatographic efficiency.



KOT reactors used in post-column reaction detection in HPLC, using both room temperature and heated chemistries.

In this set-up (see figure below) the KOT ensures thorough mixing between the column effluent and the added reagents. Typical reactions are the production of fluorescent products from reactions between eluted compounds and reagents without native fluorescence.



IDEX RefractoMax RI Detectors



Accomplish sensitive and reliable detection of sugars, lipids, polymers and other compounds having low absorptivity in the UV-Vis range, by using the RefractoMax Refractive Index Detectors. This detector is perfect for:

- Alcohols
- Mono- and polysaccharides
- Fatty acids
- Polymers
- Compounds with low UV-Vis-activity

Designed to be both powerful and user friendly. The RefractoMax is engineered to give very high baseline stability to deliver superior signal-to-noise ratio with neglectable drift even at long analysis times. This is accomplished by the optical bench which is thermostatically controlled between 30 °C to 55 °C and the high-quality electronics of the detector giving a noise less than 2.5 nRIU.

Convenient features such as a leak sensor that automatically can switch

off the pump and automated start-up, facilitates everyday use and method development. The Auto Set-up function automates purging, equilibration, autozero and control of baseline stability and noise. Instrument validation and calibration can also be carried out by the push of a button and instructions on the coloured display screen. Easy integration with different chromatography systems is ensured by the ports for external input and output communication.

Because the RefractoMax is available in three different configurations there is always a model that fit your needs.

The 524 Micro version is optimized for operation together with small ID HPLC columns used at low flow rates. Suitable degasser for this flowrate is DEGASi Micro or DEGASi Compact.



An efficient degasser is essential to get the best performance of your detector.

The 521 Analytical model is designed for highest detection sensitivity with standard HPLC column separations. Here we recommend the DEGASi Classic, GPC or Semi-prep.

The RefractoMax 522 Semi-Prep is suitable for higher flow rates and has a wider dynamic range to handle more concentrated samples. In this case, the DEGASi Prep+ would be the best choice.



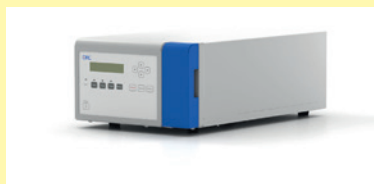
RefractoMax 524 Micro

- 0.1 to 1 mL/min
- 2.5 μ L flow cell
- High sensitivity



**DEGASi
Micro**

**DEGASi
Compact**



RefractoMax 521 Analytical

- 1 to 5 mL/min
- 8 μ L flow cell
- High sensitivity



**DEGASi
Classic**

**DEGASi
GPC**

**DEGASi
Semi-prep**



RefractoMax 522 Semi-Prep

- 1 to 100 mL/min
- 8 μ L flow cell
- Wide dynamic range



**DEGASi
Prep+**



DEGASi® PREP+ FOR ORGANIC SOLUTIONS

DEGASi® PREP+ is the world's first in-line, membrane degasser ready to use with aggressive media and organic solvents, while maintaining flow-rates efficient degassing at up to 100 ml/min/channel*. Available configurations: Stand alone, OEM open frame with 1-4 channels.

* Parallel usage of channels enables flowrates of 200 ml/min (2 channels) or even 400 ml/min (4 channels).

APPLICATIONS

- Preparative HPLC
- Flash chromatography
- High-throughput applications
- Dispensing applications
- Available in 1, 2 and 4 channels and with optional analytical flow chamber
- Ink degassing - all types of ink including organic solvent based ink and UV-ink

	DEGASi® PREP+
Recommended flow rate:	75-100 max 200 ml/min (per channel)
Maximum Flow Path Pressure:	50 PSI/3.5 bar
Wetted Materials:	Systec AF™, FEP, Tefzel, PTFE and Glass-filled PPS
Liquid Connection:	1/4"-28 Female Port
Pressure Drop:	0.0226.kPa/ml/min
Applicable Solvents:	All solvents except some Fluorinated
Size (L x H x W) weight:	260x110x150 mm (1- and 2-channels) 260x110x290 mm (4-channels)
Article number	0001-0120 1 channel 0001-0220 2 channels 0001-0420 4 channels



DEGASi® HIGH FLOW 1000 FOR WATER SOLUTIONS

DEGASi® HIGH FLOW 1000 degasser works with real high flow rates and ultra-high degassing efficiency. With water-based solutions it removes dissolved gases at flow rates up to 1000 ml/min. The degasser is equipped with the new superior Systec® DST pump which is more reliable and almost entirely silent – a remarkable upgrade from older versions. This pump is also lighter and operates with less vibrations.

APPLICATIONS

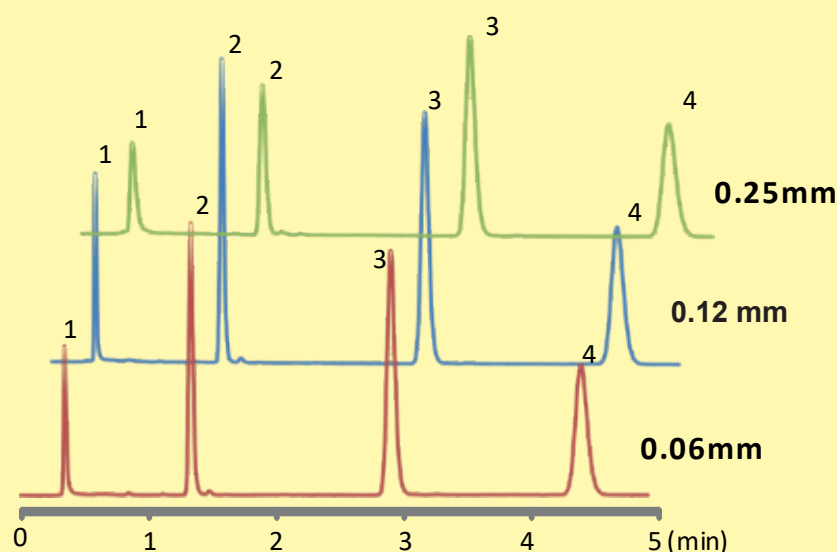
- Clinical chemistry analyzers
- Process applications
- Ink degassing (water based ink)
- Dispensing applications
- High-throughput applications
- Water based buffer solutions
- Dissolution testing

	DEGASi® HIGH FLOW 1000
Recommended flow rate:	0–1000 ml/min
Maximum Flow Path Pressure:	14 PSI/1 bar
Wetted Materials:	Silicone, PVC, Nitrile Rubber, Polyamide
Liquid Connection:	Barb for ID 10
Pressure Drop:	<20 kPa @600 mL/min
Applicable Solvents:	Water and buffer solutions
Size (L x H x W) weight:	365x135x150 mm 5300g
Article number	0003-HF.1000

Did you know?



Effect of inner diameter of tubing



Average of theoretical plate (n=3)

Inner diameter of tubing	0.06mm	0.12 mm	0.25mm
Peak (1)	792	785	246
Peak (2)	7790	7652	3535
Peak (3)	10704	10345	7998
Peak (4)	10113	9772	7689

Column: SunShell C18, 2.6 μ m 50 x 2.1 mm

Mobile phase: CH₃CN/H₂O=60/40

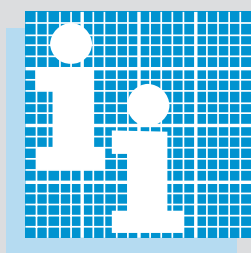
Flow rate: 0.3 mL/min Temperature: Ambient

Tube length: 30 cm (PEEK, from the column to the flow cell)

Instrument: X-LC(JASCO) Response time: 0.01 sec

The theoretical plates were compared after changing the inner diameter of the tubing between the column and the flow cell of the detector. A tubing with larger inner diameter has a larger dead volume, which makes the peak width to be wider. As a result, the theoretical plate decreases. We recommend to use tubing with ID 0.12 mm or less for core shell columns for maximum efficiency. As can be seen there was little advantage to go to 0.06 mm ID tubing, but the back pressure increases, so ID 0.12 mm is the preferred choice.

P/N 1535L, PEEK tubing 1/16" OD x 0.125mm ID, 50 feet



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