Where design meets performance ...

IFC PAL Applications

Valve Selection and Flow Rates

Analytical and Prep Applications

Safety Issues

...CTC ANALYTICS

IFC PAL

Valve Selection

- ✓ Bore Size 0.75 mm : Flow Rates 5 to approx.100 ml/min
- ✓ Bore Size 0.40 mm : Flow Rates 0.5 to approx. 20 ml/min
- ✓ Bore Size 0.25 mm : Flow Rates 10 to 500 ul/min
- ✓ Bore Size 0.15 mm : Flow Rates nl – Range to low ul Range [1]
- ✓ Bore Size 0.10 mm : Flow Rates nl – Range to low ul Range [2]

1: no vertical port. Valve mounted on holder with 60 ° angle, used for injection

2: no vertical port, valve mounted on holder with 60 ° angle,
used for column switching

...CTC ANALYTICS

IFC PAL

Tubing ID

- Analytical System:
  OD 1/16 inch, ID 0.8 mm
- Preparative System:
  OD 1/16 inch, ID 1.0 mm

IFC PAL

- **Syringe on Injector Side:**
  5ml HPLC Syringe Needle Gauge 19
  Gauge 19: OD 1.07 , ID 0.69 mm
- **Consequences:**
  - ✓ Injection Unit: Needle Guides
  - ✓ Valve: Needle Guide, Needle Seal (Teflon, blue color)
  - ✓ FastWashStation: Glass Inserts

  Details: see Service Note # 07/2004

IFC PAL Analytical Version

- Example of typical Application for Drug Discovery:
- Biological Screening, MT-Plates with „hits"
- Hit is checked if a single or several compounds are present. Chromatographic separation.
- Flow rate: 400 ul/min, UV detection
- Time based fraction collection, 6 sec/well
- Collected into MT384
- Collected Fraction are sent back to bio-screening

IFC Preparative Version

- Example of Typical Application for Drug Discovery and Purification:

- Purification or Chiral Separation of a new drug for further studies, like tox or clinical trials, mg to gram range
- Flow Rates: 5 ml to 50 ml/min
- Often normal phase separation
- Column Bed pressure sensitive

IFC Preparative Version

- Example of Typical Application for Drug Discovery and Purification continued:
- Avoid any backpressure, tubing, Valve, Injection Syringe, SP-Syringe
- Detection by UV-, Chiral- or MS-Detector
- Peak-Detection Mode
- Collection into Reagent-Glass-Tubes
- Safety Measures have to be taken!!!
- Solvent evaporation: various approaches

IFC PAL

- Safety Measures:

- ✓ Grounding
- ✓ Grounding
- ✓ Grounding

especially for IFC Prep-Version.....

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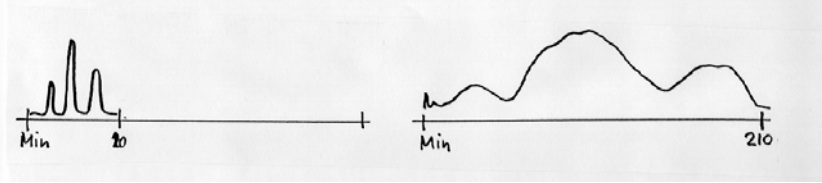
IFC PAL

Sample Re-Injection

- Re-Injection Directly from Collection Tube
  - Needle Length
  - Layer of Solvent/Sample
- Evaporation of Solvent
  - Sample Stability

IFC PAL | Scale-up

- Scale-up Analytical to Preparative Scale:



Particles	**10 µm**	***40 - 150 µm***
Length	**25 cm**	***65 cm***
ID	**4.6 mm**	***25 mm***
Flow	**1 ml/min**	***20 ml/min***
Runtime	**20 min**	***210 min***
Total Solvent	**20 ml**	***4200 ml***

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Scaleable and Absolute Factors

- It is important to normalize all of the scaleable factors by the appropriate linear scale-up factor. Do **not** change any absolute factors.

Scaleable Factors	Absolute Factors
Flow Rate	**Packing Material / Column Length**
Tubing Area	**Back Pressure**
Sample Injection Volume	**Sample Concentration**
Detector Flow Cell Size	**Peak Height and Area**
Solvent Consumption	**Percent Recovery**
Throughput	**Purity**
Dead Volume	**Gradient Slope**
Sample Loop Size	**Run Time**
Fraction Volumes	**Column Performance**
	Temperature

IFC PAL | Scale-up

- ✓ Make your first “preparative injection” on a small diameter “analytical” column.
  Optimize the separation.
- ✓ Increase all of the scaleable elements of the system linearly.
  Do not change any of the “absolute” elements.
- ✓ Perform the preparative separation.

IFC PAL | Scale-up

Use A Linear Scale-Up Factor

- A linear scale-up factor is simply the ratio of the cross sectional areas of the analytical column and the intended preparative column.

- Scale-Up Factor $= P\, r^2_{prep} / P\, r^2_{analytical}$

$= r^2_{prep} / r^2_{analytical}$

IFC PAL | Scale-up