

# An Interactive Spreadsheet-based **Approach to Simplify Method Transfer Between Different Vendor UHPLC / HPLC** Instruments

# Alan P McKeown

Advanced Chromatography Technologies Ltd, 1 Berry Street, Aberdeen, Scotland, AB25 1HF UK

### **1. Introduction**

- Method Transfer: migration of an LC method from one instrument to another without any change to the column or method.
- Methods may be transferred to different sites/laboratories within the same organisation.
- Due to outsourcing of development and manufacturing activities, transfer to external companies is becoming more common.

#### 2. Challenges

- Methods may be transferred to instruments from the same vendor with differing configurations (tubing, dwell, quaternary vs binary pumping etc).
- Methods may be transferred onto different vendor instruments.
- If the changes in instrument configuration are not corrected for, a change in selectivity of the separation may result in:

#### **3. Gradient Method Transfer**

- Column dimensions and particle size remain the same, no changes to flow, injection volume or gradient time required.
- Do need to correct for any change in system dwell volume  $(V_D)$ .
- System dwell volume effectively adds an isocratic hold to the beginning of a gradient method.

- Transfer between different vendor's instruments and the wide variability of instrument configurations can present challenges when transferring LC methods.
- Several key considerations can help improve the chances of successful method transfer.
- A free to download MS Excel spreadsheet has been developed to simplify method transfer.
- Loss of resolution
- Poor method performance
- Regulatory requirements.
- Typically no changes to the method are necessary for isocratic method transfer.
- Transfer of gradient methods presents more of a challenge than isocratic methods.
- If system dwell volume decreases on transfer, an additional isocratic hold of time x is added to the gradient program.
- If system dwell volume increases, injection is delayed until x minutes after the start of the gradient.
- The duration of any adjustment is calculated by



x = duration of isocratic hold or delayed injection (negative for delayed injection, positive for isocratic hold),  $V_{D1}$  = LC system 1 dwell volume,  $V_{D2}$  = LC system 2 dwell volume, F = Flow rate

# **4. ACE LC Method Translator**

Method transfer can be easily accomplished using the Method Transfer tab in the ACE LC Translator.



# **5. Modifying the gradient method**

- The method adjustment can be applied through the LC operating software.
- In the case of EZChrom Agilent OpenLab edition, this is readily achieved using the gradient table for pre-gradient holds or the "Advance Gradient"



## 6. Example 1 – transfer between low-V<sub>D</sub> UHPLC systems



#### **7. Example 2 – transfer from mid- to low-V**<sub>D</sub> systems



#### 8. Example 3 – transfer from high- to low-V<sub>D</sub> system



#### **9. Example 4 – transfer from low- to high-V**<sub>D</sub> systems



#### **10. Easy UHPLC Method Transfer between instrument vendors**

#### **11. Possible pitfalls**

**12. Summary and Conclusions** 

100.0

5.0

Using the ACE Method Transfer Tool, gradient method migration between different vendor LC systems is easily achieved.



- Different systems may show different mixing characteristics
  - > Transfer from binary to binary system or quaternary to quaternary if possible.
  - Modifications to system mixing volumes may help.



- For smaller format columns, it is critical to ensure the new instrument is suitable.
  - May be possible to reconfigure tubing, flow cell etc. if necessary

- Providing the new instrument is fit for purpose, isocratic method transfer is relatively straightforward.
- The primary concern when transferring gradient methods is to correct for dwell volume changes.
- If dwell volume is not corrected for, changes in selectivity may be encountered for the transferred method.
- The likelihood/severity of selectivity changes increases as:
  - Dwell volume difference between systems increases
  - Column volume decreases
- The ACE LC Translator can be used to easily transfer gradient methods between LC systems.
- Free to download at www.ace-hplc.com





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