V&P Scientific Pin Tools for Tecan Liquid Handlers

V&P Pin Tools Add Value to the EVO

On the MCA 96

On the RoMa Arm

For the MCA 384, With Docking Station VP 550ER

On the EVO Deck
Why Investigators Use Pin Tools

Cost
No disposable tips; pin tools quickly pay for themselves

Small volumes
Dispense as low as 3 nL

Volume ranges
Wide range: 3 nL to 5000 nL

Formats
1536, 384, 96, 48, 24 well

Cycle times
Shorter, up to half; UHTP at 2,000,000 compounds/day

Dilution steps
Not needed; saves time, reagents & cost

Miniaturization of assays
Easier to carry out

Why Customers Ask For V&P Pin Tools

Selection
“The Recognized Leader in Pin Tools”
Best selection of pins with wide range of features
180 pin types, 445 different Pin Tools

Quality
Very high; all pins are validated and CV’s included with shipment

Technical service
- Extensive help in selecting the right pin tool
- Phone assistance in set-up
- Trouble-shooting after set-up & during use

Accessories
Extensive range of essential accessories (cleaning materials, blotting systems, docking stations, registration plates); other useful accessories (reservoirs, stirrers, magnetic separation, pin dryer, heating/chilling blocks, delivery systems)
Many Applications for V&P Pin Tools

- Liquid to liquid transfers
  - Screening compound libraries
  - Replicating/inoculating microplates or agar surfaces
  - Serial dilutions
- Cell-based assays
- Making arrays on membranes or agar
- PCR & other enzymatic assays
- DNA & RNA assays
- Cell monolayer wounding
- Liquid to dry plate transfers for multiplexing arrays
- Sampling of frozen materials
- And many other........

Components of the V&P Pin Tool

1. V&P Mounting Plates for Tecan
   - Use with MCA 96 (96 or 384 Pin Tool)
   - Use with MCA 384 (96 or 384 Pin Tool)
   - For RoMa Arm (384 or 96)

2. Floating Fixture

3. Pins
   - Additional Rotational Plate for 384 or 1536 Pin Tool
Pins in Robotic Pin Tools are Floating (FP)

- **Style**: Tube or E-clip
- **Diameters**: 5 options of tube-style pins for range of delivery volumes

### Diameters
- FP4 (0.914 mm)
- FP3 (0.787 mm)
- FP1 (0.457 mm)
- FP8 (0.356 mm)
- FP9 (0.229 mm)

Solid: Transfer by hanging drop and on sides
Slotted: Transfer in slot, on sides, and by hanging drop

Additional Pin Options and Features

- **Solid or slotted**: Slots provide more volume options, including very small nL amounts
- **E-clip pins**: Used for larger volumes (500-5000 nL); can be slotted

Both tube and E-clip pins are available in longer lengths for deep well plates
Hydrophobic/Lipophobic Pin Coating

- Prevents/reduces non-specific binding
- Prevents/reduces lipid and lipoprotein binding
- Decreases volume on side of pin
- Increases size of hanging drop
- Can be applied to all V&P stainless steel pins
- Entire pin is coated, including slot
- Approximately $2 more vs. uncoated pin

Factors Affecting Transfer Volume

- Pin diameter
- Volume of slot in pin
- Surface tension of liquid being transferred
- Plate format, e.g., 48, 96, 384, 1536
- Depth to which pin is immersed in source liquid
- Withdrawal speed of pin from source liquid
  (increased speed = increased volume)
Volume Transferred is Affected by Pin Immersion Depth

Effect of Source Well Volume on Volume Transferred

<table>
<thead>
<tr>
<th>Volume in Source Well</th>
<th>Pin Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume Transferred</td>
<td></td>
</tr>
<tr>
<td>% Transferred</td>
<td></td>
</tr>
<tr>
<td>FP9</td>
<td></td>
</tr>
<tr>
<td>FP1</td>
<td></td>
</tr>
<tr>
<td>FP3</td>
<td></td>
</tr>
</tbody>
</table>

Volume Transferred is Affected by Withdrawal Speed

Effect of Increasing Withdrawal Speed On Volume Transferred

<table>
<thead>
<tr>
<th>Withdrawal Speed (mm/sec)</th>
<th>Volume Transferred</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5</td>
<td>0</td>
</tr>
<tr>
<td>20.0</td>
<td>50</td>
</tr>
<tr>
<td>32.5</td>
<td>100</td>
</tr>
<tr>
<td>45.0</td>
<td>150</td>
</tr>
<tr>
<td>57.5</td>
<td>200</td>
</tr>
<tr>
<td>70.0</td>
<td>250</td>
</tr>
</tbody>
</table>

1 Carried out in 96-well plates
Each Pin Transfers a Range of Volumes

<table>
<thead>
<tr>
<th>PIN</th>
<th>DIAMETER</th>
<th>SHAPE</th>
<th>DELIVERY VOLUME RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP9</td>
<td>0.229 mm</td>
<td>Solid</td>
<td>3 - 8 nl</td>
</tr>
<tr>
<td>FP1</td>
<td>0.457 mm</td>
<td>Solid</td>
<td>11 - 31 nl</td>
</tr>
<tr>
<td>FP1S10</td>
<td>0.457 mm</td>
<td>10 nl Slot</td>
<td>21 - 40 nl</td>
</tr>
<tr>
<td>FP1S50</td>
<td>0.457 mm</td>
<td>50 nl Slot</td>
<td>56 - 75 nl</td>
</tr>
<tr>
<td>FP3</td>
<td>0.787 mm</td>
<td>Solid</td>
<td>29 - 79 nl</td>
</tr>
<tr>
<td>FP3S100</td>
<td>0.787 mm</td>
<td>100 nl Slot</td>
<td>114 - 163 nl</td>
</tr>
<tr>
<td>FP3S200</td>
<td>0.787 mm</td>
<td>200 nl Slot</td>
<td>203 – 250 nl</td>
</tr>
<tr>
<td>FP3S500</td>
<td>0.787 mm</td>
<td>500 nl Slot</td>
<td>427 - 464 nl</td>
</tr>
</tbody>
</table>

1. Volume range determined by speed of withdrawal from source plate
2. Z-speed range = 1.5-30 mm/sec; liquid transferred in DMSO
3. Volume in source = 75 ul
4. Carried out in 384 well plates

Questions for Pin Tool Selection

- What is the assay format?
  - 24, 48, 96, 384 or 1536?
  - Are the source and recipient plate formats the same?
  - Standard microplates or deep well plates?
- What volume is to be transferred?
- What are the typical volumes in the source and recipient plates?
  - For example, typical source volumes are 50-100 ul for 96 well and 10-25 ul for 384 well
  - Recipient wells should contain at least as much volume as source wells
Questions for Pin Tool Selection, cont.

- What type of sample is being transferred?
  - For example:
    - Compound libraries in 100% DMSO to aqueous cell-based assays
    - Bacterial or yeast cells in culture media to agar surface
  - Consider slotted vs. solid; slotted pins offer several advantages with:
    - Source well volumes are low
    - Source well volumes are variable (e.g., cherry picking)
  - Is the sample likely to stick nonspecifically to stainless steel?

Initial Pin Tool Setup

During Customer Set Up:

- Customer determines Z-speed for transfer volume desired
  - Standard curve generated: FITC concentration vs. fluorescent signal
  - Test curve generated: Pin Tool withdrawal speed vs. fluorescent signal using assay parameters (source & recipient well volumes)
  - Comparison of results determines withdrawal speed to use for desired transfer volume
- Protocols provided in V&P Tech Note 267
Pins Must Be Clean!

- THOROUGH PIN CLEANING IS ESSENTIAL
- V&P’s Tech Note 67B provides protocols
- Clean at beginning and end of each assay day
- Wash, rinse & blot between sample transfers
- Heavy-duty clean for periodic maintenance

V&P’s Essential Pin Cleaning Materials

Important to Order With Every Pin Tool

- Pin Cleaning Solution (concentrated solution)
- Blotting Systems (Lint-free paper & absorbent pad)
V&P Reservoirs Facilitate Pin Washing

V&P provides a wide variety of reservoirs

Flowing

- VP 540A
- VP 540BC
- VP 540ETOH-4
- VP 549H2O-4

Static

- VP 540-1

Fountain

NEW: Blotting media on top, useful when deck positions are limited

Essential V&P Accessories

- Docking Station for Mounting Plate Used With MCA 384
- Safe Shipping System
- Docking Station for Mounting Plate Used With MCA 96
- Pin Tool Registration Plates
V&P Pin Tool Support

- Prior to purchase
  - Assist customers in selecting pin tools, pins, and other robotic accessories
  - Information available at www.vp-scientific.com
    Also at www.vp-scientific.com/tecan.htm
- Pin tool set-up
  - Protocols for determining volumetric liquid transfer (Tech Note 267); does not include software or programming
  - Assistance by phone/email with V&P protocols
- Pin Maintenance Service
- Post-sales
  - Availability for trouble-shooting by phone or email
  - Applications support by phone or email

Contact V&P for Assistance

- Initial warranty against defects in manufacture
- V&P will handle trouble-shooting on pin tools
- For any questions regarding set-up, performance, possible repairs, or other issues, customer should always contact V&P so we can help determine the problem & provide solutions
- **Contact information:**
  - Phone: 858-455-0643, ask for Tech Support
  - Email: techsupport@vp-scientific.com
V&P’s Pin Tool Maintenance Service

- Preventative maintenance and/or refurbishment of your Pin Tools
- Pin Tools are sent back to V&P
- Cleaning, replacement of damaged pins, and revalidation
- Discounted price for replacement parts
- Quick turnaround

V&P Scientific, Inc.

Contact Information
Phone: 858-455-0643, ask for Sales
Email: sales@vp-scientific.com

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