

# SEGMENT INSIGHTS

## UV SP AND RESET IN CONJURE™ AND PROPEL™

### PART 1: ANATOMY OF A UV SEGMENT TRACE

There are several parameter definitions to understand prior to describing how best to set the UV Detection Parameters. It would be best to illustrate these with an actual UV Trace from a Conjure™ System as shown to the right **Figure 1**. The example segment trace uses Ethanol (EtOH) as the Transport Solvent and the reactants have been dissolved in DMA.

There are six definitions defined below and indicated in figure - *note the two user configured parameters, Detection Level and Reset Value, are not reviewed in Parts 2 and 3.*

- **Baseline** - This value is that of the Transport Solvent (EtOH) flowing through the UV Flow Cell. As EtOH is a poor absorbing UV material, the detector signal (high voltage) is strong.
- **Leading Edge** - As the leading edge of the segment begins to enter the flow cell, some product diffusion occurs, but just after this diffusion is when the leading edge Fluorous Spacer enters the flow cell. As fluoros material has virtually no UV absorbance, the signal almost peaks at the Baseline level. But since there is only 40  $\mu$ L of leading spacer, the peak is short lived.
- **Product** - Compound (Product) will saturate the UV Detector as per Beer's Law. In the illustration shown, reactants have been dissolved in DMA. As DMA has a strong UV absorbance (low voltage), the detector becomes saturated.
- **Trailing Edge** - The rear fluoros spacer defines the trailing edge. In the example shown, the peak magnitude of the trailing edge is not as high as the Leading Edge. This effect is mostly due to the break up of the fluoros in the reaction segment.
- **Tailing** - The tailing is the diffused reactant material lagging behind the Trailing Edge fluoros spacer. This type of diffusion is common and is the principle driver in setting the Reset UV parameter value.
- **Baseline Recovery** - the baseline UV signal in the example does not reach the same level as of the Baseline. This is a common issue and relates to the diffusion of the oncoming segment into the flow cell. It is possible to have the Baseline Recovery reach the same level as the original Baseline, but this would lead to larger than required segment spacing as illustrated in **Figure 2**.

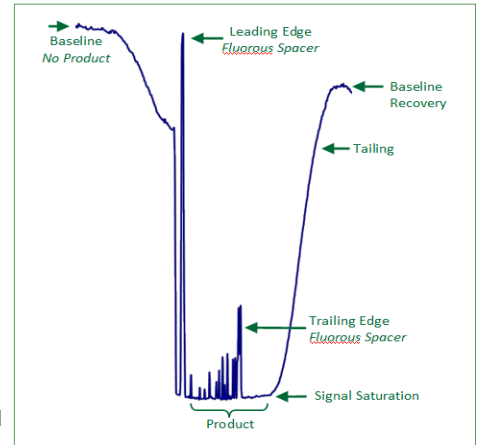


Figure 1 - UV Segment Trace

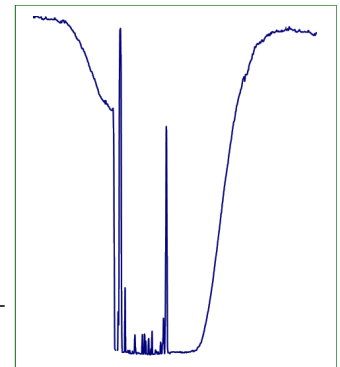


Figure 2 - High Baseline Reset

### PART 2: CONJURE AND PROPEL UV DETECTION VALUES

Both Conjure and Propel have two user controlled UV Detection Values; Set Point (SP) and Reset Values, **Figure 3**.

- **Detection Level (SP Value)** - Triggers when a reaction segment is actually existing the reactor, which in turn resets the sampling and collection timing. *Hint: both the Conjure and Propel use a negative detection value, which means that when compound is detected, the Detection voltage drops from baseline.*
- **Reset Level** - Defines when the Trailing Edge of the segment has exited the reactor. The Reset Value is often the parameter that causes a missed segment detection due to the system not resetting for segment detection. *Hint: this value is generally set higher than the SP Value, but lower than both the Baseline and Baseline Recovery Values.*

In the Conjure, these values are set from within the *Control Software > Reactor Tab*, **Figure 4**. In the Propel these values are set from within the *System Status and Control* settings, **Figure 5**.

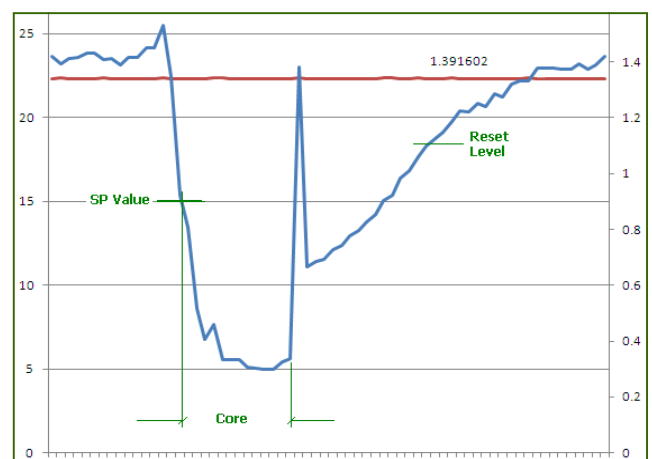


Figure 3 - SP & Reset Values

## PART 3 : SETTING SP AND RESET VALUES

### Setting SP Level

Setting the SP Value is very straightforward. The best value is one that is above the Product signal, but dramatically lower than the Baseline Recovery Value as illustrated in Figure 3. When reviewing the settings and performance of the detection during development keep in mind that the leading edge fluoruous spacer will cause a positive peak. This may cause alarm but not to worry. Set the SP Value (Detection Level) lower than the lower than the Reset Baseline so that no false positives are triggered.

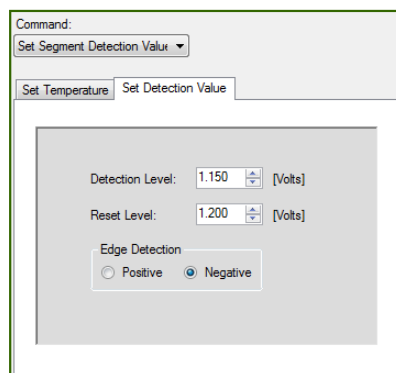


Figure 4 - Conjure Detection Value Settings

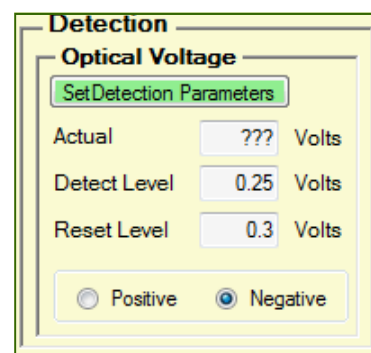


Figure 5 - Propel Detection Value Settings

### Setting Reset Level

Setting the Reset Level Value is a bit trickier as the level must be higher than the SP Level, but lower than the Baseline Recovery value. The most common problem has been the setting of this value too high (higher than the actual Baseline Recovery value) such that the system never begins detection of a sequential segment. More on this in Part 4. During development, track the Baseline Recovery and set the Reset Level Value midway between the Product Value and the Recovery Baseline actual value.

## PART 4 : CONJURE DETECTION SYSTEM SETTINGS

Unlike the Propel, the Conjure has a more sophisticated segment tracking database that allows the user to maximum throughput by setting two detection values related to when the Conjure begins and ends detection. Both these settings are in volume units ( $\mu\text{L}$ ) and located in the *Conjure Control > System Settings > Detection Tab* (Figure 6). These values are used as illustrated in Figure 7, where the last 3 Reactor Progress blocks on the Conjure Control > Overview Tab indicate the volume remaining within the reactor in which the Detection System begins tracking for a segment.

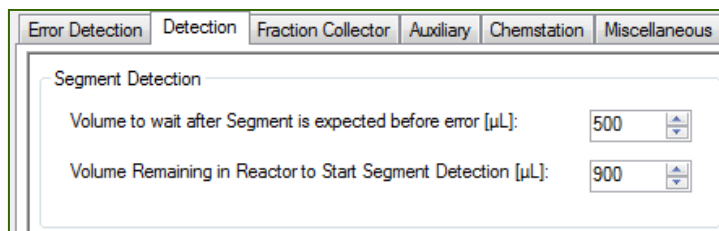


Figure 6 - Conjure Detection Active Volumes

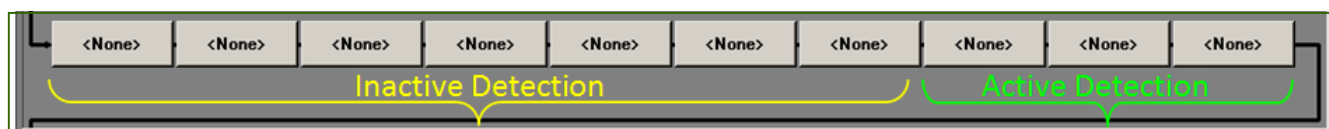


Figure 7 - Conjure Detection Active Blocks

**IMPORTANT!** When the segment transitions from the Inactive Detection progress blocks (Figure 7) to the Active Detection blocks (last 3), a system **Detect Reset** command is sent to the Reactor application. Even though the system may be in Active Detection, actual detection will not begin until the UV Value is above the **Reset Value** (Figure 8). If the Reset Value is not reached, which is often due to the set value being too high, then the subsequent segment will not be detected, sampled or collected.

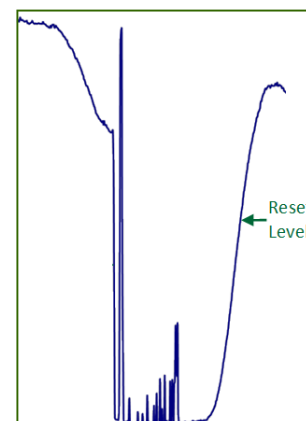


Figure 8 - Reset Value



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