

## SimPrep Liquid Handling Station Baseline Study

### Introduction

Efforts to improve sample workflow and throughput are a continual source of interest for laboratories as these efforts help them to improve their margins while maintaining or improving customer satisfaction. However, when a change is made to a sample preparation protocol care must be taken to ensure that the data produced continues to be of the highest quality. For customers adopting the SimPrep Automated Liquid Handling Station one of the most common concerns is that of maintaining a clean baseline. To that end, Hill Laboratories in New Zealand conducted a study comparing blank samples poured by hand with samples dispensed by the SimPrep system.

### Sample Preparation

Before preparing samples with the SimPrep, the system was primed 20 times with 5% HNO<sub>3</sub>. This was done to simulate normal conditions on a new system. The automated system then dispensed 5mL of 5% HNO<sub>3</sub> into 25 different vials. The controls samples were prepared by hand pouring 5 ml aliquots of 5% HNO<sub>3</sub> into 25 sample vials. All 50 vials were then analyzed on the ICP-MS. Detection limits for the individual isotopes are listed in Table 1

**Table 1: Isotope Detection Limits**

Isotope	Detection Limits (µg/L)
Bj <sup>209</sup> , Tl <sup>205</sup> , Cd <sup>111</sup>	0.01
Ag <sup>109</sup> , U <sup>238</sup>	0.02
Ba <sup>137</sup> , Be <sup>9</sup> , Co <sup>59</sup>	0.03
Rb <sup>85</sup>	0.04
Cu <sup>63</sup> , Mn <sup>55</sup> , Mo <sup>98</sup> , Pb <sup>206</sup> , Sb <sup>121</sup> , V <sup>51</sup>	0.05
La <sup>139</sup>	0.08
Cs <sup>133</sup>	0.09
Sr <sup>88</sup>	0.1
As <sup>75</sup> , Fe <sup>56</sup> , Li <sup>7</sup> , Zn <sup>66</sup>	0.20
Sn <sup>120</sup>	0.25
Ni <sup>60</sup>	0.30
Al <sup>27</sup>	0.6
B <sup>10</sup>	2
Mg <sup>25</sup> , Na <sup>23</sup> , P <sup>31</sup>	20
Ca <sup>43</sup> , K <sup>39</sup>	50



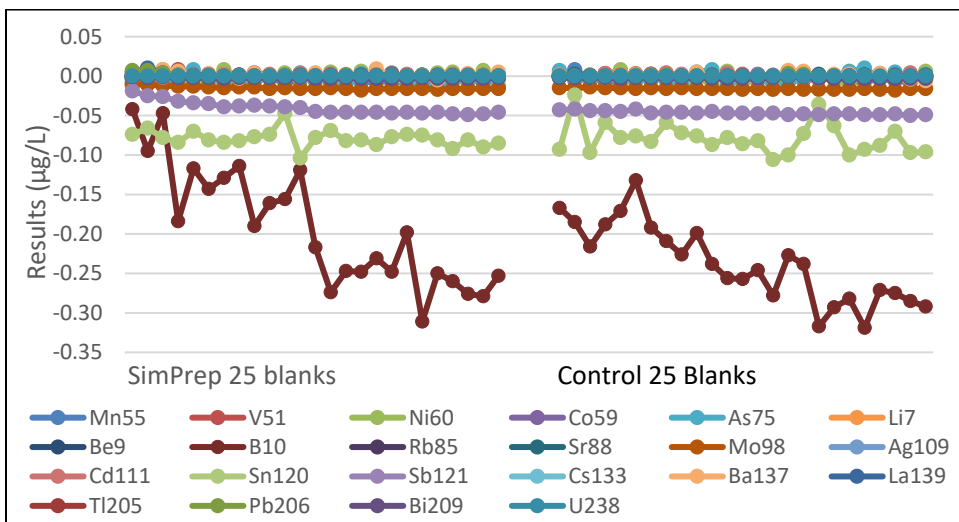
**SimPrep Liquid Handling Station**

## Results

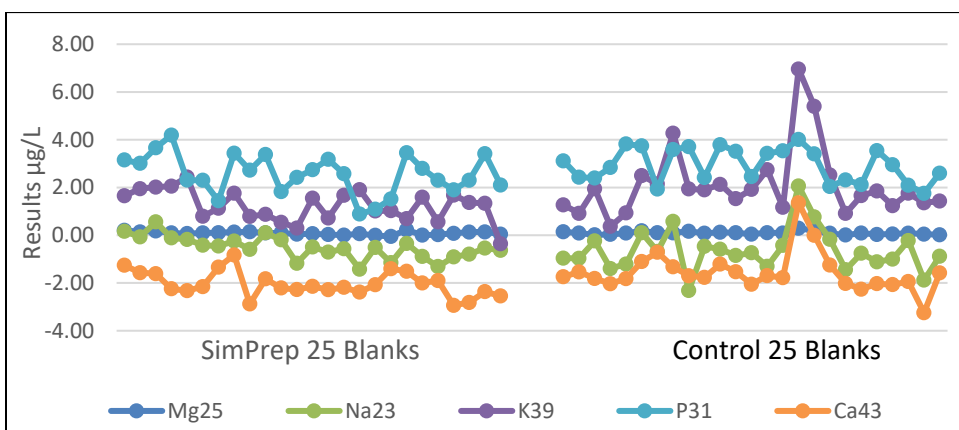
The blank values for all 50 measurements are in Figures 1 and 2. Similar baselines are seen with both the SimPrep results and the control results. This indicates that the Liquid Handling Station was not a source of any visible contamination. Notably, the Boron result was non detect despite the use of a borosilicate syringe.

For a few elements, the SimPrep showed less contamination and better stability than the control blanks; this data is shown in Table 2. The control blanks had results over the detection limit for Fe, Al, and Cu whereas the SimPrep did not.

The provided data has shown the SimPrep to be comparable to or cleaner than hand preparation. For more information, contact your local Teledyne Cetac Sales Representative or go to our website at [www.teledynecetac.com](http://www.teledynecetac.com)



**Figure 1: 50 Blanks Analyzed after preparation with the SimPrep and by hand**



**Figure 2: 50 Blanks Analyzed for Mg, Na, K, P, and Ca**

**Table 2: Blank Results for elements with contamination**

	SimPrep				Control Blank			
	Minimum Result (µg/L)	Maximum Result (µg/L)	Range (µg/L)	RSD %	Minimum Result (µg/L)	Maximum Result (µg/L)	Range (µg/L)	RSD %
<b>Al<sup>27</sup></b>	0.05	0.45	0.40	68	0.09	1.08	1.17	87
<b>Cu<sup>63</sup></b>	-0.02	0.01	0.03	190	-0.02	0.06	0.08	1300
<b>Fe<sup>56</sup></b>	-0.18	0.10	0.28	82	-0.18	0.50	0.68	2100
<b>Zn<sup>66</sup></b>	-0.04	0.08	0.12	180	-0.05	0.12	0.17	1300

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