

### ROBUSTNESS TESTS ON THE SCANSTATION

Author: Thomas ALEXANDRE, PhD, INTERSCIENCE, [talexandre@interscience.com](mailto:talexandre@interscience.com)

Unit: ScanStation® - Software version:1.30

#### Objective:

The aim of this study is to assess the performance of the ScanStation (ISS) by comparing manual and automatic enumeration of plated samples for the robustness counting evaluation.

#### Protocol:

These analyses were performed with pure cultures of a Biomérieux BioBall *Escherichia coli* ATCC 8739. This strain was plated on PCA agar plates (90 mm diameter) and contact plates (55 mm diameter). These plates were prepared in duplicate incubated at 37°C in two batches in two different ScanStation (machines #59 and #61) at the same time. The automatic and manual readings were compared to assess

the intra- and inter- machine variation. The plating, the setting parameters, and the incubation was performed by the same person. Thus, the only difference is the counting recording by the two ScanStation #59 and #61.

#### Results:

##### 1. Manual vs. ScanStation #59 enumeration comparison

For each plated sample, the following **table 1** shows the manual and automatic readings of colonies after incubation. The value of these readings is reported in counted CFU with the false positive and negative counting detected during the manual reviewing.

Plate ID	Plate Diameter	ISS enumeration	Manuel enumeration	False negative	False positive
55	55	26	19	0	7
56	55	25	24	0	1
57	55	25	25	0	0
58	55	22	22	0	0
59	55	25	25	0	0
60	55	22	22	0	0
61	55	16	16	0	0
62	55	10	10	0	0
63	55	20	20	0	0
64	55	28	28	0	0
66	55	15	15	0	0
67	55	19	19	0	0
68	55	19	19	0	0
69	55	24	24	0	0
72	90	23	23	0	0
74	90	23	23	0	0
75	90	23	23	0	0
76	90	20	20	0	0
77	90	29	29	0	0
78	90	21	21	0	0

Plate ID	Plate Diameter	ISS enumeration	Manuel enumeration	False negative	False positive
79	90	19	19	0	0
80	90	20	20	0	0
81	90	19	19	0	0
82	90	20	20	0	0
83	90	14	14	0	0
84	90	22	22	0	0
85	90	14	14	0	0
86	90	20	20	0	0
87	90	14	14	0	0
88	90	25	25	0	0
89	90	13	13	0	0
90	55	21	21	0	0
91	55	17	17	0	0
92	55	11	11	0	0
93	55	26	26	0	0
94	55	21	22	1	0
<b>Total</b>		<b>680</b>	<b>681</b>	<b>1</b>	<b>0</b>

Standard deviation	4,55
Variance	20,73
Relative error (MRE)	0,01
<b>False positive colony %</b>	<b>1,10</b>
<b>False negative colony %</b>	<b>0,14</b>

Table 1: Comparison of the ScanStation #59 counting with the manual counting.

These results do not show significant difference between the two enumeration methods. Furthermore, the following graph in the **figure 1** shows the correlation summarizing of all manual and ScanStation enumerations performed with the machine #59. The coefficient correlation  $R^2$  shows a value close to 1, meaning there is close to no difference between manual and ScanStation #59 enumeration. Thus, the intra-machine variation is negligible.

## 2. Manual vs. ScanStation #61 enumeration comparison

For each plated sample, the following **table 2** shows the manual and automatic readings of colonies after incubation. The value of these readings is reported in counted CFU with the false positive and negative counting detected during the manual reviewing.

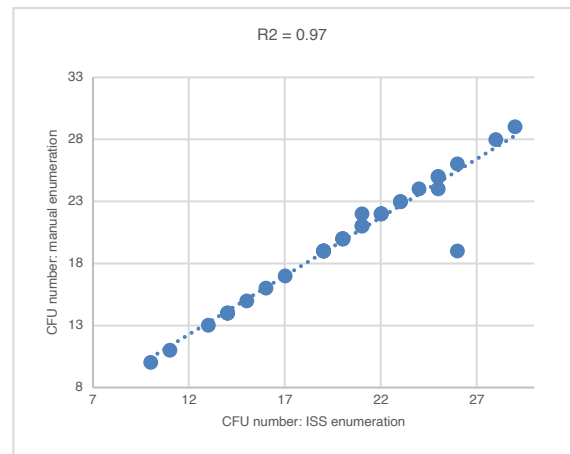


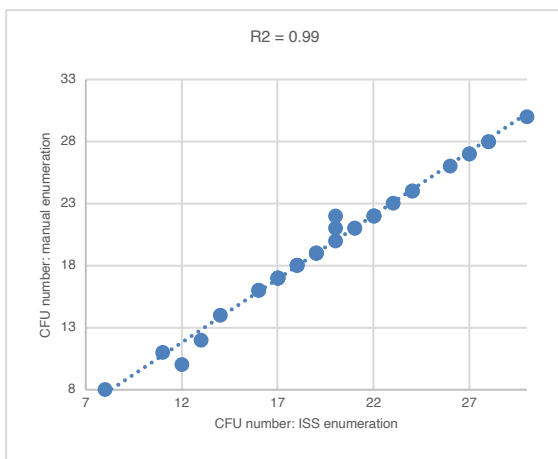
Figure 1: correlation graph of manual and automatic enumeration with the ScanStation #59.

Plate ID	Plate Diameter	ISS enumeration	Manuel enumeration	False negative	False positive
173	55	13	12	0	1
174	55	18	18	0	0
175	55	17	17	0	0
176	55	12	10	0	2
177	55	22	22	0	0
178	55	20	21	1	0
179	55	19	19	0	0
180	55	28	28	0	0
181	90	30	30	0	0
182	90	27	27	0	0
183	90	22	22	0	0
184	90	14	14	0	0
185	90	16	16	0	0
186	90	21	21	0	0
187	90	18	18	0	0
188	90	24	24	0	0
189	90	17	17	0	0
190	90	16	16	0	0
191	90	21	21	0	0
192	90	17	17	0	0
193	90	18	18	0	0
194	90	27	27	0	0
195	90	23	23	0	0
196	90	19	19	0	0
199	90	28	28	0	0
201	55	22	22	0	0
202	55	20	22	2	0
203	55	24	24	0	0
204	55	26	26	0	0
206	55	19	19	0	0
207	55	20	20	0	0
208	55	17	17	0	0
209	55	11	11	0	0
210	55	19	19	0	0
211	55	8	8	0	0
<b>Total</b>		<b>693</b>	<b>693</b>	<b>3</b>	<b>3</b>

Standard deviation	5,22887908
Variance	27,3411765
Relative error (MRE)	0,01054654
<b>False positive colony %</b>	<b>0,43290043</b>
<b>False negative colony %</b>	<b>0,43290043</b>

Table 2: Comparison of the ScanStation #61 counting with the manual counting.

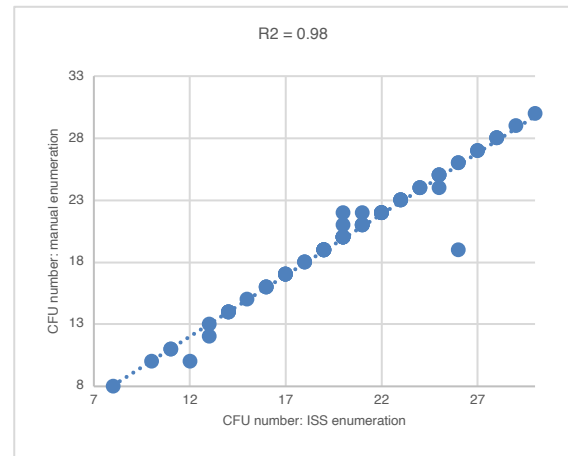
These results do not show significant difference between the two enumeration methods. Furthermore, the following graph in the **figure 2** shows the correlation summarizing of all manual and ScanStation enumerations performed with the machine #61. The coefficient correlation  $R^2$  shows a value close to 1, meaning there is close to no difference between manual and ScanStation #61 enumeration. Thus, the intra-machine variation is negligible.



**Figure 2: correlation graph of manual and automatic enumeration with the ScanStation #61.**

### 3. Manual vs. ScanStation #59 and #61 enumeration comparison

Both manual and automatic counting of the two ScanStation #59 and # 61 were gathered in the following graph in the **figure 3** to show the correlation summarizing of all performed enumerations. The coefficient correlation  $R^2$  shows a value close to 1, meaning there is close to no difference between manual and automatic enumeration for the two machines. Thus, the inter-machine variation is negligible.



**Figure 3: correlation graph of manual and automatic enumeration with the ScanStation #59 and #61.**

### Conclusion:

The robustness tests on the ScanStation shown repeatable data in intra- and inter-machine conditions.