SWWC\_CQAWWC\_CQAWP

Y.X. L.W. C.M.

# 1 R Package and Data Loading

# 2.1 Ppu for one data with USL-normalization

# 2.2 Ppu and confidence interval with bootstrap for one data with USL-normalization

# 3.1 Ppu CQAWWC for one to three data with USL-normalization

# 3.2 Ppu CQAWWC with confidence interval for one to three data with bootstrap and USL-normalization

# 3.3 Ppu CQAWWC monitoring model with training, CIL, and monitoring

# 4.1 Ppu CQAWP for one to three data with USL-normalization

# 4.2 Ppu CQAWP for one to three data with bootstrap and USL-normalization

# 4.3 Ppu CQAWP monitoring model with training, CIL, and monitoring

# 5.1 Tradition Ppu for each subgroup and the minmal as the CQA’s Ppu

# 5.2 Tradition Ppu for each subgroup and the minmal as the 1 to 3 CQAs’ Ppu

# 6.1 Ppu of the three subgroups of DAR by USL normalization (they are equal to each subgrop Ppu in the following section)

Table 1: Subgroup of DAR with USL=122.2 ug/swab

| **Ppu** | **P0.5** | **P0.99865** | **N** | **Sample\_SD** | **Bandwidth\_Method** | **Bandwidth\_Value** |
| --- | --- | --- | --- | --- | --- | --- |
| 2.159 | 3.041 | 47.947 | 18 | 10.375 | Silver1.06 | 6.16928 |

Table 2: Subgroup of DAR with USL=169.7 ug/swab

| **Ppu** | **P0.5** | **P0.99865** | **N** | **Sample\_SD** | **Bandwidth\_Method** | **Bandwidth\_Value** |
| --- | --- | --- | --- | --- | --- | --- |
| 65.515 | 0.318 | 1.839 | 24 | 0.391 | Silver1.06 | 0.21956 |

Table 3: Subgroup of DAR with USL=20 ug/swab

| **Ppu** | **P0.5** | **P0.99865** | **N** | **Sample\_SD** | **Bandwidth\_Method** | **Bandwidth\_Value** |
| --- | --- | --- | --- | --- | --- | --- |
| 23.414 | 1.854 | 6.046 | 18 | 1.473 | Silver1.06 | 0.87567 |

# 6.2 Ppu of DAR by the minimal of each subgroup (subgroup wise worst case)

Table 4: The SWWC Ppu of DAR and Ppu of Each Subgroup of DAR

| **Ppu** | **Ppu\_USL\_20** | **Ppu\_USL\_122.2** | **Ppu\_USL\_169.7** |
| --- | --- | --- | --- |
| 2.159 | 23.414 | 2.159 | 65.515 |

#6.3 Ppu of DAR by pooling USL normalized data

Table 5: Ppu of DAR by Pooling the Three Subgroups with USL-Normalization

| **Ppu** | **P0.5** | **P0.99865** | **N** | **Sample\_SD** | **Bandwidth\_Method** | **Bandwidth\_Value** |
| --- | --- | --- | --- | --- | --- | --- |
| 2.568 | 1.339 | 39.753 | 60 | 6.044 | Silver1.06 | 2.82492 |

#6.3 Ppu of CAR by USL-normalization

Table 6: Ppu of CAR

| **Ppu** | **P0.5** | **P0.99865** | **N** | **Sample\_SD** | **Bandwidth\_Method** | **Bandwidth\_Value** |
| --- | --- | --- | --- | --- | --- | --- |
| 26.348 | 1.278 | 5.025 | 33 | 0.835 | Silver1.06 | 0.44 |

# 7 Ppu of Mic by USL-normalization

Table 7: Ppu of Mic

| **Ppu** | **P0.5** | **P0.99865** | **N** | **Sample\_SD** | **Bandwidth\_Method** | **Bandwidth\_Value** |
| --- | --- | --- | --- | --- | --- | --- |
| 20.164 | 0.035 | 4.993 | 20 | 0.894 | Silver1.06 | 0.52077 |

# 8.1 Overall Ppu by SWWC (Subgroup wise worst case)

Table 8: Process Overall Ppu by SWWC\_KDEDP

| **Ppu\_Overall** | **Data1\_Ppu** | **Data1\_Ppu\_USL\_20** | **Data1\_Ppu\_USL\_122.2** | **Data1\_Ppu\_USL\_169.7** | **Data2\_Ppu** | **Data2\_Ppu\_USL\_103.1** | **Data3\_Ppu** | **Data3\_Ppu\_USL\_25** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2.159 | 2.159 | 23.414 | 2.159 | 65.515 | 26.348 | 26.348 | 20.164 | 20.164 |

# 8.2 Overall Ppu by CQAWWC (CQA wise worst case)

Table 9: Process Overall Ppu by CQAWWC\_KDEDPonUSLND

| **Ppu** | **Ppu\_Data1** | **Ppu\_Data2** | **Ppu\_Data3** |
| --- | --- | --- | --- |
| 2.568 | 2.568 | 26.348 | 20.164 |

# 8.3 Overall Ppu by CQAWP (CQA wise pooling)

Table 10: Process Overall Ppu by CQAWP\_KDEDPonUSLND

| **Ppu** | **P0.5** | **P0.99865** | **N** | **Sample\_SD** | **Bandwidth\_Method** | **Bandwidth\_Value** |
| --- | --- | --- | --- | --- | --- | --- |
| 2.699 | 1.067 | 37.719 | 113 | 4.506 | Silver1.06 | 1.85541 |

# 9 CQAWWC Model Monitoring Cleaning Process Performance

Table 11: Monitoring Results of the Cleaning Process for Equipment A by CQAWP-BAKDEDPonUSLND Model

| **Ppu\_training** | **Ppu\_threshold** | **Ppu\_monitoring** | **decision** |
| --- | --- | --- | --- |
| 2.528 | 2.304 | 2.568 | Cleaning process is capable. |

# 10 CQAWP Model Monitoring Cleaning Process Performance

Table 12: Monitoring Results of the Cleaning Process for Equipment A by CQAWP-BAKDEDPonUSLND Model

| **Ppu\_training** | **Ppu\_threshold** | **Ppu\_monitoring** | **Performance\_conclusion** |
| --- | --- | --- | --- |
| 2.676 | 2.497 | 2.699 | Cleaning process is capable. |