CO-RE 96 Probe Head pipetting specifications

with or without TADM feature

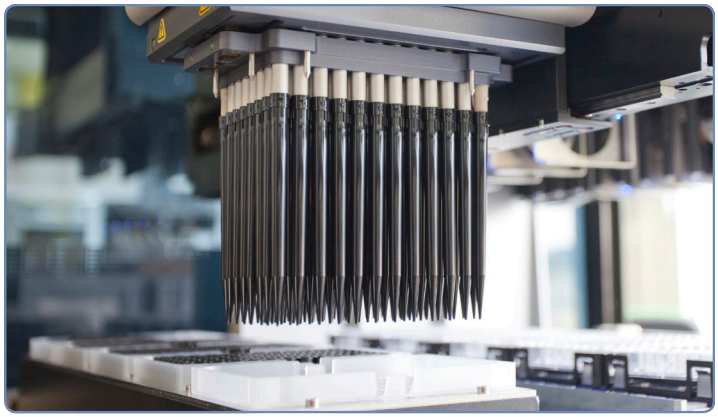

Figure 1: CO-RE 96 Probe Head.

Verification procedure

This technical note describes the verification procedure at Hamilton Robotics. It has been applied in the design phase of the Microlab STAR Line to validate the pipetting performance.

Validation

The trueness has been validated by a precision balance (5 digits). The precision of the STAR systems have been validated by photometric analyses during the design phase of its development using a plate photometer and strictly controlled environmental conditions. The specifications in table 1 are those validated under the conditions described in this technical note.

Final QC

Each individual STAR system undergoes final testing in our production environment using a plate photometer. The measurements taken during final testing are made under broader environmental conditions with an assortment of the specifications in table 1. The final testing data are found in the Declaration of Quality (DoQ). The DoQ is part of the documentation delivered with each instrument.

Field verification

Finally, the specifications of the volume field verification (FV2) allow the use of a transportable balance and photometer under a broader variety of environmental conditions, typically those found in laboratories.

Required instruments and resources

- Test temperature: 20 ± 2°C
- Relative humidity: 50% ± 5%
- Photometer
- Balance used: Mettler Toledo WXS
- Windshield on the balance stage
- Test fluid: colorized buffer liquid
- 10µl, 50µl, 300µl, 1000µl tips
- Plate shaker

Disposable tip size	Volume	Trueness IRI (%)	Precision CV (%)
10µl	1µl	5.0%	5.0%
	5µl	2.5%	2.0%
	10µl	1.5%	1.5%
50µl	1µl	5.0%	5.0%
	5µl	2.5%	2.0%
	50µl	1.5%	1.0%
300µl	10µl	3.0%	2.0%
	50µl	1.5%	1.0%
	300µl	1.0%	1.0%
1000µl	10µl	7.5%	3.5%
	100µl	2.0%	1.0%
	1000µl	1.0%	1.0%

Table 1: Pipetting specifications of disposablel tips for CO-RE 96 Probe Head.

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Protocol

Testing of the Microlab STAR Line is done by a dye-pipetting procedure followed by a photometric analysis to verify the CV of the CO-RE 96 Probe Head. The trueness has been validated gravimetrically using a precision balance (5 digits). The trueness and precision specifications given for the STAR Line refer to an instrument with 1000µl CO-RE 96 Probe Head. The photometric method uses 3 pipettings for all 96 channels at the specified volume. For each pipetting (aspiration/dispense), a new set of CO-RE disposable tips is used. For Volumes > 50µl the applied dispense mode is jet dispense. Volumes ≤ 50µl are dispensed in (liquid) surface mode.

Volume verificationdesign phase

Careful preparation is essential to set-up the verification procedure described in this technical note. The test equipment is equilibrated with the temperature of the test environment, so it is installed at least 12 hours before the verification starts. The STAR Line instrument requires a warm-up period of at least 1 hour.

Measurement procedure for > 50µl (jet mode)

1. Pick up the disposable tips
2. Aspirate red sodium salt solution at the corresponding test volume (using the cLLD function to detect the liquid surface)
3. Zero the Balance
4. Dispense the test volume (jet mode)
5. Measure the weight of the liquid pipetted (stable balance value)
6. Measure the optical density of each well

Steps 1 – 6 are executed ≥ 3 times per volume

7. Statistical calculation of the volumes is done by using the corresponding liquid density at the test temperature. Use the photometric data to calculate precision. Use the gravimetric data and the corresponding liquid density values to determine average dispense accuracy and precision.

Measurement procedure for volumes ≤ 50µl (surface mode)

1. Pick up the disposable tips
2. Aspirate 200µl borate buffer (using the cLLD function to detect the liquid surface)
3. Dispense 200µl borate buffer (using a fixed height)
4. Pick up new disposable tips
5. Aspirate red sodium salt solution at the corresponding test volume (using the cLLD to detect the liquid surface)
6. Zero the balance
7. Dispense the test volume (surface mode)
8. Measure the weight of the liquid (stable balance value)
9. Mix by efficient shaking on the plate shaker
10. Measure of the optical density of each well

Steps 1 – 10 are executed ≥ 3 times per volume

11. *see 7 in "Measurement procedure for > 50µl (jet mode)"*

Acceptance criteria

Calculated trueness (R) and precision (CV) values are within specifications if they are less than the values appearing in the table above (pip spec of the 1000µl CO-RE 96 Probe Head).

- Results may vary using other liquid or environmental conditions.
- Environmental conditions such as vibration, ventilation, foot traffic, dust, strong light, and fluctuating temperature and humidity can adversely affect pipetting results.

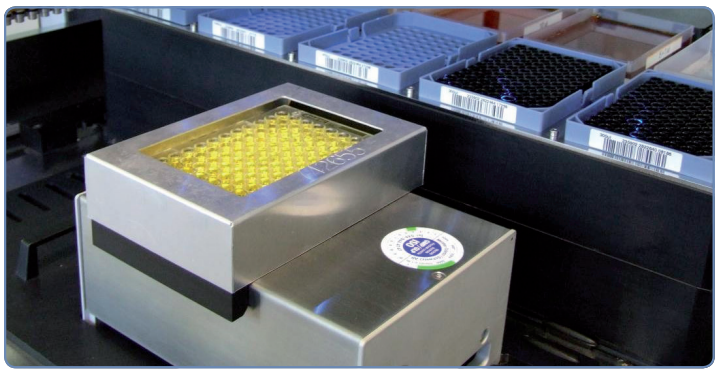

Figure 2: Setup for multiprobe volume verification: integrated balance on the deck of the STAR. system

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