

A new QualAssure™ solution to use with MVS: PCRMix™

Goal: This technical bulletin provides information and instruction for using PCRMix QualAssure with the Multichannel Verification System (MVS) and Data Manager v3.5 software (or newer).

Special note: PCRMix QualAssure solutions are only to be used with the MVS and are not for use in PCR instruments or PCR amplification steps. PCRMix is intended to mimic the rheological and pipetting characteristics of commercially available master mixes (see Figure 1). Thus, the PCRMix can be used to check the performance of a liquid handler or a pipette that is used for volume transfers of master mix-like liquids.

What you need to know about PCRMix

PCRMix QualAssure solutions are for use with the MVS and have been manufactured with a proprietary formulation that includes some of the main constituents that comprise commercial master mixes, but without polymerases or dNTPs. Master mix reagents are typically more viscous than regular aqueous solutions, which can make pipetting accurately and consistently a challenge. PCRMix is an "off the shelf" solution that simplifies performance optimization and verification of automated liquid handlers used to dispense master mix-like liquids for assays such as PCR, qPCR, and NGS library prep.

Intended Uses:

1. Calibration and performance verification for volume transfers involving master mix-like liquids.
2. Liquid class optimization of methods/techniques using master mix-like liquids.

Handling Guidelines for PCRMix QualAssure

We recommend that you handle PCRMix in the same way that you handle your current master mix reagents. For example, if master mix is typically dispensed while cold, ensure that PCRMix is refrigerated before use. PCRMix should be stored tightly capped and out of direct sunlight, at temperatures between 2° and 30° C. Avoid extended exposure to freezing temperatures. If the contents of the bottle are frozen, allow to thaw slowly. Gently invert the bottle several times to mix the contents before use.

Using PCRMix with MVS

The PCRMix QualAssure solutions integrate seamlessly with the existing MVS workflow and the procedure is very similar to using all other MVS Aqueous and DMSO QualAssure solutions. The process of defining plate layouts, Diluent usage, scanning barcodes, shaking and reading test plates, as well as the test reports, are virtually the same with PCRMix.

Table 1. PCRMix volume ranges in 96-well plates

MVS PCRMix Volume Range	
	96-well (µL)
PCRMix B	10.00 – 49.99
PCRMix C	2.000 – 9.999

During the testing process, the user may observe a few minor differences:

1. When using PCRMix, the MVS shaker's rpm settings are automatically lowered to reduce the chances of forming bubbles in the wells. During the MVS testing process, once the PCRMix barcode is scanned, the software changes the shaker settings and the user does not have to make any changes. **NOTE:** if using an offline shaker, shaker settings may have to be lowered manually.

Table 2. Shaker RPM settings are automatically changed with using PCRMix

MVS PCRMixShaker Settings (Q shaker)	
	96-well (rpm)
Default (Aqueous, DMSO)	1500
PCRMix	1300

2. Unlike the Aqueous and DMSO QualAssure solutions, there are deeper menisci in each well when using PCRMix. Note: the MVS Software accounts for the deeper meniscus in the calculation of the liquid volume in each well.

Table 3. MVS system specifications are different for PCRMix as compared to Aqueous and DMSO QualAssure solutions.

MVS System Specifications: PCRMix Usage in 96-well plates		
Test Volume (μ L)	Accuracy (%)	CV (%)
2.000 – 49.99	4.0	0.80

Optimizing ALH (Automated Liquid Handler) methods for master mix-like liquids

Using PCRMix to optimize the transfers of master mix-like liquids can be broken down into four basic steps: dispense, measure, assess, and adjust if needed. These steps are then repeated until the performance has been dialed in successfully. There are a multitude of liquid handling parameters that can be adjusted and it is easy to check for changes after each adjustment using the MVS. It is recommended to create a backup copy of the method/technique before making any alterations to the variables. Depending on the situation, changing the aspirate/dispense rates, immersion depth, dispense height, blowout volume, or adding pause steps can improve the repeatability of PCRMix transfers. Adjusting a technique's correction factor or calibration curve may also be needed to improve accuracy.

Technical Bulletin

By testing and adjusting your liquid handler with a solution that properly simulates your master mix transfers, you will be able to ensure accurate pipetting.

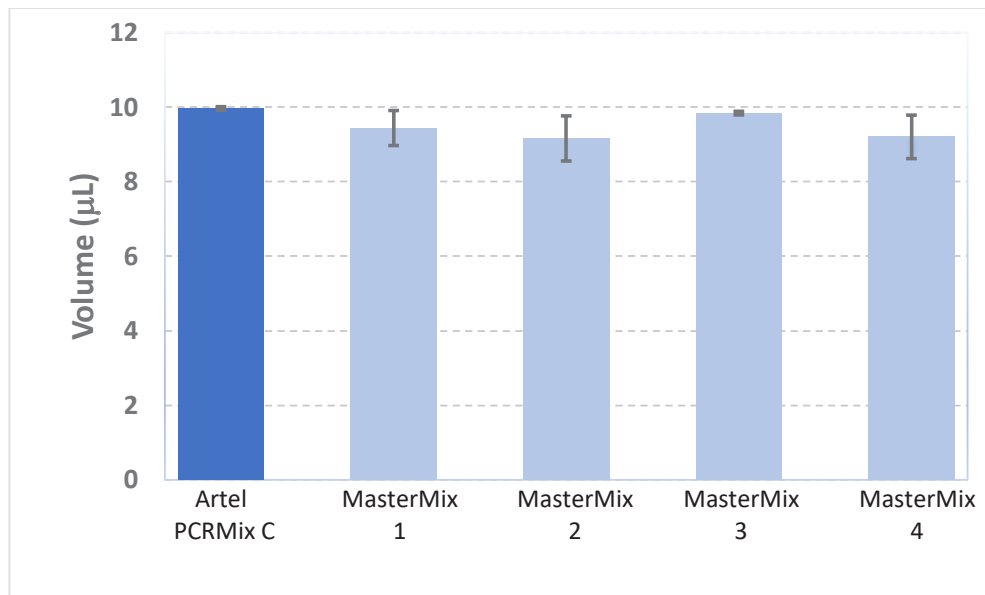


Figure 1. The following data shows a gravimetric comparison of PCRmix pipetted alongside four other commercial master mix reagents. First, the liquid handler was optimized to deliver 9.99 µL of cold (~4°C) PCRmix C using the MVS. Next, the same method was used to dispense chilled samples of four varieties of master mix. This gravimetric pipetting comparison shows that the PCRmix reagent pipettes similarly to commercially available master mix reagents.

Contact Artel Technical Services - we are here to help.

If you have any additional questions or concerns, please contact Technical Support at support@artel.co or at 888-406-3463 option 2.