A4XP Beads Quality Control Report

QC Item A: Macro-Scale Mixed DNA Marker Size Selection and Fragment Recovery

This test evaluates DNA fragment recovery and exclusion behavior of A4XP beads under different bead-to-sample ratios using mixed DNA markers.

Parameter	Description
Sample	185 µL purified water + 5 µL DL2000 DNA Marker + 10 µL 50 bp DNA Marker
Test ratios	0.6×, 0.8×, 1.0×, 1.2×, 1.4×, 1.6× and 1.8× bead volume
Evaluation method	Agarose gel electrophoresis

Acceptance criteria:

- 0.6×: partially recover the 500 bp fragment; recovery of 750–2000 bp fragments should exceed 60%; QC and control batch band patterns should be consistent.
- 0.8×: partially recover the 250 bp fragment; recovery of 400–2000 bp fragments should exceed 60%; QC and control batch band patterns should be consistent.
- 1.0×: recover the 200 bp fragment and most of the 250 bp fragment; QC and control batch band patterns should be consistent.
- 1.2×: partially recover the 150 bp fragment; QC and control batch band patterns should be consistent.
- 1.4×: recover most of the 150 bp fragment, with no or very little 100 bp recovery; QC and control batch band patterns should be consistent.
- 1.6×: recover a small portion of the 100 bp fragment; recovery of fragments 150 bp and above should exceed 60% and approach or exceed 80%; QC and control batch band patterns should be consistent.
- 1.8×: recover the 100 bp fragment with recovery approaching or exceeding 80%; QC and control batch band patterns should be consistent.

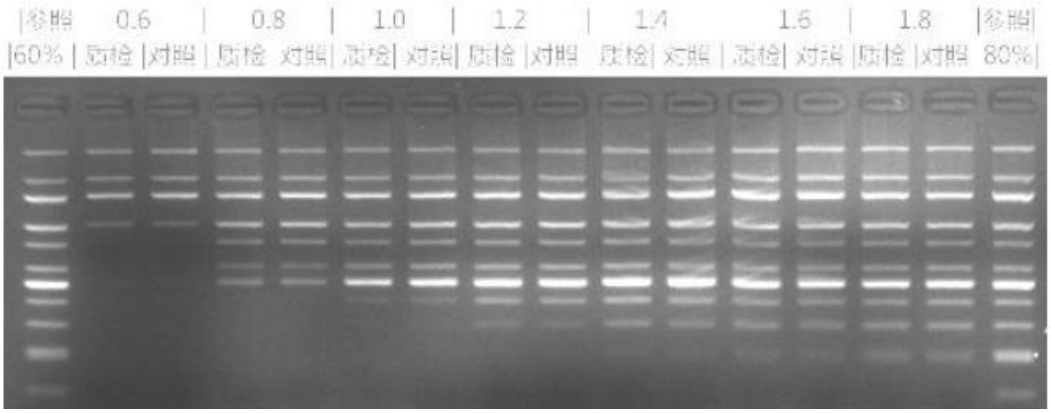

Figure 1. Macro-scale mixed DNA marker size selection using A4XP beads from 0.6× to 1.8× bead ratios.

Conclusion: No obvious difference was observed between the QC batch and the control batch. The QC batch passed this test.

QC Item B: Microscale Mixed DNA Marker Recovery at Different Bead Ratios

This test evaluates microscale recovery of mixed DNA markers at selected bead ratios. The sample consisted of 197 µL purified water, 1.5 µL DL2000 DNA Marker and 1.5 µL 50 bp DNA Marker. The acceptance criterion was that the recovery difference between the QC batch and the control batch should not exceed 3% under the tested ratios.

Batch	Ratio	Qubit (ng/µL)	Yield (ng)	Recovery	Average	Difference vs. Control	QC Result
Original sample	-	1.64	164	-	-	-	-
Control	0.6×	0.570 / 0.588	57.0 / 58.8	34.76% / 35.85%	35.3%	-	-
	0.9×	0.936 / 0.932	93.6 / 93.2	57.07% / 56.83%	57.0%	-	-
	1.2×	1.12 / 1.12	112 / 112	68.29% / 68.29%	68.3%	-	-
	1.8×	1.44 / 1.41	144 / 141	87.80% / 85.98%	86.9%	-	-
QC	0.6×	0.504 / 0.488	50.4 / 48.8	30.73% / 29.76%	30.2%	-5.1%	Not passed*
	0.9×	0.984 / 0.930	98.4 / 93.0	60.00% / 56.71%	58.4%	1.4%	Pass
	1.2×	1.18 / 1.14	118 / 114	71.95% / 69.51%	70.7%	2.4%	Pass
	1.8×	1.43 / 1.42	143 / 142	87.20% / 86.59%	86.9%	0.0%	Pass

***Note:** At 0.6×, the QC batch recovery was lower than the control batch. The report notes that this may have been affected by small elution-volume variation under the 50 µL elution condition. Future QC testing may use 100 µL elution volume to reduce volume-related error.

Conclusion: The QC batch showed no obvious difference from the control batch overall and passed QC evaluation, with the 0.6× result noted for elution-volume-related variation.

QC Item C: Background Nucleic Acid Assessment

This test evaluates whether the A4XP beads contain detectable background nucleic acid.

Batch	Replicate	Qubit Reading (ng/µL)	QC Result
QC batch	1	Too low	Pass
QC batch	2	Too low	Pass
QC batch	3	Too low	Pass
QC batch	4	Too low	Pass
Control batch	1	Too low	-
Control batch	2	Too low	-
Control batch	3	Too low	-
Control batch	4	Too low	-

Conclusion: Qubit readings were below the detectable range, indicating no detectable background nucleic acid under the tested conditions.