

Installation Qualification Protocol

Document # 730004135

Version # 03

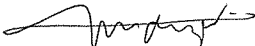
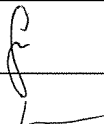
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Appendix A: TRAINING RECORD

Document #	735002010	Document Title	Acquity BSM Pump Automated Final Test	Version	13
				Revision	P

☒ Read and Understood (If self-trained – If not self-trained this section can be deleted)

By signing you acknowledge that you have reviewed, understand, and agree to comply with the policies and practices of the procedure defined above.

Printed Name	Signature	Initials	Date
Joel Mamalateo Deduyo		JMD	21 OCT 2020
Mohammad Shamsul Bin Afandi		MSBA	21 Oct 2020
Ang, Kin Cheong		AKC	21 OCT 2020

Print multiple copies of this Training Record Template as needed

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Waters Corporation - Test Record

Part Number: 186015061
 Operator: 246394
 Serial Number: J20BBS001A
 Test System: TE82943-11
 Test Software: 2.4

Product: Acquity Bio BSM
 Start Time: 10/21/2020, 16:27:
 End Time: 10/21/2020, 18:46:
 Order: N/A
 Location: Flextronics, SG

TMD: TMD010882

TMD: V00

Firmware: 1.72.415 (Aug 27 2018 13:51:50)

Name	LSL	Measurement	USL	Unit	Outcome
Test Electrical Safety					PASS
Test Loader Download					PASS
Test Reboot Firmware for Pump B Download					PASS
Test Firmware Version					PASS
Test Serial Number					PASS
Test Alarms at Bootup					PASS
Test Switch2 Output ON					PASS
Test Switch2 Output OFF					PASS
Test Switch3 Output ON					PASS
Test Switch3 Output OFF					PASS
Test Run Stopped Output ON					PASS
Test Run Stopped Output OFF					PASS
Test Switch1 Output ON					PASS
Test Switch1 Output OFF					PASS
Test Gradient Start Input SHORT					PASS
Test Gradient Start Input OPEN					PASS
Test Stop Flow Input SHORT					PASS
Test Stop Flow Input OPEN					PASS
Test Auxiliary1 Input SHORT					PASS
Test Auxiliary1 Input OPEN					PASS
Test Auxiliary2 Input SHORT					PASS
Test Auxiliary2 Input OPEN					PASS
Test Analog Output2 set to 2.0 VDC	1.9	2	2.1	VDC	PASS
Test Analog Output2 set to 0.0 VDC	-0.1	0	0.1	VDC	PASS
Test Analog Output1 set to 2.0 VDC	1.9	2	2.1	VDC	PASS
Test Analog Output1 set to 0.0 VDC	-0.1	0	0.1	VDC	PASS
Test Leak Detect Connected					PASS
Test Leak Detect Disconnected					PASS
Test Leak Detect Input Low					PASS
Test Leak Detect Input High					PASS
Test Alarms Recheck					PASS
Test Seal Wash Pump Prime/Flow	2	3.3	5	ml/min	PASS
Test Pump A Input 2 Prime with IPA	115	164.2	280	PSI	PASS
Test Pump B Input 2 Prime with IPA	115	153.9	280	PSI	PASS
Test Pump A Input 1 Prime with MeOH	15	44.5	85	PSI	PASS
Test Pump B Input 1 Prime with MeOH	15	41.4	85	PSI	PASS
Test Degasser Pressure	0	0.64	1.3	PSI	PASS
Test Degasser Switch Setting					PASS
Test Pump A Dynamic Leak - Accum. Leak Rate	1	64	150	nL/min	PASS
Test Pump A Dynamic Leak - Accum. Percent of Stroke	-10	25	50	%	PASS
Test Pump A Dynamic Leak - Accum. Max Pressure	14000	14096	15000	psi	PASS
Test Pump A Dynamic Leak - Primary Leak Rate	-50	82	150	nL/min	PASS
Test Pump A Dynamic Leak - Primary Percent of Stroke	-10	25	50	%	PASS
Test Pump A Dynamic Leak - Primary Max Pressure	12000	12062	13000	psi	PASS
Test Pump A Dynamic Leak Low PSI - Accum. Leak Rate	1	7	150	nL/min	PASS

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Test Pump A Dynamic Leak Low PSI - Accum. Percent of Stroke	-10	9	50	%	PASS
Test Pump A Dynamic Leak Low PSI - Accum. Max Pressure	4000	4084	5000	psi	PASS
Test Pump A Dynamic Leak Low PSI - Primary Leak Rate	-50	27	150	nL/min	PASS
Test Pump A Dynamic Leak Low PSI - Primary Percent of Stroke	-10	5	50	%	PASS
Test Pump A Dynamic Leak Low PSI - Primary Max Pressure	2000	2025	3000	psi	PASS
Test Pump B Dynamic Leak - Accum. Leak Rate	1	114	150	nL/min	PASS
Test Pump B Dynamic Leak - Accum. Percent of Stroke	-10	24	50	%	PASS
Test Pump B Dynamic Leak - Accum. Max Pressure	14000	14186	15000	psi	PASS
Test Pump B Dynamic Leak - Primary Leak Rate	-50	55	150	nL/min	PASS
Test Pump B Dynamic Leak - Primary Percent of Stroke	-10	24	50	%	PASS
Test Pump B Dynamic Leak - Primary Max Pressure	12000	12019	13000	psi	PASS
Test Pump B Dynamic Leak Low PSI - Accum. Leak Rate	1	49	150	nL/min	PASS
Test Pump B Dynamic Leak Low PSI - Accum. Percent of Stroke	-10	8	50	%	PASS
Test Pump B Dynamic Leak Low PSI - Accum. Max Pressure	4000	4058	5000	psi	PASS
Test Pump B Dynamic Leak Low PSI - Primary Leak Rate	-50	1	150	nL/min	PASS
Test Pump B Dynamic Leak Low PSI - Primary Percent of Stroke	-10	4	50	%	PASS
Test Pump B Dynamic Leak Low PSI - Primary Max Pressure	2000	2011	3000	psi	PASS
Test Flow Rate Accuracy Pump A 2ml/min	1.98	1.993	2.02	ml/min	PASS
Test Pump A Pressure Ripple	0	12	15	PSI	PASS
Test Flow Rate Accuracy Pump A 0.5ml/min	0.495	0.502	0.505	ml/min	PASS
Test Flow Rate Accuracy Pump B 2ml/min	1.98	1.995	2.02	ml/min	PASS
Test Pump B Pressure Ripple	0	14	15	PSI	PASS
Test Flow Rate Accuracy Pump B 0.5ml/min	0.495	0.502	0.505	ml/min	PASS
Test Flow Rate Accuracy Pump A&B 1.0ml+1.0ml/min	1.98	1.997	2.02	ml/min	PASS
Test High Pressure Flow Pump A&B	9000	10438	14500	PSI	PASS
Test Dynamic Leak Manifold to Filter Tube	0	0.716	1	ul/min	PASS
Test Serial Number Re-verification					PASS
Test Fans					PASS
Test LEDs					PASS

Acquity Bio BSM Final Test Overall Result - PASS

Signed:

(246394)

END OF DATA

Date: 21 Oct 20

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Waters Corporation - Test Record

Part Number: 186015061
 Operator: 246394
 Serial Number: J20BBS001A
 Test System: TE82943-12
 Test Software: 2.4

Product: Acquity Bio BSM
 Start Time: 10/21/2020, 19:25:
 End Time: 10/22/2020, 09:38:
 Order: N/A
 Location: Flextronics, SG

TMD: TMD010882

TMD: V00

Firmware: 1.72.415 (Aug 27 2018 13:51:50)

Name	LSL	Measurement	USL	Unit	Outcome
Test Electrical Safety					PASS
Test Loader Download					PASS
Test Reboot Firmware for Pump B Download					PASS
Test Firmware Version					PASS
Test Serial Number					PASS
Test Alarms at Bootup					PASS
Test Switch2 Output ON					PASS
Test Switch2 Output OFF					PASS
Test Switch3 Output ON					PASS
Test Switch3 Output OFF					PASS
Test Run Stopped Output ON					PASS
Test Run Stopped Output OFF					PASS
Test Switch1 Output ON					PASS
Test Switch1 Output OFF					PASS
Test Gradient Start Input SHORT					PASS
Test Gradient Start Input OPEN					PASS
Test Stop Flow Input SHORT					PASS
Test Stop Flow Input OPEN					PASS
Test Auxiliary1 Input SHORT					PASS
Test Auxiliary1 Input OPEN					PASS
Test Auxiliary2 Input SHORT					PASS
Test Auxiliary2 Input OPEN					PASS
Test Analog Output2 set to 2.0 VDC	1.9	2	2.1	VDC	PASS
Test Analog Output2 set to 0.0 VDC	-0.1	0	0.1	VDC	PASS
Test Analog Output1 set to 2.0 VDC	1.9	2	2.1	VDC	PASS
Test Analog Output1 set to 0.0 VDC	-0.1	0	0.1	VDC	PASS
Test Leak Detect Connected					PASS
Test Leak Detect Disconnected					PASS
Test Leak Detect Input Low					PASS
Test Leak Detect Input High					PASS
Test Alarms Recheck					PASS
Test Seal Wash Pump Prime/Flow	2	3.4	5	ml/min	PASS
Test Pump A Input 2 Prime with IPA	115	163.1	280	PSI	PASS
Test Pump B Input 2 Prime with IPA	115	158.1	280	PSI	PASS
Test Pump A Input 1 Prime with MeOH	15	44.9	85	PSI	PASS
Test Pump B Input 1 Prime with MeOH	15	41	85	PSI	PASS
Test Degasser Pressure	0	0.64	1.3	PSI	PASS
Test Degasser Switch Setting					PASS
Test Pump A Dynamic Leak - Accum. Leak Rate	1	57	150	nL/min	PASS
Test Pump A Dynamic Leak - Accum. Percent of Stroke	-10	25	50	%	PASS
Test Pump A Dynamic Leak - Accum. Max Pressure	14000	14154	15000	psi	PASS
Test Pump A Dynamic Leak - Primary Leak Rate	-50	26	150	nL/min	PASS
Test Pump A Dynamic Leak - Primary Percent of Stroke	-10	25	50	%	PASS
Test Pump A Dynamic Leak - Primary Max Pressure	12000	12058	13000	psi	PASS
Test Pump A Dynamic Leak Low PSI - Accum. Leak Rate	1	6	150	nL/min	PASS

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Test Pump A Dynamic Leak Low PSI - Accum. Percent of Stroke	-10	9	50	%	PASS
Test Pump A Dynamic Leak Low PSI - Accum. Max Pressure	4000	4144	5000	psi	PASS
Test Pump A Dynamic Leak Low PSI - Primary Leak Rate	-50	19	150	nL/min	PASS
Test Pump A Dynamic Leak Low PSI - Primary Percent of Stroke	-10	5	50	%	PASS
Test Pump A Dynamic Leak Low PSI - Primary Max Pressure	2000	2012	3000	psi	PASS
Test Pump B Dynamic Leak - Accum. Leak Rate	1	100	150	nL/min	PASS
Test Pump B Dynamic Leak - Accum. Percent of Stroke	-10	24	50	%	PASS
Test Pump B Dynamic Leak - Accum. Max Pressure	14000	14091	15000	psi	PASS
Test Pump B Dynamic Leak - Primary Leak Rate	-50	53	150	nL/min	PASS
Test Pump B Dynamic Leak - Primary Percent of Stroke	-10	24	50	%	PASS
Test Pump B Dynamic Leak - Primary Max Pressure	12000	12019	13000	psi	PASS
Test Pump B Dynamic Leak Low PSI - Accum. Leak Rate	1	44	150	nL/min	PASS
Test Pump B Dynamic Leak Low PSI - Accum. Percent of Stroke	-10	8	50	%	PASS
Test Pump B Dynamic Leak Low PSI - Accum. Max Pressure	4000	4098	5000	psi	PASS
Test Pump B Dynamic Leak Low PSI - Primary Leak Rate	-50	2	150	nL/min	PASS
Test Pump B Dynamic Leak Low PSI - Primary Percent of Stroke	-10	4	50	%	PASS
Test Pump B Dynamic Leak Low PSI - Primary Max Pressure	2000	2015	3000	psi	PASS
Test Flow Rate Accuracy Pump A 2ml/min	1.98	2.012	2.02	ml/min	PASS
Test Pump A Pressure Ripple	0	5	15	PSI	PASS
Test Flow Rate Accuracy Pump A 0.5ml/min	0.495	0.497	0.505	ml/min	PASS
Test Flow Rate Accuracy Pump B 2ml/min	1.98	2.014	2.02	ml/min	PASS
Test Pump B Pressure Ripple	0	4	15	PSI	PASS
Test Flow Rate Accuracy Pump B 0.5ml/min	0.495	0.503	0.505	ml/min	PASS
Test Flow Rate Accuracy Pump A&B 1.0ml+1.0ml/min	1.98	2.014	2.02	ml/min	PASS
Test High Pressure Flow Pump A&B	9000	10446	14500	PSI	PASS
Test Dynamic Leak Manifold to Filter Tube	0	0.147	1	ul/min	PASS
Test Serial Number Re-verification					PASS
Test Fans					PASS
Test LEDs					PASS

Acquity Bio BSM Final Test Overall Result - PASS

Signed:  (246394)

Date: 22 Oct 20

END OF DATA

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