MesaLabs

QS-505 Validation Summary v1
MagnaAmp Product Line

Executive Summary

The MagnaAmp manufacturing process is validated according to QS-501 *Validation Master Plan for the Mesa Labs, Inc., Bozeman Manufacturing Facility 625 Zoot Way.*

The MagnaAmp manufacturing process, under anticipated conditions, will consistently produce product that meets pre-determined specification requirements.

Process Performance Qualification

Process Performance Qualification (PPQ) conducted under Protocol #PQ171201P *Process Performance Qualification for the Manufacture of MagnaAmp.* This PPQ qualifies manufacturing of all MagnaAmp catalog numbers at 625 Zoot Way, Bozeman MT 59718. Catalog numbers validated under protocol #PQ171201P are:

- MA/4
- MA/5
- MA/6
- MANC

Validation Lots

- MA/6; log 6 50/box and 10 negative controls, Lot MA-296
- MA/6; log 6 50/box and 10 negative controls, Lot MA-297
- MA/6; log 6 50/box and 10 negative controls, Lot MA-298

Rationale for selection of products

MagnaAmp manufacturing is a three-phase process: inoculation of media, ampoule filling/sealing and qualification. The inoculation phase consists of distributing a known quantity of bacteria into MagnaAmp media per LP-201. The inoculated media is dispensed into glass ampoules and flame sealed using liquid filling machines (LFM-101 and LFM-102). Once sealed, the ampoules are subjected to qualification testing consisting of population and steam resistance testing. The results are used to generate the label claim for each lot of MagnaAmp. Satisfactory completion of the qualification testing results in release of MagnaAmp for distribution.

A matrix approach was chosen for validation of the manufacturing process:

- The components used to manufacture these items are representative of the components used to manufacture all variants of the MagnaAmp.
- The organism, *Geobacillus stearothermophilus*, utilized for the validation lots represent the only organism used to manufacture MagnaAmp.
- Three runs were considered sufficient to simulate conditions that will be encountered during routine manufacturing, such as start-up, shut-downs, breaks, and manufacturing over multiple days.

As compared to the manufacturing process prior to transfer to the new facility, there were no changes to the manufacturing process, no changes to specifications, and no changes to components or component suppliers. Procedures were renumbered to align with the quality system, and a number of minor changes occurred to allow for slightly different workflow in the new facility; they otherwise remained unchanged.

Acceptance criteria and results

Three consecutively manufactured lots meeting the criteria provided below were required to confirm that the MagnaAmp manufacturing process, under anticipated conditions, will consistently produce product that meets pre-determined specification requirements.

For the QA final inspection per QSWI-103, the Acceptable Quality Level (AQL) for acceptability of a particular lot's inclusion in this qualification was based on criticality and frequency of the defect. If the lot in question fell within these established limits it was deemed acceptable for use as a validation lot. The defects were divided into two tiers. Defects considered *Critical to Performance* were assigned an AQL of 99%. Defects considered as having *No Impact to Performance* were assigned an AQL of 95%. Results are reported below for each validation lot.

MA/6 Lot MA-296		
Critical to Performance	**Results**	**Pass/Fail**
Population on assayed ampoule must be the targeted population log: Log6	$2.5x10^6$	PASS
Steam D-value must be within the range of 1.5-2.5minutes	1.8 minutes	PASS
Labeling, specific to product traceability (species, lot number and expiration)	0 labeling errors	PASS
No Impact to Performance	**Results**	**Pass/Fail**
Position of print on box label	0 printing errors	PASS
Inclusion of C of A in package	0 packages without a C of A	PASS
Quantity per box: 50ct biological indicators and 10ct negative control/box	0 boxes missing ampoules	PASS

MA/6 Lot MA-297		
Critical to Performance	**Results**	**Pass/Fail**
Population on assayed ampoule must be the targeted population log: Log6	$2.7x10^6$	PASS
Steam D-value must be within the range of 1.5-2.5minutes	1.5 minutes	PASS
Labeling, specific to product traceability (species, lot number and expiration)	0 labeling errors	PASS
No Impact to Performance	**Results**	**Pass/Fail**
Position of print on box label	0 printing errors	PASS
Inclusion of C of A in package	0 packages without a C of A	PASS
Quantity per box: 50ct biological indicators and 10ct negative control/box	0 boxes missing ampoules	PASS

MA/6 Lot MA-298		
Critical to Performance	**Results**	**Pass/Fail**
Population on assayed ampoule must be the targeted population log: Log6	$2.5x10^6$	PASS
Steam D-value must be within the range of 1.5-2.5minutes	2.0 minutes	PASS
Labeling, specific to product traceability (species, lot number and expiration)	0 labeling errors	PASS
No Impact to Performance	**Results**	**Pass/Fail**
Position of print on box label	0 printing errors	PASS
Inclusion of C of A in package	0 packages without a C of A	PASS
Quantity per box: 50ct biological indicators and 10ct negative control/box	0 boxes missing ampoules	PASS

Deviations to protocol

There were no deviations encountered during the execution of protocol PQ171201P.

Method Verification

The following Compendial Method Verifications were completed as part of this protocol:

- Population assay testing of liquid self-contained biological indicators per ISO 11138-1
- Steam resistance testing on liquid self-contained biological indicators per ISO 11138-3

Equipment Qualification

The following equipment qualifications were completed in order to execute this protocol:

Equipment Number	Equipment	Qualification document(s)	Protocol Deviations	Conclusion
KTL-101	Steam Kettle	KTL101-IOQ-101	None	The Steam Kettle has been installed successfully. The installation and operation qualification criteria have been met.
STZ-101	Steam Autoclave	STZ101-IOQ-001	None	The Steam Autoclave has been installed successfully. The installation, operation, and performance criteria have been met.
		STZ101-PQ-004	None	
STZ-102	Steam Autoclave	STZ-102-IOQ-001	None	The Steam Autoclave has been installed successfully. The installation, operation, and performance criteria have been met.
		STZ102-PQ-006	None	

Equipment Number	Equipment	Qualification document(s)	Protocol Deviations	Conclusion
LFM-101	Liquid Filling Machine	LFM101-IOQ-001	None	The Liquid Filling machine has been installed successfully. The installation and operation qualification criteria have been met.
LFM-102	Liquid Filling Machine	LFM102-IOQ-001	None	The Liquid Filling machine has been installed successfully. The installation and operation qualification criteria have been met.
RES-101	Steam Resistometer	RES101-IOQ-001	None	The steam resistometer has been installed successfully. The installation and operation qualification criteria have been met.
RES-103	Steam Resistometer	RES103-IOQ-001	D-001: the resistometer was only qualified up to 132°C instead of 135°C. No impact to PPQ protocol or product	The steam resistometer has been installed successfully. The installation and operation qualification criteria have been met.
INC-103	30-35°C Incubator	INC103-IOQ-001	None	The 30-35°C incubator has been installed successfully. The installation and operation qualification criteria have been met.
INC-105	55-60°C Incubator	INC105-IOQ-001	None	The 55-60°C incubator has been installed successfully. The installation and operation qualification criteria have been met.

Utility Qualification

The following utility qualifications were completed in order to execute this protocol:

System Number	Utility	Qualification document(s)	Protocol Deviations	Conclusion
AIR-101	Compressed Air System	AIR101-IOQ-001	None	The Compressed Air System has been installed successfully. The installation and operation qualification criteria have been met.
STM-101	Steam System	STM101-IOQ-001	None	The Steam System has been installed successfully. The installation and operation qualification criteria have been met.
WPU-101	RO/DI Water System	WPU101-IOQ-001	None	The RO/DI Water System has been installed successfully. The installation and operation qualification criteria have been met.
		WPU101-PQ-002	Six deviations, described below. No impact to protocol	The RO/DI water system meets acceptance criteria. Data confirmed that the system generates water that meets or exceeds Type II RO/DI water specifications

Deviations to WPU101-PQ-001:

- WPU-101-PQ-001-D-01 was opened to document that microbial data gathered before 11Jul2017 were determined to be invalid, as it was discovered that the filters used for testing were not sterile. No impact to the protocol; the required 30 business days of testing was completed.
- WPU101-PQ-001-D-02 was opened for using expired test strips to record the ozone levels. Data were invalidated. No impact to the protocol; the required 30 business days of testing were completed.
- WPU101-PQ-001-D-03 was opened for having a detectable level of ozone present in the water when ozone wasn't being generated. Data was invalidated. No impact to protocol; the reason ozone was detected was that Facilities had run the ozone cycle less than 90 minutes before the testing was performed.
- WPU101-PQ-001-D-04 was opened to document that the form used to record data for this study included an action limit for a sampling point before the RO tanks. No action limit should have been set, as this data was being gathered for information only, is not part of the RO system, and was not included in the performance qualification. No impact to the protocol, as all data required for the protocol were gathered and are reported.

- WPU101-PQ-001-D05 was opened to document that all microbial testing was performed at 10 Evergreen Drive instead of at 625 Zoot Way. No impact to protocol; testing was performed and documented according to procedures and forms identified in the protocol.
- WPU101-PQ-001-D-06 was opened to document that microbial samples were incubated at room temperature instead of in a 20-25°C incubator as specified in the protocol. No impact to protocol; room temperatures were confirmed to have remained within 20-25°C for the period of the study.

Standard Operating Procedures

The protocol was executed under the following standard operating procedures:

Document Number	Revision	Title
LP-203	3	Preparation of Proprietary Media for Product
LP-201	2	Manufacture of MagnaAmp, SterilAmp II and ProSpore
LP-302	2	Resistance Determination of Biological Indicators
LP-301	2	Population Assay of Biological Indicator Products
LP-404	1	Operation of Steam BIERs
LP-410	2	The ProSpore, MagnaAmp and ATSB Filling Machine
AP-201	3	Packaging of Product
QSWI-103	1	QA Release of Finished Product Inventory

Training

The operators in the table below completed qualification training on the SOPs identified above during the PPQ.

Operator	Procedure(s)	Status of read-and-understand training on SOPs	Status of qualification training on SOPs
CV	LP-203, LP-201, LP-301, LP-302,LP-404, LP-410	Complete	Complete
KG	LP-203	Complete	Complete
EA	LP-201, LP-301, LP-302, LP-404	Complete	Complete
MS	LP-201, LP-301, LP-302, LP-404	Complete	Complete
CB	LP-410	Complete	Complete
NA	LP-310	Complete	Complete
NF	AP-201	Complete	Complete
DG	AP-201	Complete	Complete
LG	AP-201	Complete	Complete
AT	AP-201	Complete	Complete
KJ	LP-410	Complete	*In Progress

*KJ is a new operator who is currently going through the qualification process. Any tasks she completed were done in conjunction with her trainer. During the PPQ she completed qualification on LP-410.

Approvals:

Equipment Owner: _____ Date: 20 FEB 2018
Kurt McCauley - Director of Support Services

Process Owner: _____ Date: 21 Feb 2018
Robert Bradley - Director of Production

QA: Janis E Smoke Date: 21 FEB 2018
Janis Smoke - Director of QA/RA