100 Majestic Way, Bangor, PA 18013 / www.biospectra.us

BioSpectra Validation External Report

Validation Protocol for the Manufacture of:

6N HCl in IPA

To be Manufactured as the Following Codes:

6N HCl in IPA Bio Pharma and Below Compliance Grades
IHCL-4100 Through IHCL-41XX

To be Manufactured at:

BioSpectra, Inc., 100 Majestic Way, Bangor,
Pennsylvania, 18013

In Compliance with the Standards of:

IPEC / PQG
Joint Good Manufacturing
Practice Guide

Manufactured to be Suitable for Use as:

GMP Manufactured Chemical

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1. INTRODUCTION

The validation of a manufacturing process used to produce an IPEC Compliant GMP Manufactured Chemical is a requirement under IPEC Guidelines. This External Validation Protocol provides the summary details of the revalidation of BioSpectra's 6N HCl in IPA Process. This validation also describes the process as performed in Process Room N02, of Zone N at the Bangor, PA Facility and in accordance with the approved batch record. This process room is intended to manufacture an IPEC Compliant GMP Manufactured Chemical while complying with IPEC / PQG Joint Good Manufacturing guidelines. The FDA defines validation, specifically process validation as:

"The collection and evaluation of data, from the process design state through commercial production, which establishes scientific evidence that a process is capable of consistently delivering quality product."

This 6N HCl in IPA revalidation was a Concurrent Validation to validate the process performed in Process Room N02 to ensure that the 6N HCl in IPA Bio Pharma Grade process continues to conform to the pre-developed validation parameters after the approval and implementation of two issued change controls since the last validation. A Concurrent Validation is a Validation Study in which the batches can be released for commercial distribution based on the monitoring and analysis of the lot. This Validation required three batches of 6N HCl in IPA to be manufactured.

2. OBJECTIVE

The objective of this Validation Summary Report is to verify and assure that the manufacturing process for 6N HCl in IPA consistently produces material that meets a set of pre-determined specifications as listed in Table 1. This validation was performed due to change controls BCC21-70, Anhydrous Hydrogen Chloride Gas manufacturer and BCC21-95, Isopropyl Alcohol Supply Chain. IPA raw material, manufactured by Exxon Mobil supplied by Univar, will be utilized to validate and qualify the new raw material supply chain.

This validation included three batches of 6N HCl in IPA, manufactured according to the current revision of the Batch Record. This external validation report will summarize the manufacture of the validation batches within the validation study. As stated in the protocol, representative samples were submitted to the QC Laboratory and were tested against Finished Good specifications. This was conducted to verify that the process is capable of consistently producing material that meets Finished Good Specifications.

3. SCOPE:

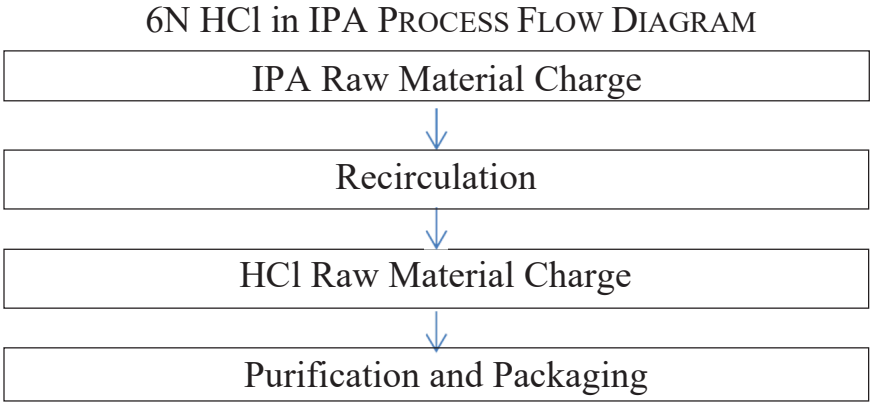
This Report applies to the validation batches of 6N HCl in IPA, Bio Pharma Grade, within this validation study. This batch process includes the following process steps: charging the raw materials, recirculating, Purification, packaging, and the testing of the finished goods. Specifications and approval requirements for all Raw Materials (RM) and components have been created; therefore, these RM and components are not covered by this Report except that only approved RM and components were used.

4. EXECUTIVE SUMMARY

This Validation was performed as required in accordance with BioSpectra's Change Control Procedures. There were two approved process changes that required the revalidation of the manufacturing process. The changes were as follows: The Isopropyl Alcohol Supplier was changed to IPA manufactured by Exxon Mobil and supplied by Univar per BCC21-95. Additionally, the anhydrous hydrogen chloride gas manufacturer changed from Olin Corporation to Niacet per BCC21-70.

The 6N HCl in IPA manufacturing process is a manufacturing/purification process with Critical Process Parameters as detailed in the Validation Protocol. The CPP were developed based on the FMEA analysis conducted for the process and were found to be in accordance with BioSpectra's Manufacturing Process Validation Master Plan. The utilities and process used in the manufacture of this product have been qualified in accordance with BioSpectra's Equipment Qualification Master Plan. The manufacturing of the validation batches for this validation study were deemed successful. The finished goods batches will be released in accordance with the Validation protocol based on the approval of the manufacturing records and associated quality control analysis.

5. PROCESS FLOW DIAGRAM



6. ANALYSIS

The three 6N HCl in IPA validation batches manufactured in accordance with the current 6N HCl in IPA Bio Pharma Grade Batch Record, DCN: *BSI-MPR-0020* has met the BioSpectra analytical requirements associated with Intermediate Product Code: IHCL-4100 and Finished Good Release Code IHCL-4101. The results can be found in Table 2.

TABLE 1: CRITICAL QUALITY ATTRIBUTES (CQA)

CQA	Test Method	Specification
Purity	Appearance and Color	Clear, Colorless to slightly yellowish fuming liquid
	Assay (Acid Titration)	$\geq$ 5.9 N
Impurity	Identification (Chloride)	Passes Test

TABLE 2: COMPOSITE CQA TESTING RESULTS FOR ICHL-4101 PRODUCT CODE

Validation Batch Composite Sample CQA Results				
Analysis	**Specification**	**IHCL-0122-00008-PV Composite**	**IHCL-0122-00009-PV Composite**	**IHCL-0122-00010-PV Composite**
Appearance and Color	Clear, Colorless to slightly yellowish fuming liquid	Clear, Colorless to slightly yellowish fuming liquid	Clear, Colorless to slightly yellowish fuming liquid	Clear, Colorless to slightly yellowish fuming liquid
Assay (Acid Titration)	$\geq$ 5.9 N	6.2 N	6.1 N	6.2 N
Identification (Chloride)	Passes Test	Passes Test	Passes Test	Passes Test

7. ADDITIONAL INFORMATION

7.1. Degradation and Impurity Profile

7.1.1. A Degradation and Impurity profile was performed for this validation in accordance with Degradation and Impurity Profile Protocol, DCN: BSI-PRL-0160. The degradation and impurity profile will be reported on in the Degradation and Impurity Profile Report.

7.2. Stability Study

7.2.1. The Stability Analysis for 6N HCl in IPA consists of an evaluation of the following analyses and associated specifications detailed in Table 3. These analyses were selected based on a combination of the finished goods requirements and Stability Indicating Protocol. The analyses listed below will be performed for each validation batch. There is no long term stability study associated with 6N HCl in IPA.

TABLE 3: STABILITY ANALYSIS

Analysis	Stability Specification
Appearance and Color	Clear, Colorless to slightly yellowish fuming liquid
Assay (Acid Titration)	$\geq$ 5.9 N
Identification (Chloride)	Passes Test

8. CONCLUSION

BioSpectra has manufactured and validated the 6N HCl in IPA manufacturing process in Process Room N02 to be compliant with key compliance grades up to and including the Bio Pharma grade. This Bio Pharma classification requires that the material be manufactured in accordance with IPEC/PQG Joint Good Manufacturing guidelines to be suitable for use as a GMP manufactured Pharma grade material. The results obtained during this validation study and subsequent analysis provide evidence that the 6N HCl in IPA manufactured using the approved process will consistently meet the approved specifications. The utilities and process used in the manufacture of this product have been qualified in accordance with BioSpectra's Equipment Qualification Master Plan. The results reported from the validation batches of 6N HCl in IPA for this Validation Study provided the evidence necessary to confirm that the process for 6N HCl in IPA is a validated process capable of consistently producing Bio Pharma Grade material that meets Finished Good Specifications (IHCL-4101).

All Raw Materials used for the processing of 6N HCl in IPA were approved before use in accordance with RM specifications. The Validation samples of 6N HCl in IPA will be placed into Long Time Stability and will be reported on annually. The data obtained from the Stability Study will be utilized to continue to support the current retest date.