Validation Report
For
Covid-19 Vaccine (PF-07302048, BNT-162) Drug Product – Phase I

AUTHOR:

ISSUED BY:	Project Engineer Launch Excellence – PGS Puurs	[redacted] 12 Feb 2021 14:47:029-0500 REASON: I approve this document. f453dc71-f5d7-4477-b488-53652414f722
NAME	JOB TITLE	SIGNATURE & DATE

The signature of the Author indicates that the information gathered in this document is complete and accurate, that all validation activities and requirements have been identified and the document is written following site validation SOP's.

APPROVALS:

SITE VALIDATION AUTHORITY:

[redacted]	DIRECTOR LAUNCH EXCELLENCE – PGS PUURS	[redacted] 12 Feb 2021 14:55:033-0500 REASON: I approve this document. 824b1985-ec75-4fde-afb6-b591c67508e9
[redacted]	TECHNICAL SERVICES – PGS KALAMAZOO	[redacted] 12 Feb 2021 15:53:012-0500 REASON: I approve this document. e4b27d94-4c88-490a-aa5d-f7ab5ad9073a
NAME	JOB TITLE	SIGNATURE & DATE

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SITE QUALITY AUTHORITY:

NAME	JOB TITLE	SIGNATURE & DATE
[redacted]	QUALITY PROJECTS ASSOCIATE – PGS PUURS	[redacted] 15 Feb 2021 02:36:034-0500 REASON: I approve this document. fa795930-17a4-44e1-9e64-6ec84dde1d46
[redacted]	QUALITY LEAD COVID-19 VACCINE – PGS PUURS	[redacted] 14 Feb 2021 13:40:024-0500 REASON: I approve this document. 57628d88-a556-4074-940a-7a29bc3d13cd
[redacted]	MGR QUALITY OPERATIONS– PGS KALAMAZOO	[redacted] 12 Feb 2021 18:19:004-0500 REASON: I approve this document. bcf9b9f3-dcbe-4cfe-a38a-d0dfba6a6f4c

The signature of the Site Quality Authority indicates that this document has been reviewed for Regulatory Compliance Practices and meets Good Documentation Practices and site validation SOP's.

EXTERNAL COMPANY AUTHORITY:

BIONTECH	[redacted] ASSOCIATE DIRECTOR GLOBAL CMC	
NAME OF EXTERNAL COMPANY	NAME & JOB TITLE EXTERNAL COMPANY REPRESENTATIVE	SIGNATURE & DATE

The signature of the External Company Representative indicates that the information in the document comply with the requirements and is correct from a technical standpoint.

VERIFICATION OF EXTERNAL APPROVAL:

SITE QUALITY AUTHORITY:

[redacted]	QUALITY PROJECTS ASSOCIATE – PGS PUURS	[redacted] 15 Feb 2021 02:36:034-0500 REASON: I approve this document. fa795930-17a4-44e1-9e64-6ec84dde1d46
NAME	JOB TITLE	SIGNATURE & DATE

The signature of the Site Quality Authority indicates that this document has been reviewed by the External Company Authority and the External Company approval is attached to this document.

This document is valid as from the date of the last signature.

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1. Introduction

1.1 Purpose

This document describes the holistic process validation approach for Phase I of Covid-19 Vaccine (PF-07302048, BNT-162) drug product formulation and fill/finish processes in PGS Puurs, PGS Kalamazoo, Dermapharm and Polymun CMO to support potential emergency use of supplies. The following supply nodes are in scope of this document:

- Supply 1 (PGS Puurs): Formulation in Vaccine Cell 2 (booth 3 and 4), Filling at Focus Cell 2, Inspection at Focus Cell 2, packaging in Focus Cell area and freezing in Logistics 2
- Supply 2: Formulation by Polymun, transport to PGS Puurs, sterile filtration in formulation booths 7 or 10, Filling on WSL5, Inspection and packaging on IL7 and freezing in Logistics 2
- Supply 3: Formulation by Dermapharm, transport to PGS Puurs, sterile filtration in formulation booths 7 or 10, Filling on WSL5, Inspection and packaging on IL7 and freezing in Logistics 2
- Supply 4 (PGS Kalamazoo): Formulation in Biologics Operations, Filling at Line 8, Inspection at Line 9, packaging at Line 82 and freezing in Building 41 Warehouse
- Supply 5 (PGS Kalamazoo): Formulation in Biologics Operations, Filling at Line 18, Inspection at Line 12, packaging at Line 82 and freezing in Building 41 Warehouse

The project described is the first phase of the validation of these different supply nodes for manufacturing the Covid-19 Vaccine. The first phase includes manufacturing of 1 batch at each supply node. In a later phase, the full validation of all supply nodes will be completed. The phased approach is established to ensure having process validation data of each individual supply node as soon as possible that can support the 'Emergency Use Authorization' (EUA) and conditional approval applications. The Phase I and Phase II process validation campaigns are separated by continued EUA manufacturing. Changes in between Phase I and Phase II will be assessed through change management procedures.

The project described is covered by the referenced CRFs (cf. ref. 1-3 and ref. 7).

In the conclusion of this report it is determined whether the process validation activities of phase I and all other studies per referenced protocol for process validation of Covid-19 Vaccine (PF-07302048, BNT-162) are successful.

1.2 Project Scope

1.2.1. General description

The scope of the validation is covered by the different CRFs (cf. ref 1-3 and ref. 7). This Validation plan provides the rationale for the validation approach. A summary of the process in scope can be found in the process definition document (cf. Ref 4) and is shown in Table 1.

The BNT162b2 drug product is prepared as a preservative-free, sterile, multi-dose concentrate of RNA-containing lipid nanoparticles (LNP) formulated in phosphate-buffered saline and 300 mM sucrose at pH 7.4 to be diluted for intramuscular administration. The drug product is filled at 0.45

mL/vial (0.5 mg/mL) into 2 mL glass vials which are stoppered and capped to provide total of 225 µg of the RNA in a multi-dose vial. At the administration site, the vaccine drug product is diluted with 0.9% sodium chloride and is intended to supply 5 to 6 doses per vial at 30 µg/dose.

Table 1: Process overview

Step	Process Inputs	Process Step
1	[redacted]	
2		
3		
4		
5		
6		

Step	Process Inputs	Process Step
OPT	[redacted]	
7		
8		
9		
10		
11		

1.2.2. Out of Scope

Validation activities for introduction of the product into other areas are out of scope of this document.

2. References

This validation plan is aligned with the SOP 51080 (Puurs), and SOP 25091 (Kalamazoo) and the therein-referenced quality standards.

The project is covered by the following documents:

Table 2:List of References

Ref N°	Document ID	Document	Approval date	Author	Location	Remarks
Ref. 1	CRF PR4953874	Introduction of COVID-19 Vaccine PF-07302048	14/08/2020	[redacted]	gQTS	NA
Ref. 2	CRF PR5336199	Validation of the manufacturing with supplied Covid vaccine Bulk Product at PGS Puurs	17/11/2020	[redacted]	gQTS	NA
Ref. 3	CRF PR5351233	Pfizer Kalamazoo Drug Product Project Validation Plan BNT162b2 Drug Product Formulation, Filtration, Filling, Inspection, Packaging and Freeze Storage	03/11/2020	[redacted]	gQTS	NA
Ref. 4	INX10042 6829 v3.0	Process Definition Document for PF-07302048 BNT162b2 Vaccine (SARS-CoV-2 full spike protein S-P1 variant)	22/10/2020	[redacted]	GDMS	NA
Ref. 5	20043-COVAL-RAT0-A2	Rational for Concurrent Validation Approach for Covid-19 Vaccine	19/11/2020	[redacted]	QA archive	NA
Ref. 6	SOP 25091 v18.0	Process Validation Requirements	28/07/2020	[redacted]	PDOCS	NA
Ref. 7	CRF PR5485842	Pfizer Kalamazoo Drug Product Project Validation Plan BNT162b2 Drug Product Formulation, Filtration, Filling, Inspection, Packaging and Freeze Storage	20/12/2020	[redacted]	gQTS	NA
Ref. 8	VAL10013 0986	Process Validation Plan For Covid-19 Vaccine (PF-07302048, BNT-162) Drug Product – Phase I	19/11/2020	[redacted]	GDMS	NA

3. Overall results

3.1 Comparability

An overview of the validation lots is shown in Table 3.

Table 3: List of Supply Nodes and Lots Number

Supply node	Lot Number
Supply 1 (PGS Puurs): Formulation in Vaccine Cell 2 (booth 3 and 4), Filling at Focus Cell 2, Inspection at Focus Cell 2, packaging in Focus Cell area and freezing in Logistics 2	EL1491
Supply 2: Formulation by Polymun, transport to PGS Puurs, sterile filtration in formulation booths 7 or 10, Filling on WSL5, Inspection and packaging on IL7 and freezing in Logistics 2	EL7834

Supply 3: Formulation by Dermapharm, transport to PGS Puurs, sterile filtration in formulation booths 7 or 10, Filling on WSL5, Inspection and packaging on IL7 and freezing in Logistics 2	EK4242
Supply 4 (PGS Kalamazoo): Formulation in Biologics Operations, Filling at Line 8, Inspection at Line 9, packaging at Line 82 and freezing in Building 41 Warehouse	EL3248
Supply 5 (PGS Kalamazoo): Formulation in Biologics Operations, Filling at Line 18, Inspection at Line 12, packaging at Line 82 and freezing in Building 41 Warehouse	EL3249

In Attachment 1, an overview of the Covid-19 Vaccine release results, Critical Process Parameters (CPPs) and In process Controls (IPCs) are shown for the five validation lots. All the results of the validation lots complied with the release specifications (Attachment 1), CPPs and IPCs were evaluated against their operating ranges.

Furthermore, additional samples were taken in the five validation lots at beginning, middle and end of the process to evaluate the inter lot variability. Results are shown in Table 4 and were all within specification.
Furthermore, interval plots with a 95% confidence interval (CI) were performed to evaluate the inter lot variability between the 5 validation lots. Beginning, middle and end results were pooled per lot. The registered acceptance criteria are shown on the interval plots, figure 1. For [redacted], [redacted] and [redacted], an overlap is shown between the 95% CI. For [redacted], the 95% CI overlapped with the specification. However, a wide 95% CI for EK4242 lot is seen due to the low resolution of the data (which is caused by rounding of the reported values to 1 decimal point), the limited data points and the non-normality. For the [redacted], the 95% CI did not overlap for all batches. However, the confidence intervals were very narrow. Based on visual evaluation, no practical relevant difference is seen in the results obtained; therefore, the lots are comparable. Furthermore, all results were within specifications.

Table 4: Results of CQAs to evaluate inter batch variability.

	Limit	*EL1491*			*EK4242*			*EL7834*			*EL3248*			*EL3249*		
		Begin	*Middle*	*End*	*Begin*	*Middle*	*End*	*Begin*	*Middle*	*End*	*Begin*	*Middle*	*End*	*Begin*	*Middle*	*End*
LNP size (nm)	[redacted]															
LNP polydispersity																
RNA encapsulation (%)																
RNA content (mg/ml)																
ALC-0315 content (mg/ml)																
ALC-0159 content (mg/ml)																
DSPC content (mg/ml)																
Cholesterol content (mg/ml)																

*The specification of LNP size was adjusted after manufacturing of the batches from 40-180 nm to 40-120 nm.

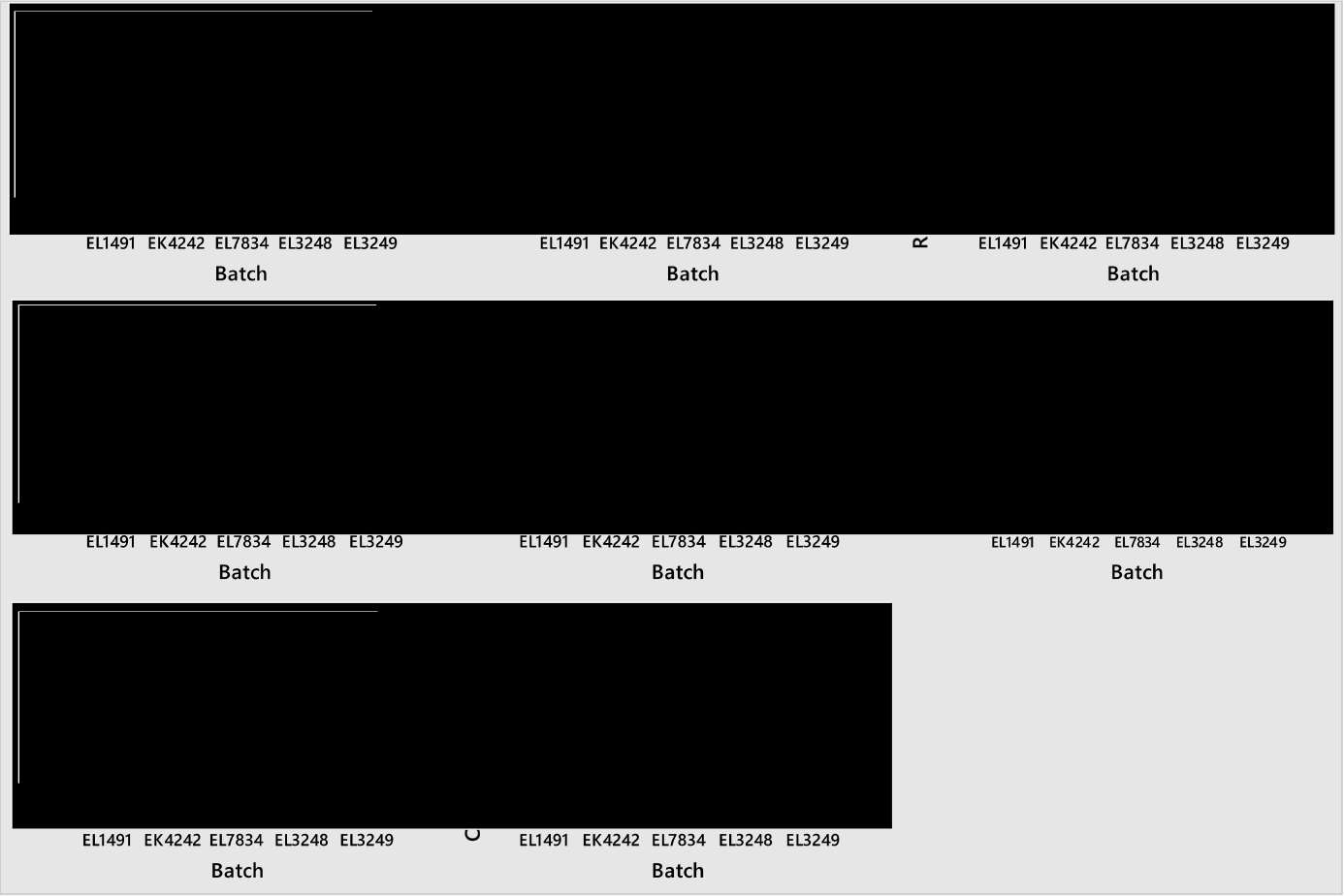

Figure 1: Interval plots to evaluate inter batch variability.

3.2 Validation deliverables

The deliverables are identified in the table below. The validation plan requires one process validation protocol per site to be issued prior to start of the batches in scope of each protocol. The concurrent validation approach dictates an interim report for each PV batch. An overall report per site was compiled that summarizes all evaluations and contains a comparability assessment of the data of all batches manufactured. Finally, a concluding report linked to this plan were written that summarizes all findings from the different validation reports.

Table 5: List of deliverables

Document ID	Document	Due Date/ Approval date	Author	Location	Remarks
20043-COVID-PRP0-A1	Process Validation Protocol For Introduction of Covid-19 Vaccine (PF-07302048, BNT-162) into PGS Puurs	20/11/2020	[redacted]	QA Archive	NA
PR 5408085	Network Process Validation Protocol For Covid-19 (PF-07302048, BNT162b2) Vx in Pfizer Kalamazoo (Phase 1)	21/11/2020	[redacted]	gQTS	NA
V-PS-118-02	Process validation protocol for CorVac Vaccination (Der-BNT162b2)	20/11/2020	[redacted]	Dermapharm QA archive	NA
BCV/VP/003-01	Process Validation Plan (Phase I Network PPQ) BNT162 LNP Preparation and Bulk DP Filling Manufacturing Process	20/11/2020	[redacted]	Polymun QA archive	NA
20043-COVID-PRRA-A1	Interim Process validation Interim Reports for Introduction of Covid-19 Vaccine (PF-07302048, BNT-162) in Pfizer Puurs (Phase I) - Batch EK4242 & EL7834	28/12/2020	[redacted]	QA Archive	Different docID as mentioned in validation plan
20043-COVID-PRRB-A1	Interim Process validation Interim Reports for Introduction of Covid-19 Vaccine (PF-07302048, BNT-162) in Pfizer Puurs (Phase I) - Batch EL1491	23/12/2020	[redacted]	QA Archive	Different docID as mentioned in validation plan
PR 5500322	Pfizer Kalamazoo Drug Product PPQ Protocol – Data Summary BNT162b2 COVID-19 Vx (PPQ1) (EL3224, EL3231, EL3248)	31/12/2020	[redacted]	gQTS	NA

Document ID	Document	Due Date/ Approval date	Author	Location	Remarks
PR 5500323	Pfizer Kalamazoo Drug Product PPQ Protocol – Data Summary BNT162b2 COVID-19 Vx (PPQ2) (EL3225, EL3232, EL3249)	31/12/2020	[redacted]	gQTS	NA
20043-COVID-PRRC-A1	Process validation Report for the Covid-19 Vaccine (PF-07302048, BNT-162) in Pfizer Puurs (Phase I)	25/01/2021	[redacted]	QA Archive	Different docID as mentioned in validation plan
PR 5408086	Network Process Validation Report For Covid-19 (Pf-07302048, BNT162b2) Vx In Pfizer Kalamazoo (Phase 1)	25/02/2021	[redacted]	gQTS	NA
V-PS-118-02	Process Validation Report for CorVac Vaccination (Der-BNT162b2)	02/02/2021	[redacted]	Dermapharm QA Archive	NA
BCV/VR/003-01	Process Validation Report (Phase I Network PPQ) BNT162 LNP Preparation and Bulk DP Filling Manufacturing Process	19/01/2021	[redacted]	Polymun QA Archive	NA
VAL100136132	Validation report Covid-19 Vaccine (PF-07302048, BNT-162) Drug Product (Phase I)	This document	TBD	GDMS	NA

4. Overall deviation discussion

In the site validation reports, a summary of the deviations is included and the evaluation on their impact on validation. There are no open deviations in the underlying reports.

5. Overall conclusion

The process validation activities as per referenced Process Validation Plan for Phase I of Covid-19 Vaccine (PF-07302048, BNT-162) drug product formulation and fill/finish processes in PGS Puurs, PGS Kalamazoo, Dermapharm and Polymun CMO to support potential emergency use of supplies were successful and the release results for the validation lots manufactured by the different supply nodes were comparable. In the Phase II, a full validation per node will be performed.

The remarks left, if any, have no impact on the quality of the product and GMP requirements.

General conclusion: ***PASS***

6. Glossary

ACMF	Andover Clinical Manufacturing Facility
BLA	Biologics license application
BNT	BioNTech
CI	Confidence Interval
CMO	Contract Manufacturing Organisation
CPP	Critical Process Parameter
CQA	Critical Quality Attribute
CRF	Change Request Form
DER	Dermapharm
DP	Drug Product
EUA	Emergency Use Authorization
FC	Focus Cell
gQTS	global Quality Tracking System
IPC	In Process Control
IL	Inspection Line
LNP	Lipid Nano Particles
MAA	Marketing Authorization Application
PGS	Pfizer Global Supply
PLY	Polymun
PV	Process validation
RNA	Ribonucleic Acid
SOP	Standard Operating Procedure
VC	Vaccine Cell
WSL	Washing and Sterilisation Line

7. Attachments

Attachment 1 – Overview of release results and CPPs/IPCs
Attachment 2 – Data verification table KZO and Puurs parameters
Attachment 3 – Data verification PLY parameters
Attachment 4 – Data verification DER parameters

Attachment 5 – Signed approval page from the external company

8. Document History

Version:	Author:	Last edited on:
1.0	[redacted]	*12/02/2021*
Initial document		

Attachment 1 to VAL100136132

[redacted] 12 Feb 2021 14:47:029-0500
REASON: I approve this document.

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1. Overview of release results

Method	Procedure	Limits on LIMS test plan	EL1491	EK4242	EL7834	EL3248	EL3249
Appearance	TM100010539	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension
Appearance (Visible particulates)	TM100010539	May contain white to off white opaque amorphous particles	Meets test	Meets test	Meets test	Meets test	Meets test
Subvisible particles	USP<787> TM100010541	Particles ≥10 µm: [redacted] per container	[redacted] particles/container	particles/container	particles/container	particles/container	particles/container
		Particles ≥25 µm: [redacted] per container	[redacted] particles/container	particles/container	particles/container	particles/container	particles/container
pH	TM100010538	6.9 – 7.9	7.2	7.2	7.2	7.0	7.1
Osmolality	TM100010540	[redacted]					
LNP size	TM100010649						
LNP polydispersity	TM100010649						
RNA encapsulation	TM100010402						
RNA content	TM100010402						
ALC-0315 content	TM100010322						
ALC-0159 content	TM100010322						
DSPC content	TM100010322						
Cholesterol content	TM100010322						
Lipids Identity	TM100010322						

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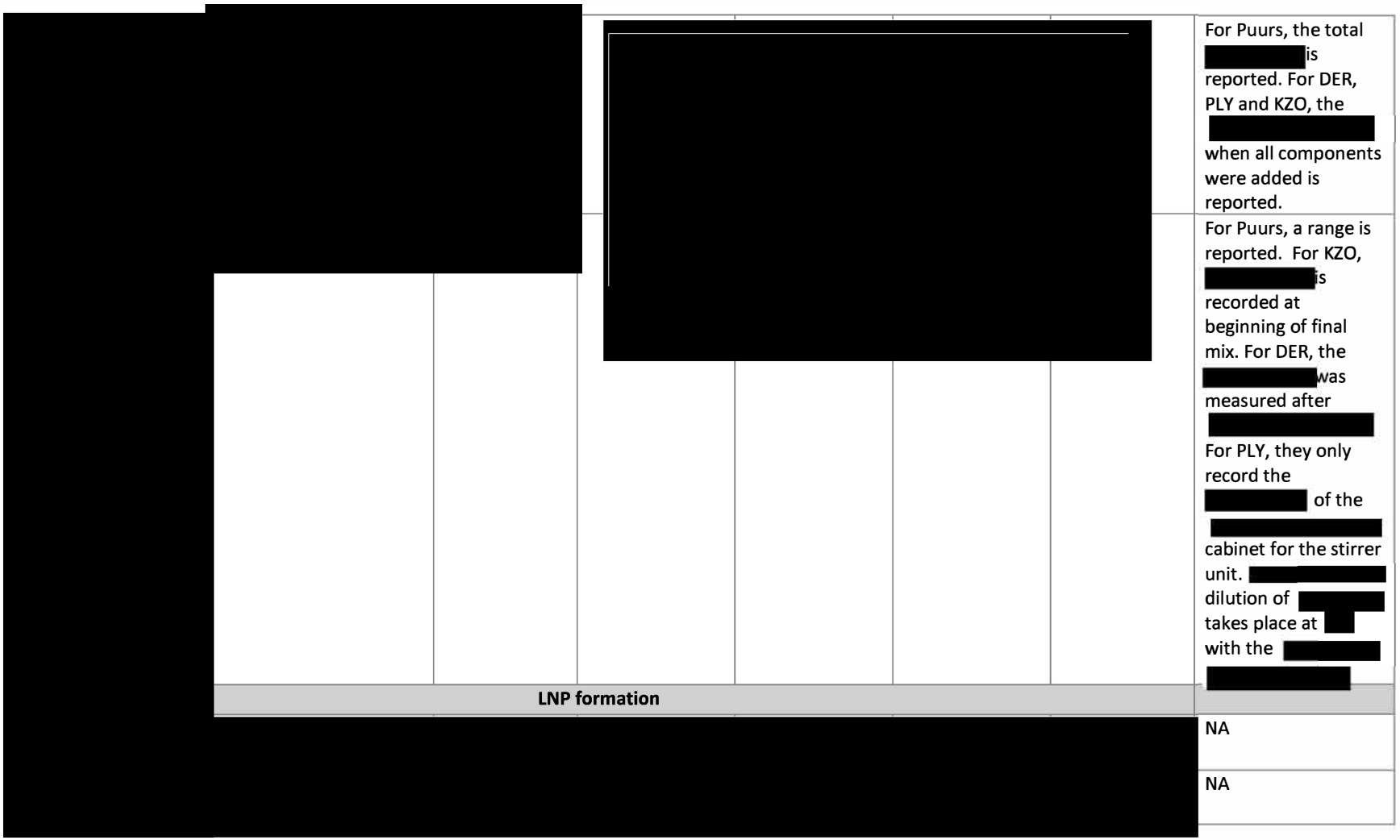
Method	Procedure	Limits on LIMS test plan	EL1491	EK4242	EL7834	EL3248	EL3249
Container Content for injections	TM100010614	Not less than the sum of the nominal volumes of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses
Identity of encoded RNA sequence	TM100010407	Identity confirmed	Confirmed	Confirmed	Confirmed	Confirmed	Confirmed
In Vitro Expression	TM100010380	[redacted]					
RNA integrity	TM100010392						
Bacterial Endotoxin	LAB-36816	[redacted]					
Sterility	LAB-37166	No growth detected	Meets test	Meets test	Meets test	Meets test	Meets test

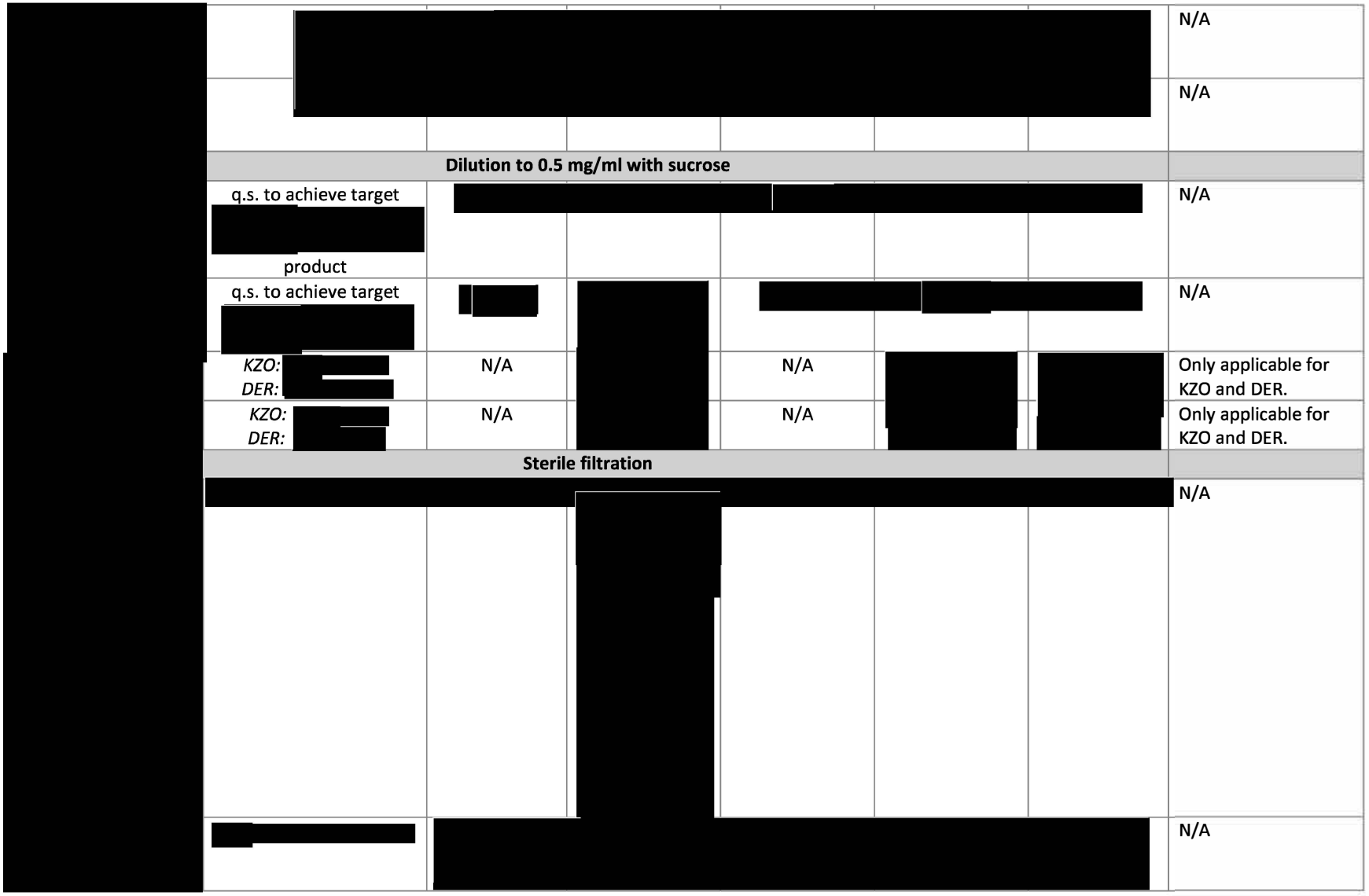
*The specification of LNP size was adjusted after manufacturing of the batches from 40-180 nm to 40-120 nm.

2. CPPs

CPPs (italic = nonCPP)	Operating range	EL1503 (Puurs)	EK4233 (DER: 201113)[1]	EK4234 (PLY: BCV4/L15)[1]	EL3224/EL3231 (KZO: Line 8)	EL3225/EL3232 (KZO: Line 18)	Comments
		EL1491	EK4242	EL7834	EL3248	EL3249	
	Dispensing and sampling lipids						
[redacted]	per unit formula	[redacted]					N/A
	per unit formula						N/A
	per unit formula						N/A
	per unit formula						N/A
	DS dilution (T4)						
	[redacted]	[redacted]					N/A
		[redacted]					[redacted]
		N/A	N/A	[redacted]	N/A	N/A	Only applicable for PLY.
		N/A	N/A		N/A	N/A	Only applicable for PLY.
		N/A	N/A	N/A	[redacted]		Only applicable for KZO.
	Organic Phase Preparation (T1)						
	[redacted]	[redacted]					N/A

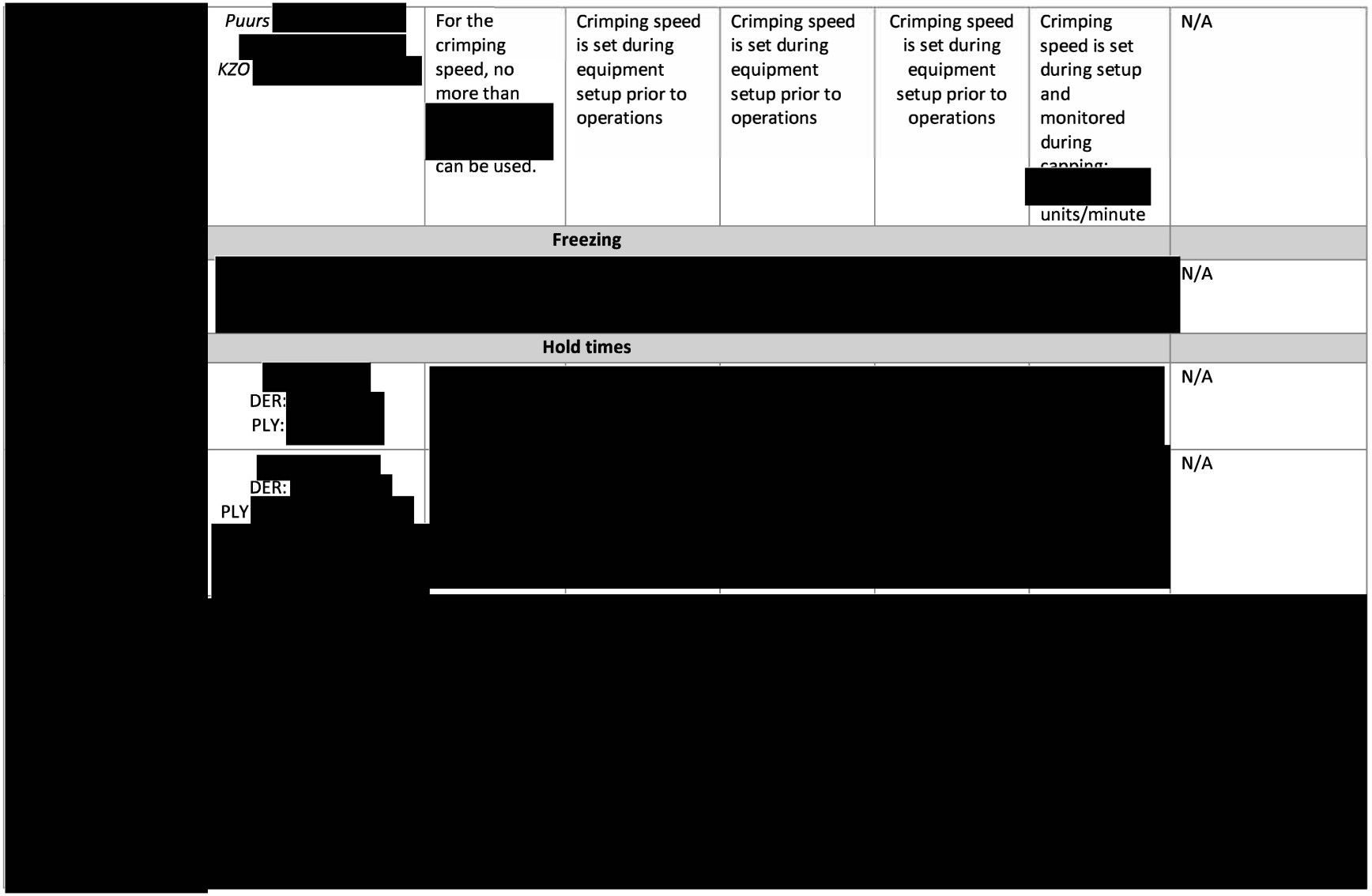


[redacted]	Conform [redacted]	Conform [redacted]	N/A (citrate added in step 2)	Conform [redacted]	Conform [redacted]	[redacted]s used during LNP process. For PLY, this parameter is not applicable.
	Target: [redacted] mL/min	Target: [redacted] mL/min	Target: [redacted] mL/min	Target: [redacted] mL/min	Target: [redacted] mL/min	[redacted] is used during LNP process in Puurs and KZO.
	Target: [redacted] mL/min	Target: [redacted] mL/min	Target [redacted] mL/min	Target: [redacted] mL/min	Target: [redacted] mL/min	[redacted] is used during LNP process in Puurs and KZO.
	Conform [redacted]	Conform [redacted]	Conform [redacted]	Conform [redacted]	Conform [redacted]	[redacted] is used during LNP process.
	[redacted]					For Puurs, PLY and DER, a [redacted] range during the LNP process is reported. For KZO, it is the [redacted] of a single time point.
	TFF					
	[redacted]					N/A
						N/A
						Different membranes with different membrane areas are used between sites.



[redacted]	[redacted]				N/A
					N/A
	Dilution to 0.5 mg/ml with sucrose				
	q.s. to achieve target [redacted] product	[redacted]			N/A
	q.s. to achieve target [redacted]	[redacted]			N/A
	KZO: [redacted] *DER:* [redacted]	N/A	N/A	[redacted]	Only applicable for KZO and DER.
	KZO: [redacted] *DER:* [redacted]	N/A	N/A	[redacted]	Only applicable for KZO and DER.
	Sterile filtration				
	[redacted]				N/A
	[redacted]	[redacted]			N/A

[redacted]	[redacted]					N/A
	Filling, stoppering and capping					
	[redacted]					N/A
	(Challenged time)		(Challenged time)	(Challenged Time)	(Challenged Time)	N/A
	[redacted]					N/A
	Puurs: [redacted] *Puurs:* [redacted] *KZO*					N/A
	Puurs [redacted] KZO: [redacted]	Fixed setting which is monitored during PM.	N/A	N/A	N/A	[redacted] Crimping pressure is only applicable in lot [redacted] n Puurs and [redacted] in KZO.
	KZO: [redacted]	N/A	N/A	N/A	[redacted]	N/A Only applicable for [redacted] n KZO.
	KZO: [redacted]	N/A	N/A	N/A	[redacted]	N/A Only applicable for [redacted] n KZO.
	KZO [redacted] Puurs: [redacted] force: [redacted]	N/A	Spring forces in rolling heads and plateaus are verified/adjusted/set during PM. This ensures the required differential [redacted]	Spring forces in rolling heads and plateaus are verified/adjusted/set during PM. This ensures the required differential	[redacted]	N/A Only applicable for [redacted] n Puurs and [redacted] in KZO.



[redacted]	*Puurs* [redacted] *KZO* [redacted]	For the crimping speed, no more than [redacted] can be used.	Crimping speed is set during equipment setup prior to operations	Crimping speed is set during equipment setup prior to operations	Crimping speed is set during equipment setup prior to operations	Crimping speed is set during setup and monitored during capping: [redacted] units/minute	N/A
	Freezing						
	[redacted]						N/A
	Hold times						
	DER: [redacted] PLY: [redacted]	[redacted]					N/A
	DER: [redacted] PLY [redacted]						N/A
	[redacted]						

Attachment 1 to VAL100136132

[1]The DER and PLY batch number changed when arrived in Puurs. Both batch numbers are indicated.

3. IPCs

[redacted]	Acceptance criterion	EL1503	EK4233 (DER: 201113)	EK4234 (PLY: BCV4/L15)	EL3224/EL3231 (KZO: Line 8)	EL3225/EL3232 (KZO: Line 18)	Comments
		EL1491	EK4242	EL7834	EL3248	EL3249	
	Formulation						
	[redacted]						
	[redacted]						

[redacted]

[redacted]	Pass	PASS	N/A	N/A	PASS	PASS	[redacted]
		PASS	PASS	PASS	PASS	FAIL	
	Pass	PASS	N/A	N/A	PASS	PASS	
		PASS	PASS	PASS	PASS	PASS	
	[redacted]	0	0	0	0	0	N/A
	FILLING						
	[redacted]						NA
	Bulk DP (IPC6)						
	[redacted]	N/A	PASS	PASS	N/A	N/A	Only performed by DER and PLY.

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RNA identification	[redacted]	N/A	N/A	PASS	N/A	N/A	Only performed by PLY.
RNA content*	[redacted]	[redacted]					N/A
RNA integrity		N/A	[redacted]		N/A	N/A	Only performed by DER and PLY.
RNA encapsulation*		[redacted]					N/A
ALC-0315 content*							N/A
ALC-0159 content*							N/A
DSPC content*							N/A
Cholesterol content*							N/A
Lipids identification*		N/A	Pass	Pass	N/A	N/A	Only performed by DER and PLY.
Particle size*		[redacted]					N/A
Polydispersity index*							N/A
pH*							N/A
Osmolality*							N/A
Bioburden		N/A	[redacted]		N/A	N/A	Only performed by DER and PLY.
Endotoxin		N/A	[redacted]	N/A	N/A	N/A	Only performed by DER and PLY.

All tests in italic are IPT-M tests, for monitoring purposes.

* For Puurs and Kalamazoo bulks, results of additional tests on diluted bulk are shown.

**The specification of LNP size was adjusted after manufacturing of the batches from 40-180 nm to 40-120 nm.

[redacted] 12 Feb 2021 14:47:029-0500
REASON: I approve this document.
f453dc71-f5d7-4477-b488-53652414f722

Attachment 2 to VAL100136132

Data description	Reference in report	Data source	Reference to data source	Data collector	Verifier
Begin Middle End result	*Table 4 and Figure 1*	*Site specific reports*	*EL1491/EK4242/EL7834: 20043-COVID-PRRC-A1* *EL3248/EL3249:* PR5408086	*EL1491/EK4242/EL7834:* [redacted] 12 Feb 2021 13:02:006-0500 REASON: I approve this document. f453dc71-f5d7-4477-b488-53652414f722 *EL3248/EL3249:* [redacted] 12 Feb 2021 13:09:016-0500 REASON: I approve this document. fce508f8-83d5-4c5a-9c67-5fad7fa11aeb	*EL1491/EK4242/EL7834:* [redacted] 12 Feb 2021 14:31:027-0500 REASON: I approve this document. fe405f8b-e37a-4f81-b994-976755ca259d *EL3248/EL3249:* [redacted] 12 Feb 2021 13:59:033-0500 REASON: I approve this document. e4b27d94-4c88-490a-aa5d-f7ab5ad9073a
Release results	*Attachment 1*	*Site specific reports*	*EL1491/EK4242/EL7834: 20043-COVID-PRRC-A1* *EL3248/EL3249:* PR5408086	*EL1491/EK4242/EL7834:* [redacted] 12 Feb 2021 13:02:006-0500 REASON: I approve this document. f453dc71-f5d7-4477-b488-53652414f722 *EL3248/EL3249:* [redacted] 12 Feb 2021 13:09:016-0500 REASON: I approve this document. fce508f8-83d5-4c5a-9c67-5fad7fa11aeb	*EL1491/EK4242/EL7834:* [redacted] 12 Feb 2021 14:31:027-0500 REASON: I approve this document. fe405f8b-e37a-4f81-b994-976755ca259d *EL3248/EL3249:* [redacted] 12 Feb 2021 13:59:033-0500 REASON: I approve this document. e4b27d94-4c88-490a-aa5d-f7ab5ad9073a
Release data KZO IVE	*Attachment 1*	*EL3231/EL3232*	*Lot Specific COA*	*EL3231/EL3232:* [redacted] 12 Feb 2021 13:09:016-0500 REASON: I approve this document. fce508f8-83d5-4c5a-9c67-5fad7fa11aeb	*EL3231/EL3232:* [redacted] 12 Feb 2021 13:59:034-0500 REASON: I approve this document. e4b27d94-4c88-490a-aa5d-f7ab5ad9073a

CPPs	*Attachment 1*	*Site specific reports*	*EL1491/EK4242/EL7834: 20043-COVID-PRRC-A1* *EL3248/EL3249:* PR5408086	*EL1491/EK4242/EL7834:* [redacted] 12 Feb 2021 13:02:006-0500 REASON: I approve this document. f453dc71-f5d7-4477-b488-53652414f722 *EL3248/EL3249:* [redacted] 12 Feb 2021 13:09:016-0500 REASON: I approve this document. fce508f8-83d5-4c5a-9c67-5fad7fa11aeb	*EL1491/EK4242/EL7834:* [redacted] 12 Feb 2021 14:31:027-0500 REASON: I approve this document. fe405f8b-e37a-4f81-b994-976755ca259d *EL3248/EL3249:* [redacted] 12 Feb 2021 14:45:045-0500 REASON: I approve this document. 717a6864-188c-4c89-91d9-a2097d49febd
Mixing time T1 EL3225/EL3232	*Attachment 1*	*Batch Record*	*Batch records EL3225/EL3232*	[redacted] 12 Feb 2021 13:09:016-0500 REASON: I approve this document. fce508f8-83d5-4c5a-9c67-5fad7fa11aeb	[redacted] 2 Feb 2021 14:45:045-0500 REASON: I approve this document. 717a6864-188c-4c89-91d9-a2097d49febd
IPCs	*Attachment 1*	*Site specific reports*	*EL1491/EK4242/EL7834: 20043-COVID-PRRC-A1* *EL3248/EL3249:* PR5408086	*EL1491/EK4242/EL7834:* [redacted] 12 Feb 2021 13:02:006-0500 REASON: I approve this document. f453dc71-f5d7-4477-b488-53652414f722 *EL3248/EL3249:* [redacted] 12 Feb 2021 13:09:016-0500 REASON: I approve this document. fce508f8-83d5-4c5a-9c67-5fad7fa11aeb	*EL1491/EK4242/EL7834:* [redacted] 2 Feb 2021 14:31:027-0500 REASON: I approve this document. fe405f8b-e37a-4f81-b994-976755ca259d *EL3248/EL3249:* [redacted] 2 Feb 2021 14:45:045-0500 REASON: I approve this document. 717a6864-188c-4c89-91d9-a2097d49febd

Hold times KZO	*Attachment 1*	*Site Specific Reports and Batch Records*	*Batch Records:* EL3224/EL3231/EL3248 EL3225/EL3232/EL3249 *Site Specific Reports:* PR5500322/PR5500323	[redacted] 12 Feb 2021 14:45:045-0500 REASON: I approve this document. 717a6864-188c-4c89-91d9-a2097d49febd	[redacted] 12 Feb 2021 13:59:034-0500 REASON: I approve this document. e4b27d94-4c88-490a-aa5d-f7ab5ad9073a

[redacted] 2 Feb 2021 14:47:029-0500
REASON: I approve this document.
f453dc71-f5d7-4477-b488-53652414f722

Polymun Scientific GmbH
Donaustrasse 99, AT-3400 Klosterneuburg
Tel.: +43 2243 / 25060 - 300
Fax: +43 2243 / 25060 - 399
office@polymun.com
www.polymun.com

Covid Vaccine
Data verification Attachment 1 to VAL100136132 for BNT162b2
Phase I PPQ results

Hereby we confirm that we have verified the data related to the Polymun PPQ Phase I run BCV4/L15 (EL7834) and depicted in Attachment 1 to VAL100136132 for their correctness and accuracy.

Sincerely,

[redacted]

Qualified Person, Head of Regulatory Affairs, Authorized Officer Polymun Scientific GmbH

Appendix: Attachment 1 to VAL100136132 (13 pages)

Attachment 1 to VAL100136132

1. Overview of release results

Method	Procedure	Limits on LIMS test plan	EL1491	EK4242	EL7834	EL3248	EL3249
[redacted]	TM100010539	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension
	TM100010539	May contain white to off white opaque amorphous particles	Meets test	Meets test	Meets test	Meets test	Meets test
	USP<787> TM100010541	Particles ≥10 µm: [redacted] per container	particles/container	particles/container	particles/container	particles/container	particles/container
		Particles ≥25 µm: [redacted] per container	particles/container	particles/container	particles/container	particles/container	particles/container
	TM100010538	[redacted]					
	TM100010540						
	TM100010649						
	TM100010649						
	TM100010402						
	TM100010402						
	TM100010322						
	TM100010322						
	TM100010322						
	TM100010322						
	TM100010322						

Attachment 1 to VAL100136132

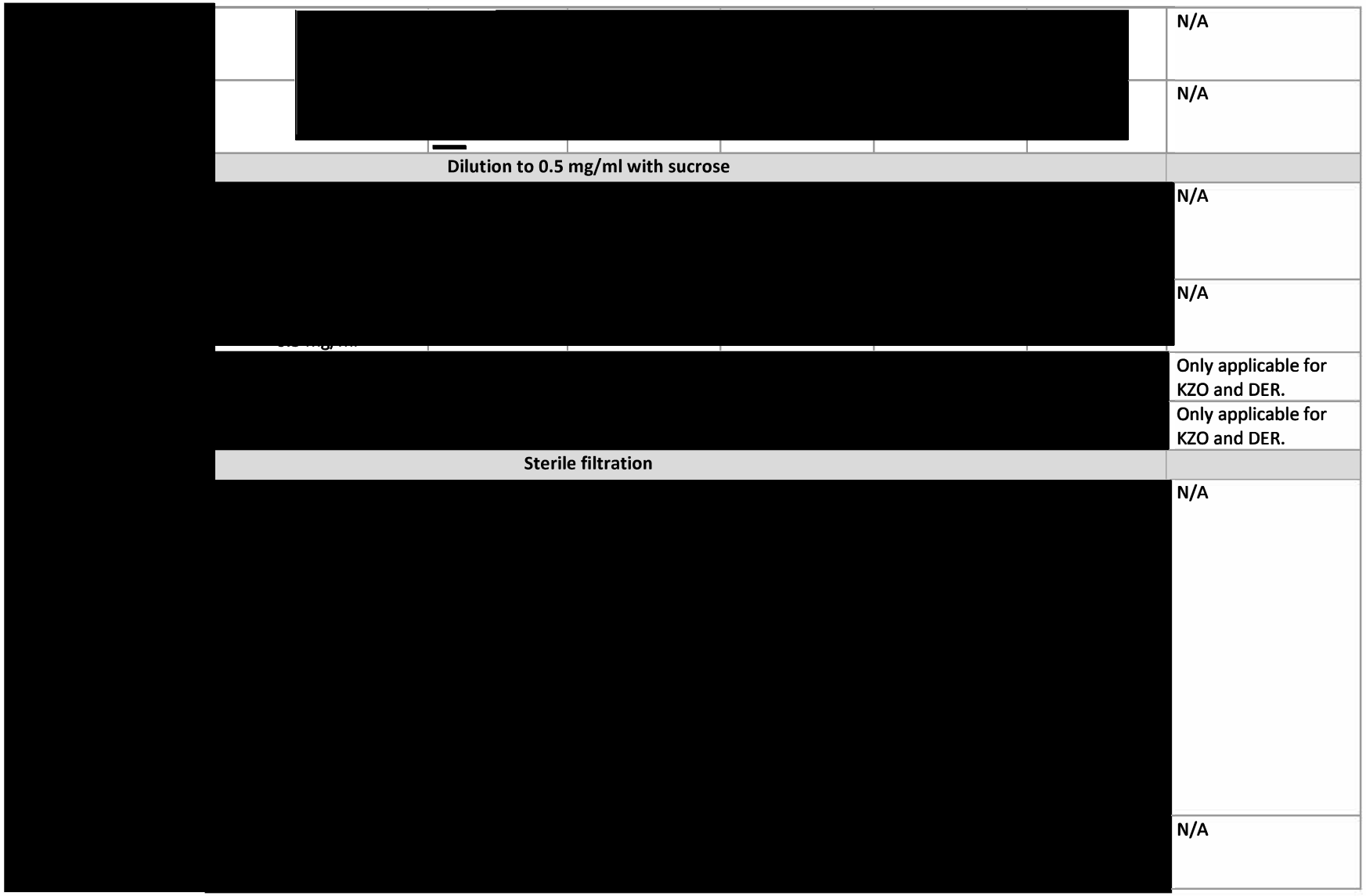
Method	Procedure	Limits on LIMS test plan	EL1491	EK4242	EL7834	EL3248	EL3249
[redacted]	TM100010614	Not less than the sum of the nominal volumes of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses	Not less than the sum of the nominal values of 5 doses
	TM100010407	[redacted]	Confirmed	Confirmed	Confirmed	Confirmed	Confirmed
	TM100010380	[redacted]					
	TM100010392						
	LAB-36816						
	LAB-37166	No growth detected	Meets test	Meets test	Meets test	Meets test	Meets test

*The specification of LNP size was adjusted after manufacturing of the batches from [redacted]

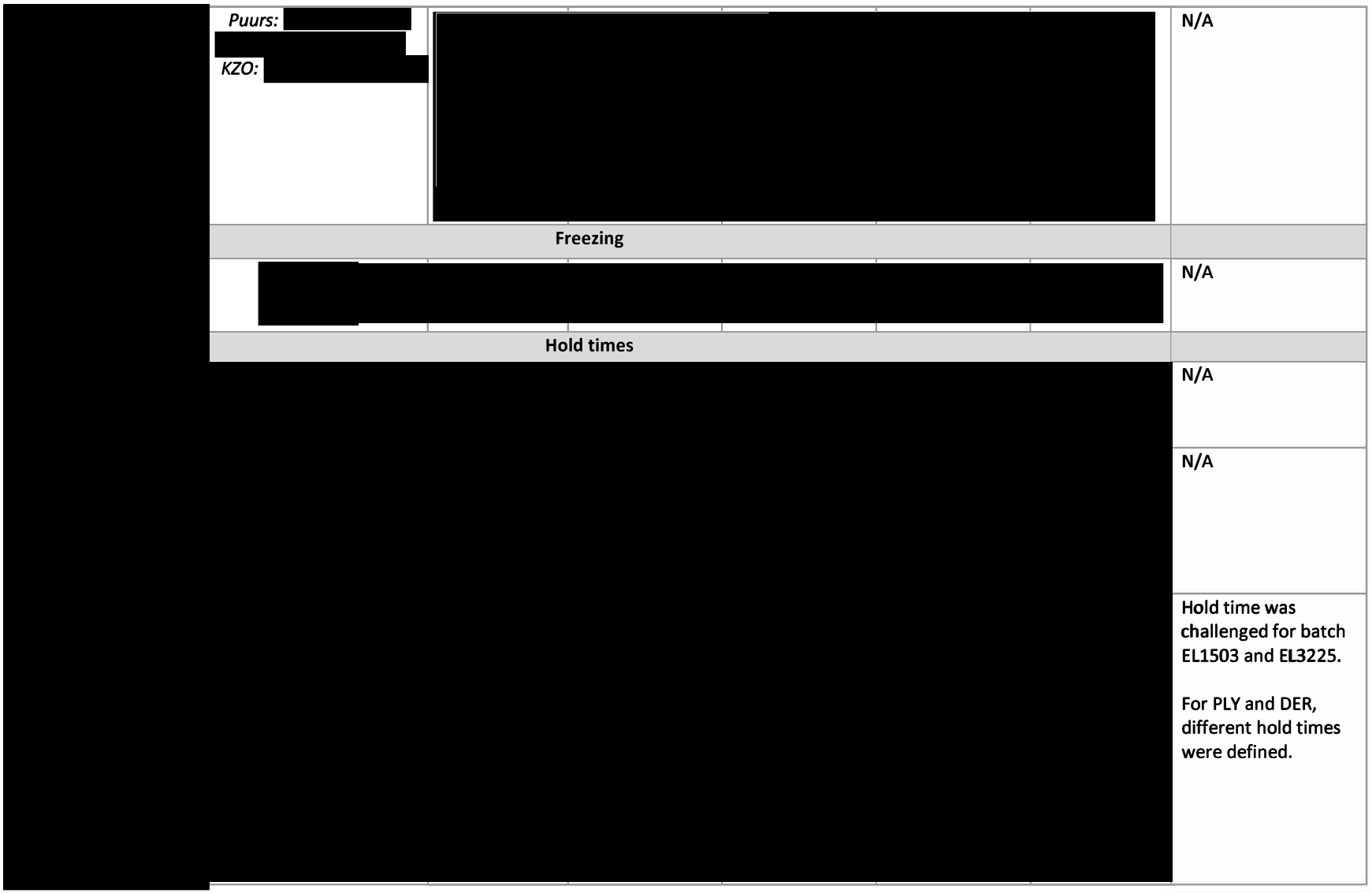
2. CPPs

Attachment 1 to VAL100136132

TFF	
	N/A
	N/A



[redacted]					N/A
Filling, stoppering and capping					
[redacted]					N/A
[redacted]					N/A
[redacted]					N/A
[redacted]	N/A	N/A	N/A	[redacted]	Crimping pressure is only applicable in [redacted] in Puurs and [redacted] in KZO.
[redacted]	N/A	N/A	N/A	[redacted]	N/A	Only applicable for [redacted] in KZO.
[redacted]	N/A	N/A	N/A	[redacted]	N/A	Only applicable for [redacted] in KZO.
[redacted]	N/A	[redacted]	[redacted]	[redacted]	N/A	Only applicable for [redacted] Puurs and [redacted] in KZO.



Puurs: [redacted] *KZO:* [redacted]	N/A
Freezing	
[redacted]	N/A
Hold times	
[redacted]	N/A
	N/A
	Hold time was challenged for batch EL1503 and EL3225. For PLY and DER, different hold times were defined.

[redacted]	N/A
	Hold time was challenged for batch EL1503 and EL3225.
	Hold time was challenged for batch EL1503 and EL3225. For PLY, this hold time is not applicable since dilution with citrate buffer is performed.
	N/A
	Hold time was challenged for batch EL3225.

[redacted]	Hold time was challenged for batch EL3225.
[redacted]	Hold time was challenged for batch EL1503 and EL3225.

The DER and PLY batch number changed when arrived in Puurs. Both batch numbers are indicated.

3. IPCs

[redacted]	Acceptance criterion	EL1503	EK4233 (DER: 201113)	EK4234 (PLY: BCV4/L15)	EL3224/EL3231 (KZO: Line 8)	EL3225/EL3232 (KZO: Line 18)	Comments
		EL1491	EK4242	EL7834	EL3248	EL3249	
	Formulation						
	[redacted]						Not performed by DER and PLY
	[redacted]	< 10	N/A	N/A	< 2.0	< 2.0	Not performed by DER and PLY
	[redacted]						N/A
	[redacted]						N/A
	[redacted]						N/A
	[redacted]						N/A

[redacted]						Different methods are used in the different sites.
						N/A
	Pass	PASS	N/A	N/A	PASS	PASS	For WSL5 batches, only pre and post filter test is performed on the sterile filter (second filter).
		PASS	PASS	PASS	PASS	FAIL	
	Pass	PASS	N/A	N/A	PASS	PASS	
		PASS	PASS	PASS	PASS	PASS	[redacted]
	[redacted]	0	0	0	0	0	N/A
	FILLING						
	[redacted]						NA
	Bulk DP (IPC6)						
	white to off-white suspension, free form observable particle	N/A	PASS	PASS	N/A	N/A	Only performed by DER and PLY.

Attachment 1 to VAL100136132

RNA identification	migration times of RNAs conform to migration times of the reference RNA	N/A	N/A	PASS	N/A	N/A	Only performed by PLY.
RNA content*	[redacted]						N/A
RNA integrity							Only performed by DER and PLY.
RNA encapsulation*							N/A
ALC-0315 content*							N/A
ALC-0159 content*							N/A
DSPC content*							N/A
Cholesterol content*							N/A
Lipids identification*							Only performed by DER and PLY.
Particle size*							N/A
Polydispersity index*							N/A
pH*	[redacted]						N/A
Osmolality*							N/A
Bioburden	PLY: ≤ [redacted] DER: ≤ [redacted]	N/A	[redacted]		N/A	N/A	Only performed by DER and PLY.
Endotoxin	DER only: ≤ [redacted]	N/A	[redacted]	N/A	N/A	N/A	Only performed by DER and PLY.

All tests in italic are [redacted] tests, for monitoring purposes.
* For Puurs and Kalamazoo bulks, results of additional tests on diluted bulk are shown.
**The specification of [redacted] was adjusted after manufacturing of the batches from [redacted]

1. Overview of release results

20/13

Method	Procedure	Limits on LIMS test plan	EL1491	EK4242	EL7834	EL3248	EL3249
Appearance	TM100010539	[redacted]	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension	White to off-white suspension
Appearance (Visible particulates)	TM100010539		Meets test	Meets test	Meets test	Meets test	Meets test
Subvisible particles	USP<787> TM100010541		[redacted] particles/container [redacted] particles/container	[redacted] particles/container [redacted] particles/container	[redacted] particles/container [redacted] particles/container	[redacted] particles/container [redacted] particles/container	[redacted] particles/container [redacted] particles/container
pH	TM100010538		[redacted]				
Osmolality	TM100010540						
LNP size	TM100010649						
LNP polydispersity	TM100010649						
RNA encapsulation	TM100010402						
RNA content	TM100010402						
ALC-0315 content	TM100010322						
ALC-0159 content	TM100010322						
DSPC content	TM100010322						
Cholesterol content	TM100010322						
Lipids Identity	TM100010322						

confirmed for mRNA / DP Process steps and batch!
(page 1 to 13)

12. FEB. 20[redacted]

GmbH Arzneimittel
Münchener Str. 15
06796 Brehna
Tel. 03 49 54-2 47-0
Fax 03 49 54-2 47-100

Status	Effective	Effective Date	-	Version	5.0	Doc Name	FORM-26098
Title	FORM: Validation Report						
Doc Alias	F(2)-19-002-Validation Report			Site Code / Department		Puu / Validation Master Plan	

EXTERNAL COMPANY AUTHORITY:

BIONTECH	[redacted] ASSOCIATE DIRECTOR GLOBAL CMC	[redacted] Digitally signed by [redacted] Date: 2021.02.12 18:05:43 +01'00'
NAME OF EXTERNAL COMPANY	NAME & JOB TITLE EXTERNAL COMPANY REPRESENTATIVE	SIGNATURE & DATE

The signature of the External Company Representative indicates that the information in the document comply with the requirements and is correct from a technical standpoint.

VERIFICATION OF EXTERNAL APPROVAL:

SITE QUALITY AUTHORITY:

[redacted]	QUALITY PROJECTS ASSOCIATE – PGS PUURS	
NAME	JOB TITLE	SIGNATURE & DATE

The signature of the Site Quality Authority indicates that this document has been reviewed by the External Company Authority and the External Company approval is attached to this document.

This document is valid as from the date of the last signature.

[redacted] 12 Feb 2021 14:47:029-0500

REASON: I approve this document.

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