Date Issued: June 22, 2021
Product ID#: 1001184094-3772250
Test Report #: 1001184094-3772250

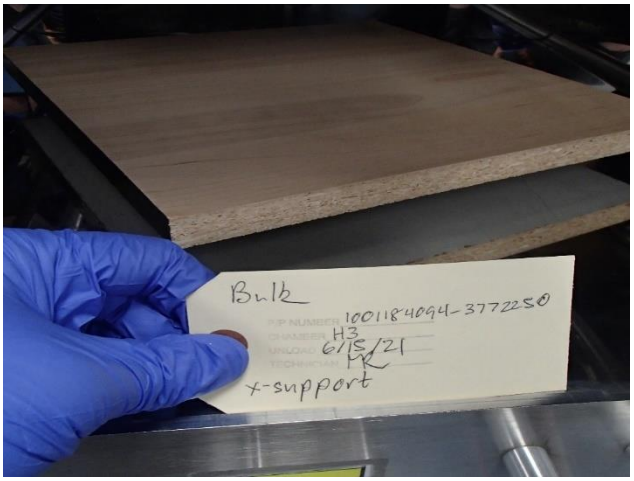
BCM2

GREENGUARD CERTIFICATION TEST REPORT						
Customer Information	ROSEBURG FOREST PRODUCTS SOUTH L P DAWN GARCIA 3660 GATEWAY ST SPRINGFIELD OR 97477					
Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels					
Test Group	Plywood Products - 02					
Category	General Construction Materials					
Test Type	Certification	Year 6				
Test Method	UL 2821 "GREENGUARD Certification Program Method for Measuring and Evaluating Chemical Emissions From Building Materials, Finishes and Furnishings Using Dynamic Environmental Chambers"					
	Environment	**TVOC**	**Formaldehyde**	**Total Aldehydes**	**CREL/TLV**	
GREENGUARD	Office	✓	✓	✓	✓	
✓ - meets criteria; X - over criteria						
Authorized by	Allyson M. McFry Chemistry Laboratory Director					

MODELING FOR PREDICTED AIR CONCENTRATION					
Certification Program	**Environment Basis**	**Modeling Basis**	**Surface Area (m^2)**	**Room Volume (m^3)**	**ACH (1/hr)**
GREENGUARD	CDPH/EHLB/Standard Method	wall	33.4	30.6	0.68

Note that certain environments and/or modeling scenarios may prevent assessment of low level CREL and TLV analytes due to the emissions being below the lower LOQ (0.04 µg). For example, benzene ½ CREL is 1.5 µg/m^3.

PHOTOGRAPH OF SAMPLE



GREENGUARD RESULTS SUMMARY

Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels		
GREENGUARD Acceptable IAQ Criteria		**168 Hour Product Measurement**	**Product Compliance for IAQ**
TVOC[a]	≤ 0.5 mg/m³	0.029 mg/m³	Yes
Formaldehyde	≤ 0.05 ppm	0.024 ppm	Yes
Total Aldehydes[b]	≤ 0.10 ppm	0.045 ppm	Yes
Individual VOCs	all ≤ 1/10 TLV	----------[c]	Yes

[a] "TVOC" is the sum of all VOCs measured via TD/GC/MS which elute between n-hexane (C_6) and n-hexadecane (C_{16}) quantified using calibration to a toluene surrogate.
[b] "Total Aldehydes" is the sum of all measured normal aldehydes from formaldehyde to nonanal, plus benzaldehyde. Heptanal through nonanal are analyzed using TD/GC/MS. The remaining aldehydes are analyzed using HPL/UV methodology. All aldehydes are quantified to authentic standards.
[c] All individual VOCs detected met the criteria of less than 1/10 the ACGIH established threshold limit values (TLVs).

PROJECT DESCRIPTION

This study was conducted using a UL Environment's GREENGUARD test method following the requirements of GREENGUARD Certification program. The product was monitored for emissions of total volatile organic compounds (TVOC), formaldehyde, target list aldehydes, and other individual volatile organic compounds (VOCs) over a 168 hour exposure period. These emissions were measured and the resultant air concentrations were determined for each of the potential pollutants. Determination of compliance is based on predicted air concentrations modeled using the GREENGUARD program room loading.

Report Outline:

Download more information regarding UL's technical references and resources, product evaluation methodologies information, quality control program, and environmental chamber evaluations from our website click here or https://www.ul.com/offerings/greenguard-certification

For RSD, Quality Assurance Report or other quality documents, Request here or contact ULE.

TABLE 1

ENVIRONMENTAL CHAMBER STUDY PARAMETERS			
Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels		
Product Manufacture Date	May 27, 2021		
Product Collection Date	May 27, 2021		
Product Shipping Date	May 27, 2021		
Date Received	June 3, 2021		
Test Description	The product was received by UL Environment as packaged and shipped by the customer. The package was visually inspected and stored in a controlled environment immediately following sample check-in. Just prior to loading, the product was unpackaged and prepared for the required loading to expose the finished surfaces only. The sample was placed inside the environmental chamber and tested according to the specified protocol.		
Test Period	June 8, 2021 - June 15, 2021		
Area	two-sided area = 0.1867 m^2		
Environmental Chamber ID and Volume	SH3 - 0.0871 m^3		
Product Loading	2.14 m^2/m^3		
Test Conditions	1.00 ± 0.05 ACH 50% RH ± 5% RH 22.7ºC - 23.6ºC		
***Accredited Laboratory Locations**	**Testing Laboratory**	**Analytical Laboratory**	**Technical Reporting Location**
	ULE - Marietta	ULE - Marietta	ULE - Marietta

The temperature range specification is 23°C ± 1°. The actual temperature range listed above may vary slightly. If the range is outside this specification, data was reviewed to ensure a negative impact did not occur.

*Accredited Laboratory Locations	
Location	**Address**
ULE - Marietta	UL Environment 2211 Newmarket Parkway, Marietta, GA 30067-9399 USA
ULE - Guangzhou	UL Verification Services (Guangzhou) 1-3F & Room 501, Building 2 (R&D Center A1), No. 25, South Huanshi Avenue, Nansha District, Guangzhou 511458, China
ULE - Cabiate	UL International Italia S.r.l ATTN: IAQ Laboratory Via Europa, 9, I – 22060 – Cabiate (Como), Italia
ULE - Vietnam	UL VS (VIET NAM) CO. LTD., Lot C5, Conurbation 2, Street K1, Cat Lai Industrial Zone, Thanh My Loi Ward, District 2, Ho Chi Minh City, Vietnam
UL - Shimadzu	Shimadzu Techno-Research, Inc. 1, Nishinokyo-Shimoaicho Nakagyo-ku, Kyoto 604-8436 Japan
KCL	Korea Conformity Laboratories #805, I-Valley, 149 Gongdan-ro Gunpo-si, Gyeonggi-do, 15849 Korea
Servaco	Servaco Product Testing N.V. Boertang 200 2400 MOL Belgium

This test is accredited and meets the requirements of ISO/IEC 17025 as verified by ANSI National Accreditation Board. Refer to certificate and scope of accreditation AT-1297.

TABLE 2

Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels		
TVOC CHAMBER CONCENTRATIONS, EMISSION FACTORS AND PREDICTED AIR CONCENTRATIONS			
Elapsed Exposure Hour*	**Chamber Concentration µg/m³**	**Emission Factor µg/m²•hr**	**Predicted Air Concentration** µg/m³**
0 (Background)	BQL	BQL	---
6	238	111	178
24	108	50.4	81
48	81.7	38.2	56
72	63.9	30.0	45
96	49.9	23.2	39
168	37.0	17.3	29
Power Law Decay Constant = k_T = 0.534			

FORMALDEHYDE CHAMBER CONCENTRATIONS, EMISSION FACTORS AND PREDICTED AIR CONCENTRATIONS				
Elapsed Exposure Hour*	**Chamber Concentration µg/m³**	**Emission Factor µg/m²•hr**	**Predicted Air Concentration****	
			µg/m³	**ppm**
0 (Background)	BQL	BQL	---	---
6	75.5	35.2	57	0.046
24	60.2	28.1	45	0.036
48	50.9	23.8	42	0.034
72	50.8	23.7	39	0.032
96	48.2	22.5	36	0.030
168	40.0	18.7	30	0.024
1st Order Exponential Decay Constant = k_F = 0.003				

TARGET LIST ALDEHYDES CHAMBER CONCENTRATIONS, EMISSION FACTORS AND PREDICTED AIR CONCENTRATIONS				
Elapsed Exposure Hour*	**Chamber Concentration µg/m³**	**Emission Factor µg/m²•hr**	**Predicted Air Concentration****	
			µg/m³	**ppm**
0 (Background)	BQL	BQL	---	---
6	262	122	196	0.095
24	181	84.3	133	0.068
48	144	67.3	113	0.059
72	136	63.3	103	0.055
96	138	64.3	97	0.051
168	112	52.0	85	0.045
Power Law Decay Constant = k_A = 0.230				

*Exposure hours are nominal (± 1 hour).

BQL = Below quantifiable level of 0.04 µg based on a standard 18 L air collection volume for VOCs and 0.1 µg based on a standard 45 L air collection volume for aldehydes.

**Predicted Air Concentrations are based on GREENGUARD modeling predicted concentration parameters. For more information click here.

TABLE 3

Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels

CHAMBER CONCENTRATIONS OF IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS

CAS Number	Compound	Elapsed Exposure Hour (µg/m³)						
		0 (BG)	6	24	48	72	96	168
66-25-1	Hexanal	BQL	41.6	27.5	22.3	21.4	18.1	16.2
108-88-3	Toluene (Methylbenzene)	BQL	39.5	16.2	7.9	4.3	2.3	
104-76-7	1-Hexanol, 2-ethyl†	BQL	30.2	14.4	10.2	8.0	6.2	4.7
535-77-3	Benzene, 1-methyl-3-isopropyl (m-Cymene)	BQL	27.0	16.4	15.3	13.6	11.3	9.8
80-56-8	Pinene, alpha (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	BQL	15.9	9.2	7.7	7.4	5.6	3.8
124-19-6	Nonyl aldehyde (Nonanal)†	BQL	8.6	3.6	2.9	2.6	2.3	2.0
562-74-3	3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)*	BQL	6.6	3.4	4.0	2.3	2.7	
112-31-2	Decanal*	BQL	6.7					
98-55-5	3-Cyclohexene-1-methanol, α,α,4-trimethyl*	BQL	5.9	3.3	2.3	2.1	1.6	2.5
127-91-3	Pinene, beta (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]heptane)†	BQL	5.6	3.2	2.6	2.4		
110-62-3	Pentanal	BQL	5.4	3.3	2.6	2.5	2.1	
71-43-2	Benzene†	BQL	4.6					
76-49-3	Bicyclo[2.2.1]heptan-2-ol, 1,7,7-trimethyl-, acetate, endo (Bornyl acetate)*	BQL	4.8	2.5	2.1			
64-19-7	Acetic acid	BQL	4.6	2.7	2.4	2.4		
124-13-0	Octanal†	BQL	4.3	2.5	2.1			
1632-73-1	Bicyclo[2.2.1]heptan-2-ol, 1,3,3-trimethyl*	BQL	3.9	2.1				
111-71-7	Heptanal (Heptaldehyde)†	BQL	3.8	2.3				
103-11-7	2-Propenoic acid, 2-ethylhexyl ester (2-Ethylhexyl acrylate)	BQL	3.6					
475-20-7	Longifolene	BQL	3.4					
79-92-5	Camphene*	BQL	3.2	2.2				
507-70-0	Borneol (endo-Borneol)*	BQL	3.1					
3777-69-3	Furan, 2-pentyl	BQL	2.7					
142-62-1	Hexanoic acid	BQL	2.8	1.7	2.7			
103-09-3	Acetic acid, 2-ethylhexyl ester*	BQL	2.6					
76-22-2	Camphor	BQL	2.5					
1196-01-6	Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-, (1S)-*	BQL	2.2					
3333-52-6	Tetramethylbutanedinitrile*†	BQL	2.1					
555-10-2	beta-Phellandrene*	BQL	2.2					
1820-09-3	trans-Verbenol*	BQL	2.1					

*Indicates NIST/EPA/NIH best library match only based on retention time and mass spectral characteristics.

†Denotes quantified using multipoint authentic standard curve. Other VOCs quantified relative to toluene.

Quantifiable level is 0.04 µg based on a standard 18 L air collection volume.

TABLE 4

Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels

EMISSION FACTORS OF IDENTIFIED INDIVIDUAL VOLATILE ORGANIC COMPOUNDS

CAS Number	**Compound**	**Elapsed Exposure Hour (µg/m²•hr)**					
		6	**24**	**48**	**72**	**96**	**168**
66-25-1	Hexanal	19.4	12.8	10.4	10.0	8.4	7.6
108-88-3	Toluene (Methylbenzene)	18.4	7.6	3.7	2.0	1.1	
104-76-7	1-Hexanol, 2-ethyl†	14.1	6.7	4.8	3.7	2.9	2.2
535-77-3	Benzene, 1-methyl-3-isopropyl (m-Cymene)	12.6	7.7	7.1	6.4	5.3	4.6
80-56-8	Pinene, alpha (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)	7.4	4.3	3.6	3.5	2.6	1.8
124-19-6	Nonyl aldehyde (Nonanal)†	4.0	1.7	1.4	1.2	1.1	0.9
562-74-3	3-Cyclohexen-1-ol, 4-methyl-1-(1-methylethyl)*	3.1	1.6	1.9	1.1	1.2	
112-31-2	Decanal*	3.1					
98-55-5	3-Cyclohexene-1-methanol, α,α,4-trimethyl*	2.8	1.5	1.1	1.0	0.7	1.1
127-91-3	Pinene, beta (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]heptane)†	2.6	1.5	1.2	1.1		
110-62-3	Pentanal	2.5	1.6	1.2	1.2	1.0	
71-43-2	Benzene†	2.2					
76-49-3	Bicyclo[2.2.1]heptan-2-ol, 1,7,7-trimethyl-, acetate, endo (Bornyl acetate)*	2.2	1.2	1.0			
64-19-7	Acetic acid	2.1	1.3	1.1	1.1		
124-13-0	Octanal†	2.0	1.2	1.0			
1632-73-1	Bicyclo[2.2.1]heptan-2-ol, 1,3,3-trimethyl*	1.8	1.0				
111-71-7	Heptanal (Heptaldehyde)†	1.8	1.1				
103-11-7	2-Propenoic acid, 2-ethylhexyl ester (2-Ethylhexyl acrylate)	1.7					
475-20-7	Longifolene	1.6					
79-92-5	Camphene*	1.5	1.0				
507-70-0	Borneol (endo-Borneol)*	1.4					
3777-69-3	Furan, 2-pentyl	1.3					
142-62-1	Hexanoic acid	1.3	0.8	1.3			
103-09-3	Acetic acid, 2-ethylhexyl ester*	1.2					
76-22-2	Camphor	1.2					
1196-01-6	Bicyclo[3.1.1]hept-3-en-2-one, 4,6,6-trimethyl-, (1S)-*	1.0					
3333-52-6	Tetramethylbutanedinitrile*†	1.0					
555-10-2	beta-Phellandrene*	1.0					
1820-09-3	trans-Verbenol*	1.0					

*Indicates NIST/EPA/NIH best library match only based on retention time and mass spectral characteristics.

†Denotes quantified using multipoint authentic standard curve. Other VOCs quantified relative to toluene.

Quantifiable level is 0.04 µg based on a standard 18 L air collection volume.

TABLE 5

Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels

CHAMBER CONCENTRATIONS OF TARGET LIST ALDEHYDES

CAS Number	Compound	Elapsed Exposure Hour (µg/m³)						
		0 (BG)	6	24	48	72	96	168
4170-30-3	2-Butenal	BQL						
75-07-0	Acetaldehyde	BQL	56.5	37.0	29.4	27.2	32.2	27.4
100-52-7	Benzaldehyde	BQL						
5779-94-2	Benzaldehyde, 2,5-dimethyl	BQL						
529-20-4	Benzaldehyde, 2-methyl	BQL						
620-23-5 / 104-87-0	Benzaldehyde, 3- and/or 4-methyl	BQL						
123-72-8	Butanal	BQL	3.0	2.1				
590-86-3	Butanal, 3-methyl	BQL						
50-00-0	Formaldehyde	BQL	75.5	60.2	50.9	50.8	48.2	40.0
66-25-1	Hexanal	BQL	86.6	55.6	45.1	41.8	42.5	32.2
110-62-3	Pentanal	BQL	10.6	7.4	6.2	6.3	5.8	4.8
123-38-6	Propanal	BQL	13.1	9.8	7.5	7.0	6.8	5.2

TABLE 6

Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels

EMISSION FACTORS OF TARGET LIST ALDEHYDES

CAS Number	Compound	Elapsed Exposure Hour (µg/m²•hr)					
		6	24	48	72	96	168
4170-30-3	2-Butenal						
75-07-0	Acetaldehyde	26.4	17.3	13.7	12.7	15.0	12.8
100-52-7	Benzaldehyde						
5779-94-2	Benzaldehyde, 2,5-dimethyl						
529-20-4	Benzaldehyde, 2-methyl						
620-23-5 / 104-87-0	Benzaldehyde, 3- and/or 4-methyl						
123-72-8	Butanal	1.4	1.0				
590-86-3	Butanal, 3-methyl						
50-00-0	Formaldehyde	35.2	28.1	23.8	23.7	22.5	18.7
66-25-1	Hexanal	40.4	25.9	21.0	19.5	19.8	15.0
110-62-3	Pentanal	5.0	3.5	2.9	2.9	2.7	2.2
123-38-6	Propanal	6.1	4.6	3.5	3.3	3.2	2.4

Quantifiable level is 0.1 µg is based on a standard 45 L air collection volume.

TABLE 7

SUPPLEMENTAL EMISSIONS INFORMATION

The table below represents this product's identified chemical emissions found on certain regulatory lists. This list only provides a statement regarding possible health effects associated with this compound and not the relative risks of exposure. Proper interpretation of the risks associated with exposure to a given regulated compound requires a more detailed evaluation of toxicological activity. Certain purchasing programs may require this information be submitted.

Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels						
CAS Number	**Compound**	**✓() = FOUND IN LISTING (CLASS)**					
		CAL PROP. 65	**NTP**	**IARC**	**CAL AIR TOXICS**	**CREL**	**TLV**
103-11-7	2-Propenoic acid, 2-ethylhexyl ester (2-Ethylhexyl acrylate)			✓(3)			
75-07-0	Acetaldehyde	✓(1)	✓(2B)	✓(2B)	✓(IIA)	✓	✓
64-19-7	Acetic acid						✓
71-43-2	Benzene†	✓(1,2)	✓(2A)	✓(1)	✓(IIA)	✓	✓
76-22-2	Camphor						✓
50-00-0	Formaldehyde	✓(1)	✓(2A)	✓(1)	✓(IIA)	✓	✓
110-62-3	Pentanal						✓
80-56-8	Pinene, alpha (2,6,6-Trimethyl-bicyclo[3.1.1]hept-2-ene)						✓
127-91-3	Pinene, beta (6,6-Dimethyl-2-methylene-bicyclo[3.1.1]heptane)†						✓
123-38-6	Propanal				✓(IVA)		✓
3333-52-6	Tetramethylbutanedinitrile†						✓
108-88-3	Toluene (Methylbenzene)	✓(2)		✓(3)	✓(IIA)	✓	✓

†Denotes quantified using multipoint authentic standard curve

CAL Prop. 65: California Health and Welfare Agency, Proposition 65 Chemicals
1 = known to cause cancer
2 = known to cause reproductive toxicity

NTP: National Toxicology Program
2A = known to be carcinogenic to humans
2B = reasonably anticipated to be carcinogenic to humans

IARC: International Agency on Research of Cancer
1 = carcinogenic to humans
2A = probably carcinogenic to humans
2B = possibly carcinogenic to humans
3 = unclassifiable as to carcinogenicity to humans
4 = probably not carcinogenic to humans

California Air Toxics
I = Substances identified as Toxic Air Contaminants, known to be emitted in California, with a full set of health values reviewed by the Scientific Review Panel.
IIA = Substances identified as Toxic Air Contaminants, known to be emitted in California, with one or more health values under development by the Office of Environmental Health Hazard Assessment for review by the Scientific Review Panel.
IIB= Substances NOT identified as Toxic Air Contaminants, known to be emitted in California, with one or more health values under development by the Office of Environmental Health Hazard Assessment for review by the Scientific Review Panel.
III = Substances known to be emitted in California and are NOMINATED for development of health values or additional health values.
IVA = Substance identified as Toxic Air Contaminants, known to be emitted in California and are TO BE EVALUATED for entry into Category III.
IVBA =Substance NOT identified as Toxic Air Contaminants, known to be emitted in California and are TO BE EVALUATED for entry into Category III.
V = Substance identified as Toxic Air Contaminants, and NOT KNOWN TO BE EMITTED from stationary source facilities in California based on information from the AB 2588 Air Toxic "Hot Spots" Program and the California Toxic Release Inventory.
VI = Substances identified as Toxic Air Contaminants, NOT KNOWN TO BE EMITTED from stationary source facilities in California, and are active ingredients in pesticides in California.

CREL: California Office of Environmental Health's Hazard Assessment (OEHHA), Chronic Reference Exposure Levels
✓ = Found in Listing

ACGIH TLV American Conference of Governmental Industrial Hygienists Threshold Limit Values for Chemical Substances and Physical Agents.
✓ = Found in Listing.

CHAIN OF CUSTODY

INTERNAL Use Only			
Project #	100184094		
Product #	3772250		
Order #	13766011		
Task Line	2.1	UL BU	
_____ of _____			

CUVDBI546

☐ *Rush Request – Subject to upcharge. Customer must confirm with UL prior to submitting product.*

GREENGUARD Test Information					
Test Type	☒ Certification Test • Annual/Initial Year 6			☐ Out-of-Scope Test	
	☐ Quarterly Test • Year Quarter			☐ Profile Study Test	
Service Line	☒ GREENGUARD ☐ GREENGUARD GOLD ☐ Other _____				
Test Group	Plywood Products - 02				
Product Category	Building Construction Materials		Subcategory		
Application	☐ Floor/Ceiling	☐ Panel	☐ Wall	☐ Work Surface	☐ Other: _____
Wet Products Only	Coverage Rate		Density		Specific Gravity

Product and Company Information			
Product Description	Roseburg SkyPly® RediPly Hardwood Plywood Panels		
Manufacture ID#			
Company Name	Roseburg	Date Manufactured	05/27/2021
		Contact Name	Dawn Garcia
Address		Job Title	
		Contact Phone	
		Contact Email	D a w n G @ r f p c o . c o

Collection Information			
Collector Name	Mitchell Black	Date Collected	05/27/2021
Collector Phone	541-530-2357	Time Collected	7:30 AM
Collector Signature	Mitch BC	Collection Location	Dillard Ply

Shipping Information			
Carrier	UPS		
Shipper Name	Candi Gaedecke	Date Shipped	05 27 2021
Shipper Phone	(541)679-3311	Time Shipped	10:00 am
Shipper Signature	CGaedecke	Air Bill #	1Z 7R1 271 03 9730 4890

Sample Submitted to			
☐ UL Environment (Marietta) 2211 Newmarket Pkwy Suite 106 Marietta, GA 30067, USA	☐ UL Verification Services (Guangzhou) Building A1, 3F, Nansha Science and Technology Innovation Ctr. No. 25, South Huanshi Avenue, Nansha District, Guangzhou 511458, China	☐ UL International Italia S.r.l ATTN: IAQ Laboratory Via Europa, 9 I – 22060 – Cabiate (Como), Italia	☐ UL VS (Vietnam) Co., Ltd. Lot C5, Conurbation 2, Street K1, Cat Lai Industrial Zone Thanh My Loi Ward, District 2 Ho Chi Minh City, Vietnam

Post Testing Sample Disposition (Sample will be disposed of 30 days after report is issued if information below is not provided)			
Return Shipping Co.		Customer Shipping Acct #	

Internal Use Only – Receiving Information					
Receiver Name				Receiver Signature	
Condition Upon Arrival	☒ Acceptable	☐ Not Acceptable		Receive Date	6.3.21
Condition Notes				Receive Time	12:50 pm
Completed By	ULE	Based On	Program Testing Schedule	Date	03/31/2021

00-EN-F0853 – Issue 6.0