Firmenich Incorporated (06242)

Date: 6/30/2023

New Jersey Department of Environmental Protection
Reason for Application

Permit Being Modified

Permit Class: PCP **Number:** 190007

Description of Modifications:

Currently, the Habanolide process consists of E8506 (V-570) and E8527 (V-57A0) which run in parallel and each peforms a peroxide reaction followed by decantation. This process is identfiied in the permit as OS32. After decantation, the Habanolide feed material is transferred to E507 (V-580) for the next step in the process.

Firmenich is requesting to modify the process flow such that E8506 (V-570) and E8527 (V57A0) will perform the peroxide reaction,but the decantation step will ocur in a new vessel V-57B0. The displaced vapor in the headspace of V-57B0 will be recovered in whichever vessel (either V-570 or V-57A0) is actvely transferring to V57B0 at the time. Emisions will continue to exhaust to the Pad 5 combined vent header which runs through a vapor condensor prior to discharging to atmosphere. The P&ID for the new configuration is attached.

The throughput of Habanolide will increase from 3,250 MT/yr to 3,850 MT/yr which is an increase of approximately 18.5% and is due to total batches increasing from 5.4 batches/day to 6.5 batches/day. The overall VOC emissions will be conservatively increased by 20% to address the additonal number of batches that can be made each year. There are no changes being made to the raw materials.

A description in the equipment details for V-57A0 was found to be incorrect and was updated as part of this application. No other changes are being requested at this time.

New Jersey Department of Environmental Protection
Facility Profile (General)

Facility Name (AIMS): Firmenich Incorporated

Facility ID (AIMS): 06242

Street Address: FIRMENICH INCORPORATED
150 FIRMENICH WAY
PORT NEWARK, NJ 07114

Mailing Address: FIRMENICH INCORPORATED
150 FIRMENICH WAY
PORT NEWARK, NJ 07114

State Plane Coordinates:

X-Coordinate:	595,035
Y-Coordinate:	679,401
Units:	New Jersey State Plane 8
Datum:	NAD83
Source Org.:	DEP-Program
Source Type:	DEP Program Database

County: Essex

Location Description: East of Doremus Avenue
North of Turnpike Extension

Industry:

Primary SIC:	2869
Secondary SIC:	
NAICS:	325199

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Air Permit Information Contact

Organization: Firmenich Incorporated
Org. Type: Corporation
Name: Michael Damato
NJ EIN: 16335900001
Title: Sr. Health Safety & Environmental Manage
Phone: (973) 274-6638 x
Fax: ( ) - x
Other: (973) 590-1830 x
Type:
Email: michael.damato@firmenich.com
Mailing Address: Firmenich Incorporated
150 Firmenich Way
Port Newark, NJ 07114

Contact Type: Consultant

Organization: GZA GeoEnvironmental Inc.
Org. Type: Corporation
Name: Bhuvnesh J Parekh
NJ EIN:
Title: Senior Consultant
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Mailing Address: 55 Lane Road, Suite 407
Fairfield, NJ 07004

Contact Type: Emission Statements

Organization: Firmenich Incorporated
Org. Type: Corporation
Name: Michael Damato
NJ EIN: 16335900001
Title: Sr. Health Safety & Environmental Manage
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Mailing Address: Firmenich Incorporated
150 Firmenich Way
Port Newark, NJ 07114

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Fees/Billing Contact

Organization: Firmenich Incorporated
Org. Type: Corporation
Name: Michael Damato
NJ EIN: 16335900001
Title: Sr. Health Safety & Environmental Manage
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Other: (973) 590-1830 x
Type:
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Contact Type: Responsible Official

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Org. Type: Corporation
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Mailing Address: Firmenich Incorporated
150 Firmenich Way
Port Newark, NJ 07114

Firmenich Incorporated (06242) Date: 6/30/2023

New Jersey Department of Environmental Protection
Equipment Inventory

Equip. NJID	Facility's Designation	Equipment Description	Equipment Type	Certificate Number	Install Date	Grand-Fathered	Last Mod. (Since 1968)	Equip. Set ID
E8506	V-570	4000-Gallon Batch Reaction Vessel and Associated Equipment	Manufacturing and Materials Handling Equipment			No		ES11
E8507	V-580	800 gallon batch reaction vessel	Manufacturing and Materials Handling Equipment			No		ES12 ES13
E8522	T-580	1200 gallon feed tank for batch reaction vessel V-580	Manufacturing and Materials Handling Equipment			No		ES13
E8523	T-582	250 gallon receiver tank for batch reaction vessel V-580 Equipment	Manufacturing and Materials Handling Equipment			No		ES12
E8527	V-57A0	4000 gallon batch reaction vesselequiptment	Manufacturing and Materials Handling Equipment			No		ES11
E8528	E-580		Manufacturing and Materials Handling Equipment			No		ES12
E8534	T-557	T-557 NBA Receiver / Feed Tank	Manufacturing and Materials Handling Equipment			No		ES10
E8535	C-5711	C-5711 NBA Wash Column	Manufacturing and Materials Handling Equipment			No		ES10
E8536	T-5711	T-5711 Washed NBA Receiver Tank	Manufacturing and Materials Handling Equipment			No		ES10

New Jersey Department of Environmental Protection
Equipment Inventory

Equip. NJID	Facility's Designation	Equipment Description	Equipment Type	Certificate Number	Install Date	Grand-Fathered	Last Mod. (Since 1968)	Equip. Set ID
E8537	T-57A8	T-57A8 Washing NBA Feed Tank	Manufacturing and Materials Handling Equipment			No		ES10
E8539	T-551R	T-551R Mixing Tank	Manufacturing and Materials Handling Equipment			No		
E8540	V-57B0	4000 gallon Holding vessel	Manufacturing and Materials Handling Equipment			No		

Firmenich Incorporated (06242) Date: 6/30/2023

New Jersey Department of Environmental Protection
Control Device Inventory

CD NJID	Facility's Designation	Description	CD Type	Install Date	Grand-Fathered	Last Mod. (Since 1968)	CD Set ID
CD8502	C-50A5	Emergency Release Scrubber	Other				
CD8503	C-50A6	Emergency Release Scrubber	Other				
CD8504	Pad5Condense	Pad 5 Vent Header Condensers	Condenser				
CD8505	E-570	V-570 Condenser	Condenser				CS1
CD8506	E-57A0	V-57A0 Condenser	Condenser				CS1

Firmenich Incorporated (06242)

Date: 6/30/2023

New Jersey Department of Environmental Protection
Emission Points Inventory

PT NJID	Facility's Designation	Description	Config.	Equiv. Diam. (in.)	Height (ft.)	Dist. to Prop. Line (ft)	Exhaust Temp. (deg. F)			Exhaust Vol. (acfm)			Discharge Direction	PT Set ID
							Avg.	Min.	Max.	Avg.	Min.	Max.		
PT8501	C-50A6	Pad 5 Vent Header												
PT8502	C-50A5	C-50A5 Vent Column												
PT8505	Pad5Exhaust	Pad 5 Exhaust Fan												

Firmenich Incorporated (06242)

Date: 6/30/2023

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

BP85

OS32

Batch Process Operating Scenario Run Time (hours) *Min. Calc. Time: 15.3* *Max. Calc. Time: 28.0* *Min. User Time:* *Max. User Time:*

Step NJID	Facility's Designation	Step Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Step Run Time Hours Min.	Step Run Time Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.
ST1	Charging	Batch Reactor Fill	Normal - Steady State	ES11	CD8502 (S) CS1 (P)	PT8502	3-01-091-99	3.0	4.0	B	0.0	10.0	32.0	95.0
ST2	Mix	Mix Batch	Normal - Steady State	ES11			3-01-091-99	4.0	6.0		0.0	1.0	32.0	95.0
ST3	Heat	Adjust temperature	Normal - Steady State	ES11	CD8502 (S) CS1 (P)	PT8502	3-01-091-99	0.5	1.0	D	0.0	5.0	32.0	140.0
ST4	Transfer	Transfer batch contents between vessels	Normal - Steady State	E8540	CD8502 (S) CS1 (P)	PT8502	3-01-091-99	0.5	1.0	B	0.0	10.0	104.0	140.0
ST5	Reheat	Reaheating of the reactor	Normal - Steady State	E8540	CD8503 (S) CD8504 (P)	PT8501	3-01-091-99	0.5	1.0	B	0.0	5.0	86.0	140.0
ST6	Charging	Batch Reactor Fill	Normal - Steady State	E8507	CD8503 (S) CD8504 (P)	PT8501	3-01-091-99	0.5	1.0	B	0.0	3.5	68.0	86.0
ST7	Feed	Transfer batch contents between vessels with heat and vacuum	Normal - Steady State	ES12	CD8503 (S) CD8504 (P)	PT8501	3-01-091-99	1.5	2.5	D	0.0	3.5	122.0	266.0
ST8	Heat	Adjust temperature	Normal - Steady State	ES12	CD8502 (P)	PT8502	3-01-091-99	0.5	1.0	D	0.0	5.0	68.0	250.0
ST9	Charging	Batch Reactor Fill	Normal - Steady State	ES13	CD8502 (P)	PT8502	3-01-091-99	0.5	1.0	D	0.0	10.0	68.0	86.0
ST10	Charging	Material Handling Tank	Normal - Steady State	ES10			3-01-091-99	1.5	2.5	D	0.0	10.0	86.0	140.0
ST11	Discharge	Withdraw product to storage tank	Normal - Steady State	E8507				0.3	1.0	B	0.0	3.5	100.0	160.0
ST12	Charging/Mix	Charging and mixing in the mixing tank	Normal - Steady State	E8539				2.0	6.0	D	0.0	10.0	32.0	150.0

Firmenich Incorporated (06242)

Date: 6/30/2023

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 1

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		8.52000000	5.60400000	5.60400000	tons/yr	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		36.80100000	1.70000000	1.70000000	lb/batch	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST1 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.08200000	0.00400000	0.00400000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST2 Mix**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.00000000		0.00000000	lb/step	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST3 Heat**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		2.67000000	0.13400000	0.13400000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST4 Transfer**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.16000000	0.00800000	0.00800000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST5 Reheat**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.16000000	0.00800000	0.00800000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST6 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.05320000	0.00300000	0.00300000	lb/step	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST7 Feed**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.47300000	0.31600000	0.31600000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST8 Heat**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.47300000	0.31600000	0.31600000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST9 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.02900000	0.00100000	0.00100000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST10 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		2.86600000	2.86600000	2.86600000	lb/step	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST11 Discharge**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.95900000	0.95900000	0.95900000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST12 Charging/Mix**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.06300000	0.06300000	0.06300000	lb/step	No

000000 E8506 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:	
Manufacturer:	
Model:	
Type of Manufacturing and Materials Handling Equipment:	
Capacity:	
Units:	
Description (if other):	
Have you attached a diagram showing the location and/or the configuration of this equipment?	
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	
Comments:	

000000 E8507 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:	
Manufacturer:	
Model:	
Type of Manufacturing and Materials Handling Equipment:	
Capacity:	
Units:	
Description (if other):	
Have you attached a diagram showing the location and/or the configuration of this equipment?	
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	
Comments:	

000000 E8522 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:	
Manufacturer:	
Model:	
Type of Manufacturing and Materials Handling Equipment:	
Capacity:	
Units:	
Description (if other):	
Have you attached a diagram showing the location and/or the configuration of this equipment?	
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	
Comments:	

000000 E8523 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:

Manufacturer:

Model:

Type of Manufacturing and Materials Handling Equipment:

Capacity:

Units:

Description (if other):

Have you attached a diagram showing the location and/or the configuration of this equipment?

Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?

Comments:

000000 E8527 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:	
Manufacturer:	
Model:	
Type of Manufacturing and Materials Handling Equipment:	
Capacity:	
Units:	
Description (if other):	
Have you attached a diagram showing the location and/or the configuration of this equipment?	
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	
Comments:	

000000 E8528 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:	
Manufacturer:	
Model:	
Type of Manufacturing and Materials Handling Equipment:	
Capacity:	
Units:	
Description (if other):	
Have you attached a diagram showing the location and/or the configuration of this equipment?	
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	
Comments:	

000000 E8539 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:	
Manufacturer:	
Model:	
Type of Manufacturing and Materials Handling Equipment:	
Capacity:	
Units:	
Description (if other):	
Have you attached a diagram showing the location and/or the configuration of this equipment?	
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	
Comments:	

000000 E8540 (Manufacturing and Materials Handling Equipment)
Print Date: 6/30/2023

Make:	
Manufacturer:	Roben
Model:	D-210019
Type of Manufacturing and Materials Handling Equipment:	Decanting/Holding Tank
Capacity:	4.00E+03
Units:	gallons
Description (if other):	
Have you attached a diagram showing the location and/or the configuration of this equipment?	Yes
Have you attached any manuf.'s data or specifications to aid the Dept. in its review of this application?	
Comments:	

Firmenich Incorporated (06242)

Date: 6/14/2023

New Jersey Department of Environmental Protection
Reason for Application

Permit Being Modified

Permit Class: PCP **Number:** 190007

Description of Modifications:

Currently, the Habanolide process consists of E8506 (V-570) and E8527 (V-57A0) which run in parallel and each peforms a peroxide reaction followed by decantation. This process is identfiied in the permit as OS32. After decantation, the Habanolide feed material is transferred to E507 (V-580) for the next step in the process.

Firmenich is requesting to modify the process flow such that E8506 (V-570) and E8527 (V57A0) will perform the peroxide reaction,but the decantation step will ocur in a new vessel V-57B0. The displaced vapor in the headspace of V-57B0 will be recovered in whichever vessel (either V-570 or V-57A0) is actvely transferring to V57B0 at the time. Emisions will continue to exhaust to the Pad 5 combined vent header which runs through a vapor condensor prior to discharging to atmosphere. The P&ID for the new configuration is attached.

The throughput of Habanolide will increase from 3,250 MT/yr to 3,850 MT/yr which is an increase of approximately 18.5% and is due to total batches increasing from 5.4 batches/day to 6.5 batches/day. The overall VOC emissions will be conservatively increased by 20% to address the additonal number of batches that can be made each year. There are no changes being made to the raw materials.

A description in the equipment details for V-57A0 has been updated. No other changes are being requested at this time.

New Jersey Department of Environmental Protection
Facility Profile (General)

Facility Name (AIMS): Firmenich Incorporated **Facility ID (AIMS):** 06242

Street Address: FIRMENICH INCORPORATED
150 FIRMENICH WAY
PORT NEWARK, NJ 07114

Mailing Address: FIRMENICH INCORPORATED
150 FIRMENICH WAY
PORT NEWARK, NJ 07114

State Plane Coordinates:

X-Coordinate:	595,035
Y-Coordinate:	679,401
Units:	New Jersey State Plane 8
Datum:	NAD83
Source Org.:	DEP-Program
Source Type:	DEP Program Database

County: Essex

Location Description: East of Doremus Avenue
North of Turnpike Extension

Industry:

Primary SIC:	2869
Secondary SIC:	
NAICS:	325199

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Air Permit Information Contact

Organization: Firmenich Incorporated
Org. Type: Corporation
Name: Michael Damato
NJ EIN: 16335900001
Title: Sr. Health Safety & Environmental Manage
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Email: michael.damato@firmenich.com
Mailing Address: Firmenich Incorporated
150 Firmenich Way
Port Newark, NJ 07114

Contact Type: Consultant

Organization: GZA GeoEnvironmental Inc.
Org. Type: Corporation
Name: Bhuvnesh J Parekh
NJ EIN:
Title: Senior Consultant
Phone: (973) 774-3323 x
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Type: Mobile
Email: Bhuvnesh.Parekh@gza.com
Mailing Address: 55 Lane Road, Suite 407
Fairfield, NJ 07004

Contact Type: Emission Statements

Organization: Firmenich Incorporated
Org. Type: Corporation
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NJ EIN: 16335900001
Title: Sr. Health Safety & Environmental Manage
Phone: (973) 274-6638 x
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Other: (973) 590-1830 x
Type:
Email: michael.damato@firmenich.com
Mailing Address: Firmenich Incorporated
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Port Newark, NJ 07114

New Jersey Department of Environmental Protection
Facility Profile (General)

Contact Type: Fees/Billing Contact

Organization: Firmenich Incorporated
Org. Type: Corporation
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Phone: (973) 274-6638 x
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Contact Type: Responsible Official

Organization: Firmenich Incorporated
Org. Type: Corporation
Name: Ronald Kurtz
NJ EIN: 16335900001
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Mailing Address:
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Port Newark, NJ 07114

New Jersey Department of Environmental Protection
Equipment Inventory

Equip. NJID	Facility's Designation	Equipment Description	Equipment Type	Certificate Number	Install Date	Grand-Fathered	Last Mod. (Since 1968)	Equip. Set ID
E8506	V-570	4000-Gallon Batch Reaction Vessel and Associated Equipment	Manufacturing and Materials Handling Equipment			No		ES11
E8507	V-580	800 gallon batch reaction vessel	Manufacturing and Materials Handling Equipment			No		ES12 ES13
E8522	T-580	1200 gallon feed tank for batch reaction vessel V-580	Manufacturing and Materials Handling Equipment			No		ES13
E8523	T-582	250 gallon receiver tank for batch reaction vessel V-580 Equipment	Manufacturing and Materials Handling Equipment			No		ES12
E8527	V-57A0	4000 gallon batch reaction vesselequiptment	Manufacturing and Materials Handling Equipment			No		ES11
E8528	E-580		Manufacturing and Materials Handling Equipment			No		ES12
E8534	T-557	T-557 NBA Receiver / Feed Tank	Manufacturing and Materials Handling Equipment			No		ES10
E8535	C-5711	C-5711 NBA Wash Column	Manufacturing and Materials Handling Equipment			No		ES10
E8536	T-5711	T-5711 Washed NBA Receiver Tank	Manufacturing and Materials Handling Equipment			No		ES10

New Jersey Department of Environmental Protection
Equipment Inventory

Equip. NJID	Facility's Designation	Equipment Description	Equipment Type	Certificate Number	Install Date	Grand-Fathered	Last Mod. (Since 1968)	Equip. Set ID
E8537	T-57A8	T-57A8 Washing NBA Feed Tank	Manufacturing and Materials Handling Equipment			No		ES10
E8539	T-551R	T-551R Mixing Tank	Manufacturing and Materials Handling Equipment			No		
E8540	V-57B0	4000 gallon Holding vessel	Manufacturing and Materials Handling Equipment			No		

Firmenich Incorporated (06242) Date: 6/6/2023

New Jersey Department of Environmental Protection
Control Device Inventory

CD NJID	Facility's Designation	Description	CD Type	Install Date	Grand-Fathered	Last Mod. (Since 1968)	CD Set ID
CD8502	C-50A5	Emergency Release Scrubber	Other				
CD8503	C-50A6	Emergency Release Scrubber	Other				
CD8504	Pad5Condense	Pad 5 Vent Header Condensers	Condenser				
CD8505	E-570	V-570 Condenser	Condenser				CS1
CD8506	E-57A0	V-57A0 Condenser	Condenser				CS1

Firmenich Incorporated (06242)

Date: 6/6/2023

New Jersey Department of Environmental Protection
Emission Points Inventory

PT NJID	Facility's Designation	Description	Config.	Equiv. Diam. (in.)	Height (ft.)	Dist. to Prop. Line (ft)	Exhaust Temp. (deg. F)			Exhaust Vol. (acfm)			Discharge Direction	PT Set ID
							Avg.	Min.	Max.	Avg.	Min.	Max.		
PT8501	C-50A6	Pad 5 Vent Header												
PT8502	C-50A5	C-50A5 Vent Column												
PT8505	Pad5Exhaust	Pad 5 Exhaust Fan												

Firmenich Incorporated (06242)

Date: 6/6/2023

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

BP85

OS32

Batch Process Operating Scenario Run Time (hours) *Min. Calc. Time: 15.3* *Max. Calc. Time: 28.0* *Min. User Time:* *Max. User Time:*

Step NJID	Facility's Designation	Step Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Step Run Time Hours		VOC Range	Flow (acfm)		Temp. (deg F)	
								Min.	Max.		Min.	Max.	Min.	Max.
ST1	Charging	Batch Reactor Fill	Normal - Steady State	ES11	CD8502 (S) CS1 (P)	PT8502	3-01-091-99	3.0	4.0	B	0.0	10.0	32.0	95.0
ST2	Mix	Mix Batch	Normal - Steady State	ES11			3-01-091-99	4.0	6.0		0.0	1.0	32.0	95.0
ST3	Heat	Adjust temperature	Normal - Steady State	ES11	CD8502 (S) CS1 (P)	PT8502	3-01-091-99	0.5	1.0	D	0.0	5.0	32.0	140.0
ST4	Transfer	Transfer batch contents between vessels	Normal - Steady State	E8540	CD8502 (S) CS1 (P)	PT8502	3-01-091-99	0.5	1.0	B	0.0	10.0	104.0	140.0
ST5	Reheat	Reaheating of the reactor	Normal - Steady State	E8540	CD8503 (S) CD8504 (P)	PT8501	3-01-091-99	0.5	1.0	B	0.0	5.0	86.0	140.0
ST6	Charging	Batch Reactor Fill	Normal - Steady State	E8507	CD8503 (S) CD8504 (P)	PT8501	3-01-091-99	0.5	1.0	B	0.0	3.5	68.0	86.0
ST7	Feed	Transfer batch contents between vessels with heat and vacuum	Normal - Steady State	ES12	CD8503 (S) CD8504 (P)	PT8501	3-01-091-99	1.5	2.5	D	0.0	3.5	122.0	266.0
ST8	Heat	Adjust temperature	Normal - Steady State	ES12	CD8502 (P)	PT8502	3-01-091-99	0.5	1.0	D	0.0	5.0	68.0	250.0
ST9	Charging	Batch Reactor Fill	Normal - Steady State	ES13	CD8502 (P)	PT8502	3-01-091-99	0.5	1.0	D	0.0	10.0	68.0	86.0
ST10	Charging	Material Handling Tank	Normal - Steady State	ES10			3-01-091-99	1.5	2.5	D	0.0	10.0	86.0	140.0
ST11	Discharge	Withdraw product to storage tank	Normal - Steady State	E8507				0.3	1.0	B	0.0	3.5	100.0	160.0
ST12	Charging/Mix	Charging and mixing in the mixing tank	Normal - Steady State	E8539				2.0	6.0	D	0.0	10.0	32.0	150.0

Firmenich Incorporated (06242)

Date: 6/6/2023

New Jersey Department of Environmental Protection
Emission Unit/Batch Process Inventory

U 1

UOS NJID	Facility's Designation	UOS Description	Operation Type	Signif. Equip.	Control Device(s)	Emission Point(s)	SCC(s)	Annual Oper. Hours Min.	Annual Oper. Hours Max.	VOC Range	Flow (acfm) Min.	Flow (acfm) Max.	Temp. (deg F) Min.	Temp. (deg F) Max.

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS0 Summary**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		8.52000000	5.60400000	5.60400000	tons/yr	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step:

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		36.80100000	1.70000000	1.70000000	lb/batch	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST1 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.08200000	0.00400000	0.00400000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST2 Mix**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.00000000		0.00000000	lb/step	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST3 Heat**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		2.67000000	0.13400000	0.13400000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST4 Transfer**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.16000000	0.00800000	0.00800000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST5 Reheat**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.16000000	0.00800000	0.00800000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST6 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.05320000	0.00300000	0.00300000	lb/step	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST7 Feed**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.47300000	0.31600000	0.31600000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST8 Heat**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.47300000	0.31600000	0.31600000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST9 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.02900000	0.00100000	0.00100000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST10 Charging**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		2.86600000	2.86600000	2.86600000	lb/step	No

New Jersey Department of Environmental Protection
Potential to Emit

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST11 Discharge**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.95900000	0.95900000	0.95900000	lb/step	No

Subject Item: **BP85**

Operating Scenario: **OS32**

Step: **ST12 Charging/Mix**

Air Contaminant Category (HAPS)	Fugitive Emissions	Emissions Before Controls	Emissions After Controls	Total Emissions	Units	Alt. Em. Limit
VOC (Total)		0.06300000	0.06300000	0.06300000	lb/step	No

Habanolide Process
VOC Emission Calculations
For Permit Application
Prepared in 2012
Updated in 2023

1.0 REVISION OF OS32 HABANOLIDE PRODUCTION

1.1 Habanolide Production Process Revisions

The equipment used and the basic types of operations being performed for OS32 Habanolide Production are not being changed. However, some of the batch steps performed in the existing equipment items involved in this process are being changed. Additionally, one reactor E 8540 (V-57B0) is added to the process.

1.2 Emission Estimate Calculations for OS32

Step 1. Charging of ES11/V-570 or V-57A0

With the reactor cooled to 8°C (46°F) an initial charge of approximately 810 gallons is fed to the reactor.

An estimate of the volume of gas (nitrogen plus vapor) displaced from the reaction vessel by the charge added can be calculated as follows:

Gas Displaced by Charge Added

= (810 gal)(0.1337 acf/gal)(~1 scf/acf) = 108 scf

If needed because of the oxygen concentration in the reactor head space (the space between the batch liquid and the top of the reactor), the reactor head space may be purged with nitrogen during the initial charge. If the nitrogen purge is used, the flow rate will be approximately 20 scfm and the duration will be approximately 5 minutes. This will result in a nitrogen purge gas volume of approximately 100 scf. The nitrogen purge gas will enter the top of the reactor and it will flow through the upper portion of the head space.

The total amount of gas displaced from the reactor (including both the gas displaced by the feed and the gas displace by the nitrogen purge) will be approximately 208 scf.

The displaced gas contains vapors of the feed materials. The vapors are due principally to the predominant and most volatile of the feed materials, n-butyl acetate (NBA). The vapor pressure of NBA at the batch temperature of 46°F is approximately 4 mm Hg. The gas is not saturated with feed vapors, however, because the reactor was empty prior to charging and there is not sufficient time during charging for saturation to occur. This situation is comparable to a storage tank with a high turnover rate, in which the head space vapor concentration is well below saturation. In the USEPA AP-42 organic liquid storage tank emission calculation procedures, this was accounted for by a "turnover factor" which related the approach to saturation to the frequency of turnovers. A “saturation factor” of 0.25, corresponding to a “turnover factor” for a high turnover frequency, is used to estimate the approach to saturation during initial charging of the reactor.

Based on the above information, an estimate of the amount of VOC vapor emitted during charging can be calculated as follows:

VOC Vapor Emitted During Charging and Purging

= (0.25)(208 scf gas)(4 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor)

= 0.0820 lb

Maximum VOC Range:
VP at 70°F = 10 mm Hg = 0.19 psia
Worst-Case Maximum Vapor Concentration
= (0.25)(4/760) = 0.13%
VOC Range is B

Step 2. Mix

The batch is mixed, allowed to settle, and then wastewater from the batch is discharged to the wastewater system. There are no emissions during this operation.

Step 3. Heat

The batch is heated from 45 to 55°C.
The batch volume at the time of heating is approximately 2280 gallons.

An estimate of the volume of gas above the batch in the reactor prior to heating can be calculated as follows:

Reactor Head Space Volume Prior to Heating
= (4000 gal – 2280 gal)(0.1337 acf/gal)(530 scf/573 acf) = 213 scf

An estimate of the volume of gas above the batch in the reactor after heating can be calculated as follows:

Reactor Head Space Volume After Heating
= (4000 gal – 2280 gal)(0.1337 acf/gal)(530 scf/591 acf) = 206 scf

A very conservative estimate of the amount of gas displaced by evaporation of volatile batch constituents (NBA and water) can be estimated by assuming that these constituents exert their pure substance vapor pressures after heating and exert zero vapor pressure prior to heating.

The vapor pressure of NBA after heating is ~ 56 mm Hg ~0.074 atm
The vapor pressure of water after heating is ~ 118 mm Hg ~0.155 atm

An estimate of the volume of noncondensible gas after heating can be calculated as follows:

Noncondensible Gas Volume After Heating
= (206 scf)(1 – 0.074 – 0.155) = 159

Accordingly, a very conservative estimate of the amount of gas displaced by heating can be calculated as follows:

Volume of Gas Displaced by Heating
= 213 scf – 159 scf = 54 scf

If needed because of the oxygen content in the reactor head space, the reactor head space may be purged with nitrogen before the batch is heated. The flow rate of the nitrogen purge would be approximately 20 scfm and the duration would be approximately 5 minutes. This would result in a nitrogen purge gas volume of approximately 100 scf. If a nitrogen purge is conducted, the total volume of gas emitted from the reactor during the heating step would be 154 scf.

The vapor pressure of NBA at the average batch temperature during heating is approximately 44 mm Hg. Assuming the gas is saturated with NBA vapor at the condenser outlet, estimates of the vapor emitted by heating can be calculated as follows:

VOC Vapor Emitted During Heating, Before Control
= (154 scf gas)(44 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor) = 2.67 lb

VOC Vapor Emitted During Heating, After Control
= (154 scf gas)(6.5 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor) = 0.395 lb

Maximum VOC Range:
VP at 70°F = 10 mm Hg = 0.19 psia
Worst-Case Maximum Vapor Concentration
= (44/760) = 5.8%
VOC Range is D

Step 4. Transfer to E8540/V-57B0

The batch is transferred from the BOH reactor, V-570 or V-57A0, to new holding tank, V-57B0. The displaced volume of gas/vapor during this step is roughly equivalent to the volume in the BOH reactor (~2,900 gallons) after heating to 55°C plus ~100 gallons of tempered de-ionized water used to flush the line. During the transfer, the headspaces can be assumed to exist at 55°C.

Normally, the transfer is conducted with the two reactors having equalized headspaces; this measure is meant to reduce the volume of gas/vapor emitted during the transfer, since the only difference in volume comes from the line flushing, only 100 gallons of vapor are displaced.

If one is to consider the unlikely situation that the equalizing valve remains closed during the transfer, then a full 3,000 gallons of volume will be displaced to the emission point.

An estimate of the volume of gas (nitrogen plus vapor) displaced from the reaction vessel by the charge added can be calculated as follows:

Gas Displaced by Charge Added

= (3,000 gal)(0.1337 acf/gal)(~1 scf/acf) = 401 scf

If needed because of the oxygen concentration in the reactor head space (the space between the batch liquid and the top of the reactor), the reactor head space may be purged with nitrogen during the initial charge. If the nitrogen purge is used, the flow rate will be approximately 20 scfm and the duration will be approximately 5 minutes. This will result in a nitrogen purge gas volume of approximately 100 scf. The nitrogen purge gas will enter the top of the reactor and it will flow through the upper portion of the head space.

The total amount of gas displaced from the reactor (including both the gas displaced by the feed and the gas displace by the nitrogen purge) will be approximately 501 scf.

The displaced gas contains vapors of the feed materials. The vapors are due principally to the predominant and most volatile of the feed materials, n-butyl acetate (NBA). The vapor pressure of NBA at the batch temperature of 131 ^{o}F is approximately 4 mm Hg. The gas is not saturated with feed vapors, however, because the reactor was empty prior to charging and there is not sufficient time during charging for saturation to occur. This situation is comparable to a storage tank with a high turnover rate, in which the head space vapor concentration is well below saturation. In the USEPA AP-42 organic liquid storage tank emission calculation procedures, this was accounted for by a "turnover factor" which related the approach to saturation to the frequency of turnovers. A “saturation factor” of 0.25, corresponding to a “turnover factor” for a high turnover frequency, is used to estimate the approach to saturation during initial charging of the reactor.

Based on the above information, an estimate of the amount of VOC vapor emitted during charging can be calculated as follows:

VOC Vapor Emitted During Charging and Purging

= (0.25)(401 scf gas)(4 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor)

= 0.16 lb

Maximum VOC Range:
VP at 130^{o}F = 10 mm Hg = 0.19 psia
Worst-Case Maximum Vapor Concentration
= (0.25)(4/760) = 0.13%
VOC Range is B

Step 5. Reheat V-57B0

In the unlikely event that a shutdown occurs, V-57B0 will cool down. Before resuming operation, V-57B0 must be warmed up from ~30^{o}C to an operating temperature of 55^{o}C. The resulting change in density will result in a displaced volume through the vent going to the emission point. The VOC emission will remain the same as charging the vessel and the calculations are shown above. VOC Range is B

Step 6. Charging of E8507/V-580

An initial charge of NBA plus inorganic materials is added to reactor V-580. The volume of the material charged is approximately 200 gallons.

An estimate of the volume of gas (nitrogen plus vapor) displaced from the reaction vessel by the charge added can be calculated as follows:

Gas Displaced by Charge Added

= (200 gal)(0.1337 acf/gal)(~1 scf/acf) = 27 scf

The average temperature of the equipment and the feed materials at the time of charging is estimated to be approximately 70°F, and the maximum temperature in not expected to exceed 90°F. To provide a margin of safety for the air permit, a temperature of 90°F is used for the emission estimate calculations. Since the vessel is empty prior to charging, a vapor saturation factor of 0.25 is used in the calculations.

The vapor pressure of the volatile batch constituent (NBA) at the conservative batch temperature of 90°F is less than 20 mm Hg. Based on this information, an estimate of the VOC vapor emitted during charging can be calculated as follows:

VOC Vapor Emitted During Charging
= (0.25)(27 scf gas)(20 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor) = 0.0532 lb

Maximum VOC Range:
VP at 70°F = 10 mm Hg = 0.19 psia
Worst-Case Maximum Vapor Concentration
= (0.25)(20/760) = 0.66%
VOC Range is B

Step 7, 8. ES12 Feed, Heat

The batch is heated and feed from V-57B0 is drawn into the reactor and reacted as the pressure is steadily reduced and then held at the vacuum set point. The gas above the batch in the reactor will be displaced and withdrawn from the reactor by the heating and pressure reduction. An estimate of the volume of the gas emitted from the reactor can be calculated as follows:

Gas Volume Emitted During Heating, Evacuating, Charging and Reacting

= (800 gal – 200 gal)(0.1337 acf/gal)(~1 scf/acf) = 80 scf

The gas passes through V-580 process condensers where NBA is condensed from the gas and drained into receiver tank T-582. Tank T-582 is under vacuum, interconnected with V-580, so no gas/vapor is emitted from the tank as NBA is drained into it. Before being discharged to the atmosphere, the gas withdrawn from V-580 passes through the Pad 5 condenser system, which has been designated emission control device CD8504.

To reduce VOC emissions, the Pad 5 condenser is cooled with tempered chilled water. As explained in Section 3.2, the condenser system is controlled so that under normal operating conditions (i.e., not emergencies or process upsets) the condenser gas outlet temperature does not exceed 60°F. For conservatism, and to provide a margin of safety, 70°F is specified as the "average exhaust temperature" for the RADIUS permit application, and 70°F is the temperature used for computing controlled VOC emissions. Use of condenser cooling water that is not chilled, tempered, and controlled can be used as a basis for estimating the VOC emission rate without control. For this purpose, the average exhaust gas temperature is assumed to be 85°F. The vapor pressure of the volatile batch constituent (NBA) at the condenser outlet temperature of 70°F is approximately 10 mm Hg. The vapor pressure of NBA at 85°F is approximately 15 mm Hg. Based on this information, estimates of the VOC vapor emissions can be calculated as follows:

VOC Vapor Emitted During Heating, Evacuation, Charging and Reacting
Before Control
= (80 scf gas)(15 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor) = 0.473 lb

VOC Vapor Emitted During Heating, Evacuation, Charging and Reacting
After Control
= (80 scf gas)(10 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor) = 0.316 lb

Maximum VOC Range:
VP at 70°F = 10 mm Hg = 0.19 psia
Worst-Case Maximum Vapor Concentration
= (15/760) = 2.0%
VOC Range is D

Step 9. ES13 Charging

During the initial charging of V-580, a small amount of catalyst is fed from T-580. The catalyst is in an NBA solution. The amount of solution charged per batch is approximately 50 to 55 gallons. T-580 is periodically replenished with catalyst solution. A portion of the vapor that is emitted during replenishment is accounted for in each batch emission calculation based on the quantity of solution used for each batch.

Accordingly, based on the vapor pressure of NBA at 70°F (approximately 10 mm Hg), the portion of T-580 replenishment vapor emissions associated with each batch can be calculated as follows:

Portion of T-580 Replenishment Vapor Emissions
Associated with Each Batch
= (55 gal)(0.1337 acf/gal)(~1scf/acf)(10 scf vapor/760 scf gas)
x (1 mole vapor/387 scf vapor)(116 lb vapor/mole vapor) = 0.0290 lb

Maximum VOC Range:
VP at 70°F = 10 mm Hg = 0.19 psia

Worst-Case Maximum Vapor Concentration
= (10/760) = 1.3%
VOC Range is D

Step 10. ES10 Charging

Charging of the storage tanks T-557, C-5711, T-5711 and T-57A8 from T-582 which is a receiver tank for the batch reactor V-580.

Mass transferred/batch = 7000 kg

Approximate volume displaced/ batch = 2178.6 gal

Batch/day = 8

Volume/ day = 66 m^3

Volume fraction VOC = 0.0403

Density = 0.91 kg/m^3 (66 m^3) = 59.77 kg /day (kmol/28kg of N_2) = 2.13 kmol N_2/day (0.0403) = 0.09 kmol VOC/day

VOC emissions = 0.09 kmol VOC/day (116 kg vapor/mole vapor) = 10.40 kg VOC/day = 3.42 ton VOC/ year

VOC Range D

Step 11. E8507 Discharge

The batch of crude product is discharged to a crude product storage tank.

Mass transferred/batch = 2200 kg

Approximate volume displaced/ batch = 582 gal

Batch/day = 8

Volume/ day = 17.6 m^3

Volume fraction VOC = 0.0040
Density = 0.975 kg/m3 (17.6 m^3) = 17.22 kg/day (kmol/28kg of N_2) = 0.61 kmol N_2/day (0.0040) = 0.03 kmol VOC/day

VOC emissions = 0.03 kmol VOC/day (116 kg vapor/mole vapor) = 3.48 kg VOC/day = 1.4 ton VOC/ year

VOC Range B

Step 12. E8539 Charging/Mixing

Catalyst solution is made in campaigns in T-551R, operators charge materials to the tank on a scheduled basis and the tanks recirculation ensure the solution is well mixed. Drums of 60°C non-volatile heavies are charged with a non-volatile catalyst mixture and volatile butyl-acetate from T-5A02. The charge recipe results in a solution that is 45% n-butyl acetate by mass.

Mass transferred/batch = 185 kg

Approximate volume displaced/ batch = 51.5 gal

Batch/day = 8

Volume/ day = 1.6 m^3

Volume fraction VOC = 0.0372
Density = 0.91 kg/m^3 (1.6 m^3) = 1.47 kg/day (kmol/28kg of N_2) = 0.05 kmol N_2/day (0.0372) = 0.002 kmol VOC/day

VOC emissions = 0.002 kmol VOC/day (116 kg vapor/mole vapor) = 0.23 kg VOC/day = 0.09 ton VOC/ year

VOC Range D

HABA PERMIT APPLICATION
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NEWARK, NJ

Equipment	Facility's Designation	Description	Old Equipment/Control Device Set	New Equipment Set ID	Significant / Insignificant
E8534	T-557	T-557 NBA Receiver / Feed Tank	ES-1	ES10	Significant
E8535	C-5711	C-5711 NBA Wash Column			Significant
E8536	T-5711	T-5711 Washed NBA Receiver Tank			Significant
E8537	T-57A8	T-57A8 Washing NBA Feed Tank			Significant
E8506	V-570	4000 gallon batch reaction vessel	ES-2	ES11	Significant
E8527	V-57A0	4000 gallon batch reaction vessel			Significant
E8507	V-580	800 gallon batch reaction vessel	ES-3	ES12	Significant
E8528	E-580				
E8523	T-582	250 gallon receiver tank for batch reaction vessel			Insignificant
E8507	V-580	800 gallon batch reaction vessel	ES4	ES13	Significant
E8522	T-580	1200 gallon feed tank for batch reaction vessel			Significant
E8540	V-57B0	4000 gallon Holding vessel	E8540	E8540	Significant
E8539	T-551R	T-551R Mixing Tank	E8539	E8539	Significant
E8507	V-580	800 gallon batch reaction vessel	E8507	E8507	Significant
CD8505	E-570	V-570 Condenser	CS-1	CS1	-
CD8506	E-57A0	V-57A0 Condenser			-
CD8504	Pad5Condensers	Pad 5 Vent Header Condensers	CD8504	CD8504	-
CD8502	C-50A5	Emergency Release Scrubber	CD8502	CD8502	-
CD8503	C-50A6	Emergency Release Scrubber	CD8503	CD8503	-

HABA PERMIT APPLICATION
FIRMENICH
NEWARK, NJ

								Step Run Time (hours)			Flow (acfm)		Temperature (deg F)	
Step NJID	Facility's Designation	Step Description	Operation Type	Significant Equipment	Control Device(s)	Emission Point(s)	SCC(s)	Min	Max	VOC Range	Min	Max	Min	Max
1	Charging	Batch Reactor Fill	Normal-Steady State	ES11	CS1(P), CD8502(S)	PT8502	3-01-091-99	3	4	B	0	10	32	95
2	Mix	Mix Batch	Normal-Steady State	ES11			3-01-091-99	4	6	-	0	1	32	95
3	Heat	Adjust temperature	Normal-Steady State	ES11	CS1(P), CD8502(S)	PT8502	3-01-091-99	0.5	1	D	0	5	32	140
4	Transfer	Transfer batch contents between vessels	Normal-Steady State	E8540	CS1(P), CD8502(S)	PT8502	3-01-091-99	0.5	1	B	0	10	104	140
5	Reheat	Reheating of the reactor	Normal-Steady State	E8540	CD8504(P), CD8503(S)	PT8501	3-01-091-99	0.5	1	B	0	5	86	140
6	Charging	Batch Reactor Fill	Normal-Steady State	E8507	CD8504(P), CD8503(S)	PT8501	3-01-091-99	0.5	1	B	0	3.5	68	86
7	Feed	Transfer batch contents between vessels with heat and vacuum	Normal-Steady State	ES12	CD8504(P), CD8503(S)	PT8501	3-01-091-99	1.5	2.5	D	0	3.5	122	266
8	Heat	Adjust temperature	Normal-Steady State	ES12	CD8502 (P)	PT8502	3-01-091-99	0.5	1	D	0	5	68	250
9	Charging	Batch Reactor Fill	Normal-Steady State	ES13	CD8502 (P)	PT8502	3-01-091-99	0.5	1	D	0	10	68	86
10	Charging	Manufacturing and Material Handling	Normal-Steady State	ES10	-	-	3-01-091-99	1.5	2.5	F	0	10	86	140
11	Discharge	Discharge to tanks	Normal-Steady State	E8507	-	-		0.25	1	G	0	3.5	100	160
12	Charging/Mix	Charging and mixing in the mixing tank	Normal-Steady State	E8539	-	-		2	6	H	0	10	32	150

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NEWARK, NJ

		Before Control Devices								After Control Devices			
Step NJID	VOC Range	lb/step	Time per step (min)	lb/hr	Time per Batch (hr)	lb/batch	Days of operation / yr	lb/yr	Tons/yr	lb/step	lb/hr	lb/batch	lb/yr
1	B	0.0820	60	0.08	4.00	0.33	220	144.32	0.07	0.00	0.00	0.02	7.22
2	-	-	-	-	-	-	-	-	-	-	-	-	-
3	D	2.67	60	2.67	1.00	2.67	220	4,699.20	2.35	0.13	0.13	0.13	234.96
4	B	0.16	60	0.16	1.00	0.16	220	281.60	0.14	0.01	0.01	0.01	14.08
5	B	0.16	60	0.16	1.00	0.16	220	281.60	0.14	0.01	0.01	0.01	14.08
6	B	0.05	60	0.05	1.00	0.05	220	93.63	0.05	0.00	0.00	0.00	4.68
7	D	0.47	60	0.47	2.50	1.18	220	832.48	0.42	0.32	0.32	0.79	556.16
8	D	0.47	60	0.47	1.00	0.47	220	832.48	0.42	0.32	0.32	0.32	556.16
9	D	0.03	60	0.03	1.00	0.03	220	51.04	0.03	0.00	0.00	0.00	2.55
10	F	2.87	60	2.87	1.00	2.87	298	6,832.50	3.42	2.87	2.87	2.87	6,832.50
11	G	0.96	60	0.96	1.00	0.96	365	2,800.28	1.40	0.96	0.96	0.96	2,800.28
12	H	0.06	60	0.06	1.00	0.06	365	185.08	0.09	0.06	0.06	0.06	185.08
	Total							17,034.2	8.5				11,207.75

Tons/yr
0.00
-
0.12
0.01
0.01
0.00
0.28
0.28
0.00
3.42
1.40
0.09
5.604

Raw Material	CAS #
70 % Hydrogen Peroxide Solution	7722-84-1
Butyl Acetate	123-86-4
Bicyclene Oxide	32539-83-
70 % of p-Toluenesulfonic Acid in Water	104-15-4
25 % Sodium Hydroxide	1310-73-2
15 % Sodium Sulfite in Water	7757-83-7

	Firmenich Item Code	Kgs	Percent
1	971779	754	7%
	900608	6490	63%
-6	916575	1887	18%
	988100	31	0.3%
2	966250	40	0.4%
7	982226	1056	10%
	Total =	10,258	100%