KORDSA
THE REINFORCER

Chattanooga USA
P.O. Box 599 Hixson, TN 37343
4501 N. Access Rd, Chattanooga, TN 37415
T + 01 423 643 8300
F + 01 423 643 2726
www.kordsa.com

Laurel Hill
17780 Armstrong RD
Laurel Hill, NC 28351
T + 01 910 462 2051
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March 17, 2023

Mr. Alan Frazier
Chattanooga-Hamilton County Air Pollution Control Bureau
6125 Preservation Drive
Chattanooga, TN 37416-3638

Subject: Kordsa, Inc.
Installation Permit Application
Dip and Hot Stretch Unit with Natural Gas Ovens

Dear Mr. Frazier:

With this letter, Kordsa Inc. (Kordsa) submits a permit application for an installation permit at its Chattanooga, TN facility. The expansion includes various equipment for one Dip Unit for application of latex, formaldehyde, ammonia and various additives in a dip solution to greige fabric (synthetic woven polymer). Equipment listed in the application includes – raw materials storage tanks, process equipment, and the natural gas fired ovens (7 ovens total). A process flow diagram is included in the application. The appropriate forms and calculations are attached.

Kordsa has reviewed the applicability of 40 CFR 60 Subpart VVV in §§60.740(b) below:

> *Any affected facility for which the amount of VOC used is less than 95 Mg per 12-month period is subject only to the requirements of §§ 60.744(b), 60.747(b), and 60.747(c). If the amount of VOC used is 95 Mg or greater per 12-month period, the facility is subject to all the requirements of this subpart. Once a facility has become subject to the requirements of this subpart, it will remain subject to those requirements regardless of changes in annual VOC use.*

Kordsa has projected the annual (12-month) VOC usage requirement for the Dip Unit, and the facility will maintain overall VOC usage of the Dip Unit affected by this rule below 95 Mg (104.72 Tons) per 12-month period.

Current Permits 6132-10200501-06C and 6132-10200501-07C for Kordsa's three Boilers and five Dowtherm Vaporizers state that no more than 2300 x 10^6 cubic feet of natural gas and no more than 880,000 gallons of No. 2 Fuel Oil shall be burned in the sources combined during any period of twelve (12) consecutive calendar months. Kordsa requests to maintain this plant-wide fuel burning limit with the installation of seven (7) Natural Gas fired ovens for Dip Unit 1, each rated at 6.83 MMBtu/hr (2MW) per oven. Kordsa has reviewed its recent operations and believes it will be able to operate within the above fuel burning limits for 12-consecutive month periods for this project.

The facility is an area source of HAPs with not more than 10.0 tons per year for each individual HAP and below 24.9 tons per year for total HAPs, and, with this installation permit, Kordsa requests a limit of 9.9 Tons/Year of annual Methanol emissions (contained in the formaldehyde at 8% as a stabilizer) to avoid becoming a major source of HAPs. In the potential emissions calculations contained in this application, Kordsa has conservatively assumed that all Methanol used in the process is emitted either in the drying ovens or as fugitive emissions from the process. However, it is expected that the actual methanol emissions will be much lower as a result of thermal decomposition of the methanol during the recirculation of the oven exhaust when it is reintroduced following the combustion chamber. At the current projected annual production volume and usage rates, and with a conservative margin of 25% for the emissions from this Dip Unit, Kordsa will be able to achieve desired production output with the expected product mix and be able to demonstrate compliance by mass balance, as shown in the attached calculations.

Kordsa relied on information in the Sumitomo Rubber USA, LLC permit for the facility in Buffalo, NY, concerning use of Resorcinol. Kordsa also relied on information in the Warwick Mills, Inc. permit for the facility in New Ipswich, NH, concerning use of Grilbond G-1701 and Grilbond IL-6-50%. Each of these products is considered to be 0% VOCs and 0% HAPs based on review of the above permits and Material SDS.

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I hereby certify that, based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Please provide written notification of receipt of a complete application so that Kordsa may continue with the initial groundbreaking and civil construction phases of the project. If you have questions or comments, please contact Miles Jorgensen, Environmental Engineer, at (423) 643-2759, or my consultant, Hunter Hill, at (205) 471-0307.

Sincerely,

Kadir Toplu

Chief Operations Officer

BASIC APPLICATION FOR EQUIPMENT / AIR POLLUTION PERMIT OR CERTIFICATE OF OPERATION

FORM E001
03/2011

1. Name of Company Kordsa, Inc.
(If corporation or LLC, name on file with Tennessee Secretary of State Corporate Records Division)

2. NAICS Code: 325222; 325211

3. Company Official to Contact: J. Miles Jorgensen

4. Phone No. 423-643-2759

5. Mailing Address: 4501 N Access Road (*Street or P.O. Box*) Chattanooga (*City*) TN (*State*) 37415 (*Zip Code*)

6. Physical Location
(If different from line 5) 4501 N Access Road (*Street*) Chattanooga (*City*) TN (*State*) 37415 (*Zip Code*)

7. Application for:
☒ Installation Permit ☐ Initial Certificate of Operation ☐ Renewal Certificate of Operation

Previous Installation Permit or Certificate of Operation No.: _____

8. Type of equipment for which application is made:

☒ Process Equipment (Form E010 or Form E010A)	☐ Previously Submitted	☒ Attached
☐ Fuel Burning Equipment (Form E011)	☐ Previously Submitted	☐ Attached
☐ Incineration Equipment (Form E012)	☐ Previously Submitted	☐ Attached
☐ Minor Pollution Source (Form E014) *(Less than 1000 lbs/yr and less than 10 lbs/day total uncontrolled contaminant emissions)*	☐ Previously Submitted	☐ Attached

The following forms are filed with this application:
E010, E010A, E106, E011, E110, Storage Tanks Forms E010 (4 forms), E106

9. Equipment Name:
DIP UNIT 1 - DU1

10. If application is for a Certificate of Operation (Initial or Renewal), are there any changes since previous application in the equipment or operation which might:

A. Increase, decrease, or alter process materials, fuel, refuse type, etc.? ☐ Yes ☐ No

B. Increase, decrease, or alter emissions or emission points? ☐ Yes ☐ No

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AIR POLLUTION CONTROL BUREAU

11. Process Weight, lb/hr, (Item 6 on Form E010), Incineration Rate, lb/hr, (Item 3C on Form E012), or Fuel Burning Rate, 1,000 Btu/hr, (Item 7C on Form E011): 6,615 LB/HR (Greige Fabric) - AND - 662 LB/HR (Dip Sol'n)
= 7,277 lb/hr

This is to certify that I am familiar with operations concerning this equipment and the information provided on this application is true and complete to the best of my knowledge:

Mail completed form to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive, Suite 140
Chattanooga, TN 37416-3638

This form must be completely filled out before it will be processed

J. Miles Jorgensen
Name
Environmental Engineer
Title
03 - 17 - 2023
Date

Table 1. Facility-wide Hourly Potential Emissions

Emission Unit	EUID	Potential Emission Rate (lb/hr)															
		Total PM	Total PM [1] (Allowable)	Total PM_{10}	Total $PM_{2.5}$	NO_X	CO	SO_2	VOC	HMD	NH_3	Total HAP	Formaldehyde	Styrene	Methanol	Biphenyl	CO_2e
Boilers #2, #6, and #7		6.046	11.25	3.664	3.664	28.157	21.124	13.008	1.383	--	--	--	--	--	--	--	41,976
Riley Dowtherm Vaporizers #1 - #4 and #6		2.499	5.00	1.514	1.514	15.143	8.729	5.376	0.572	--	--	--	--	--	--	--	17,347
Facility PTE from Power Combustion Sources (lb/hr)		**8.545**	**16.250**	**5.179**	**5.179**	**43.300**	**29.853**	**18.384**	**1.955**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**59,323**
Dowtherm Transport System		--	--	--	--	--	--	--	9.640	--	--	2.523	--	--	--	2.523	--
Two Hexamethylene Diamine Storage Tanks		0.476	1.11	0.476	0.476	--	--	--	--	0.000	--	--	--	--	--	--	--
CP Line IV		1.497	1.50	1.497	1.497	--	--	--	0.180	1.497	0.074	--	--	--	--	--	--
CP Line V		1.489	1.50	1.489	1.489	--	--	--	0.173	1.489	0.071	--	--	--	--	--	--
Spinning Machines 321, 322, 331, 332, 333		1.50	2.00	1.50	1.50	--	--	--	--	--	--	--	--	--	--	--	--
Dip and Hot Stretch Unit 1	DU1	5.62	5.62	0.09	0.09	2.34	3.93	0.03	0.258	--	--	--	0.11	0.69	2.46	--	5,627.12
DIP UNIT 1 Process NH3, VOCs & HAPs	DU1	--	--	--	--	--	--	--	3.92	--	15.28	N/A				--	--
Storage Tanks	DU1																
Facility PTE from Non-Combustion Sources (Includes Ovens)		**10.582**	**11.729**	**5.051**	**5.051**	**2.342**	**3.935**	**0.028**	**14.173**	**2.986**	**15.425**	**2.523**	**0.114**	**0.690**	**2.457**	**2.523**	**5,627**
Insignficant Activities by Emission Level[2]																	
Emergency Generator		0.220	--	0.085	0.082	7.04	3.86	0.27	0.430	--	--	--	--	--	--	--	778.26
Emergency Fire Pump		0.173	--	0.066	0.064	5.51	3.02	0.21	0.337	--	--	--	--	--	--	--	609.83
Space Heaters		0.024	--	0.006	0.006	0.31	0.26	0.00	0.017	--	--	--	--	--	--	--	374.71
Facility-wide PTE (lb/hr)		**19.126**	**27.979**	**10.230**	**10.230**	**45.642**	**33.788**	**18.412**	**16.127**	**2.986**	**15.425**	**4.409**	**0.114**	**0.690**	**2.457**	**2.523**	**64,950**

1. For process areas with Total PM permit limits, emissions based on permit limits. For other areas, potential emissions are based on maximum annual production.
2. To be considered an insignificant activity under §4-56(c)(12)(ii) of the Chattanooga City Code, each individual stack related to an insignificant activity must have a potential-to-emit of less than 0.500 lb PM/hr and not emit any gaseous pollutants.
The combined emissions from all sources deemed insignficant by emission level must be less than 2 lb PM/hr. The flake handling system is included as an insignificant activity per §4-56(c)(12)(ii) of the Chattanooga City Code.
Additionally, the total emissions from each individual insignficant activity category (including listed categories and insignficant by emission level) must be less than 5 tpy for each criteria pollutant emitted and less than 1,000 lb/yr for each HAP per §4-56(c)(11),(12) of the Chattanooga City Code.
The storage tanks (greater than 1,000 gal in capacity) at the site are deemed to be insignficant by emission level per §4-56(c)(12)(xi) of the Chattanooga City Code.

Table 2. Facility-wide Annual Potential-to-Emit

Emission Unit	EUID	Potential Emission Rate (TPY)															
		Total PM	Total PM [1] (Allowable)	Total PM_{10}	Total $PM_{2.5}$	NO_X	CO	SO_2	VOC	HMD	NH_3	Total HAP	Formaldehyde	Styrene	Methanol	Biphenyl	CO_2e
Boilers #2, #6, and #7		5.392	--	1.865	1.865	41.166	45.743	3.435	2.939	--	--	1.03	0.05	--	--	--	72,348
Riley Dowtherm Vaporizers #1 - #4 and #6		3.459	--	0.865	0.865	45.518	38.235	0.273	2.503	--	--	0.86	0.03	--	--	--	54,677
Facility PTE from Power Combustion Sources (tpy)		**8.851**	**0.000**	**2.730**	**2.730**	**86.683**	**83.978**	**3.708**	**5.442**	**0.000**	**0.000**	**1.886**	**0.088**	**0.000**	**0.000**	**0.000**	**127,024**
Dowtherm Transport System		--	--	--	--	--	--	--	20.152	--	--	5.091				5.091	--
Two Hexamethylene Diamine Storage Tanks		0.329	--	0.33	0.33	--	--	--	--	0.00	--	--				--	--
CP Line IV		2.859	6.57	2.859	2.859	--	--	--	0.790	2.86	0.323	--				--	--
CP Line V		1.707	6.57	1.707	1.707	--	--	--	0.758	1.71	0.311	--				--	--
Spinning Machines 321, 322, 331, 332, 333		6.57	8.76	6.57	6.57	--	--	--	--	--	--	--				--	--
Dip and Hot Stretch Unit 1	DU1	19.67	19.67	5.89	5.89	8.20	13.77	0.10	0.90	--	53.48	11.79	0.41	2.49	8.60	--	19,695
DIP UNIT 1 Process NH3, VOCs & HAPs	DU1	--	--	--	--	--	--	--	13.72	--						--	--
Storage Tanks	DU1	--	--	--	--	--	--	--	0.08	--	--	--	--	--	--	--	--
Facility PTE from Non-Combustion Sources (Includes Ovens)		**31.133**	**41.568**	**17.355**	**17.355**	**8.198**	**13.772**	**0.098**	**36.402**	**4.566**	**54.116**	**16.886**	**0.410**	**2.489**	**8.600**	**5.091**	**19695**
Insignficant Activities by Emission Level[2]																	
Emergency Generator		0.011	--	0.004	0.004	0.352	0.193	0.014	0.022	--	--	--	--	--	--	--	38.9
Emergency Fire Pump		0.009	--	0.003	0.003	0.276	0.151	0.011	0.017	--	--	--	--	--	--	--	30.5
Space Heaters		0.10	--	0.026	0.026	1.374	1.154	0.008	0.076	--	--	--	--	--	--	--	1,641.23
Facility-wide PTE (tpy)		**40.108**	**41.568**	**20.118**	**20.118**	**96.883**	**99.248**	**3.839**	**41.958**	**4.566**	**54.116**	**18.771**	**0.498**	**2.489**	**8.600**	**5.091**	**148,430**

1. For process areas with Total PM permit limits, emissions based on permit limits. For other areas, potential emissions are based on maximum annual production.
2. The total emissions from each individual insignficant activity category (including listed categories and insignficant by emission level) must be less than 5 tpy for each criteria pollutant emitted and less than 1,000 lb/yr for each HAP per §4-56(c)(11),(12).
The flake handling system is included as an insignificant activity per §4-56(c)(12)(ii) of the Chattanooga City Code.
The storage tanks (greater than 1,000 gal in capacity) are included as insignificant activity per §4-56(c)(12)(xi) of the Chattanooga City Code.

PROCESS EQUIPMENT APPLICATION

FORM E010
07/2000

1. ***Name of Company*** (as shown on Line 1, Form E001): Kordsa, Inc.

2. ***Equipment Name*** (as shown on Line 10, Form E001): DIP UNIT - 1

3. ***Installation Date***: November 2023

4. ***Type of Process***: Dip Coating and Hot Stretch Process

5. ***Major Raw Materials Used***: Woven Synthetic Polymer Fabric

6. ***Process Weight***: 6,615 LB/HR (Greige Fabric) - AND - 662 LB/HR (Dip Sol'n) Pounds per hour
This is the total weight of all materials introduced into the process.

7. ***Control Equipment***

- [x] Emissions Uncontrolled
- [ ] Baghouse (File Form E102)
- [ ] Wet Collecting Device (File Form E103)
- [ ] Inertial Separators (File Form E105)
- [ ] Electrostatic Precipitator (File Form E104)
- [ ] Other – Specify: _____

8. ***Control Efficiency***

Enter the control efficiency for each pollutant emitted by this equipment (for appropriate Forms E102, E103, E104, E105, E107, or enter zeros if the emissions are uncontrolled as noted in Item 7.

Pollutant	% Efficiency
Particulates	0
SO_x	0
NO_x	0
CO	0
Hydrocarbons	0
Other:	

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CONTROL BUREAU

9. ***Emissions Summary***

Enter the amount of each pollutant listed in pounds per hour.

Pollutant	Uncontrolled Emissions (File Form E106)	Actual Emissions (Stack Test Report)		Estimated Emissions (See Formula A)
Total Suspended Particulate	5.62	N/A		5.62
PM10	0.09	N/A		0.09
Sulfur Oxides	0.03	N/A		0.03
Nitrogen Oxides (as NO_2)	2.34	N/A	OR	2.34
Other (specify)	0.258	N/A		0.258
VOC				

Formula A:

$$\text{Estimated Emissions} = \frac{(100\% - \text{Control Efficiency (\%)})}{100\%} \times \text{Uncontrolled Emissions}$$

10. ***Environmental Impact***

Those emissions indicated in Item 9 may at times under normal operating conditions cause (check all that apply):

☐ Odors ☐ Eye Irritations ☐ Property Damage ☑ Health Effects

☑ Other nuisances outside of plant property ☐ No environmental damage

11. ***Emission Point Data***

Stack Height (emission point) above ground: See Attached Ft.
Ground Elevation above sea level at stack base: 690 Ft.
Stack Diameter: Attached Ft.
Volume of gas discharged into atmosphere: _____ cfm
Gas exit temperature: _____ °F

12. ***Ave. Operating Time***

Daily: 20 hours Weekly: 7 Days Yearly: 50 Weeks

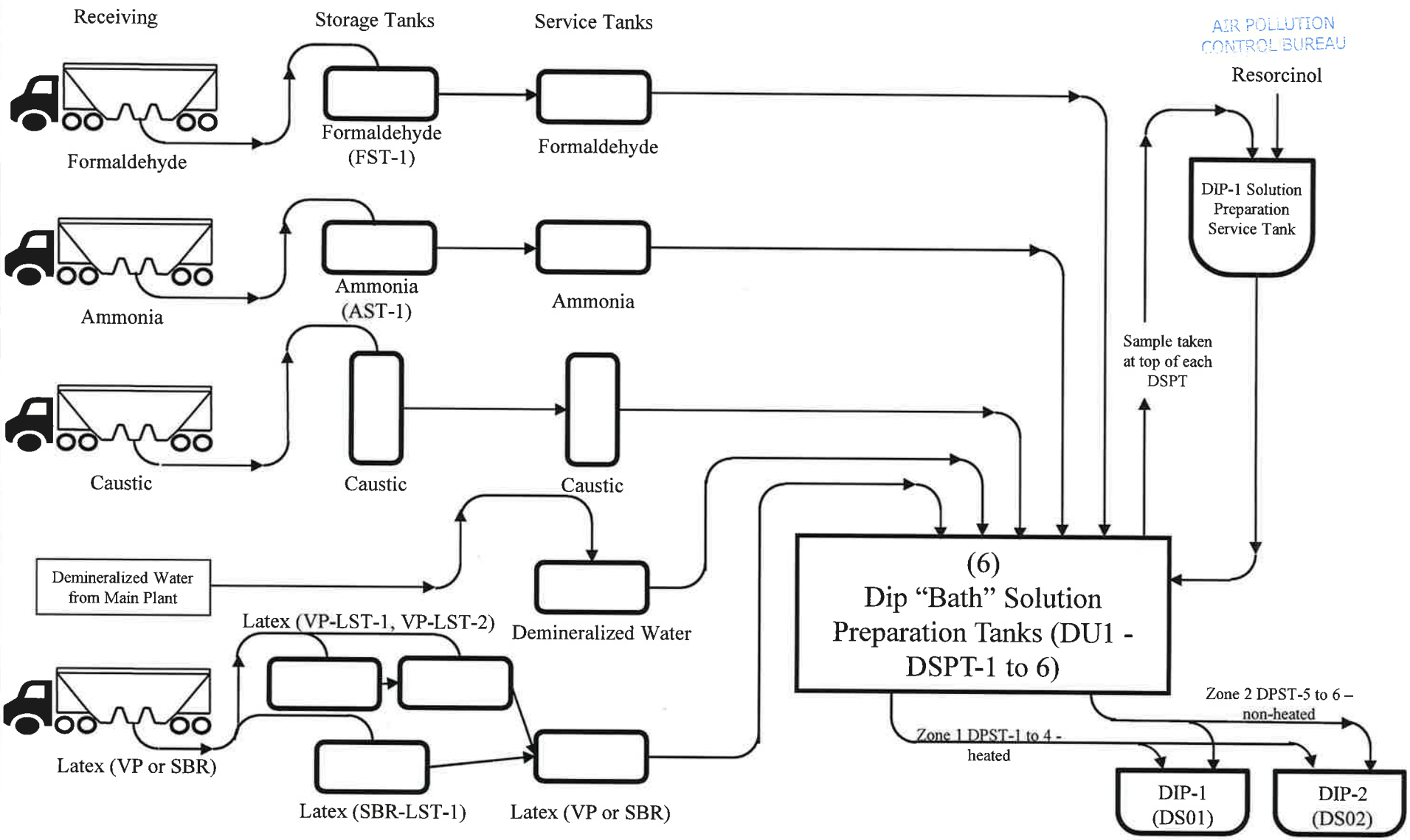
This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge.

J. Miles Jorgensen
Company Official

Environmental Engineer
Title

03-17-2023
Date

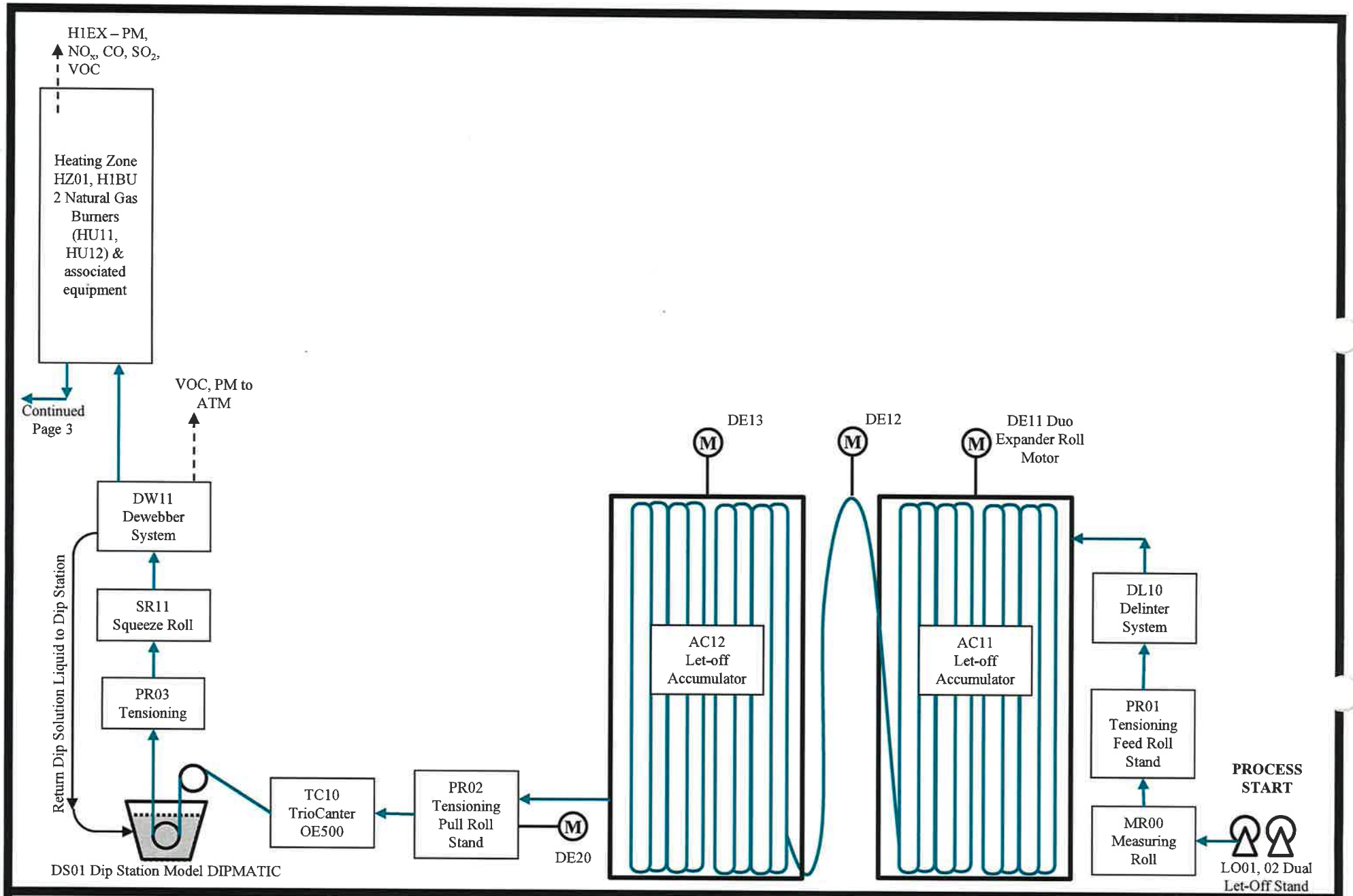
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive, Suite 140
Chattanooga, TN 37416-3740



STEVENSEHS CONSULTING

Kordsa, Inc. – Dip and Hot Stretch Unit 1 – Receiving and Solution Prep

Emissions Process Flow Diagram
Page 1 of 8

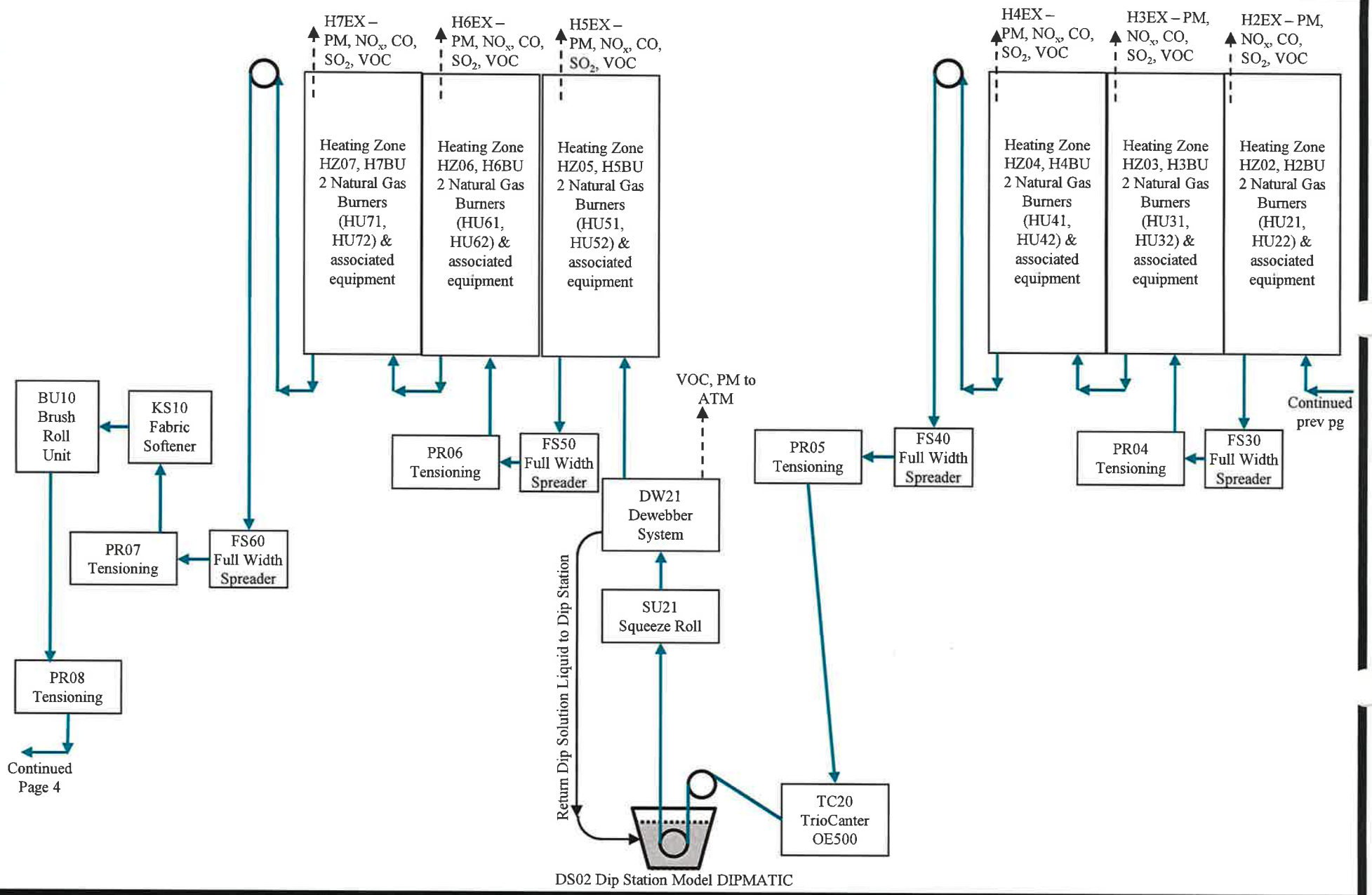


STEVENSEHS CONSULTING

Kordsa, Inc. – Dip and Hot Stretch Unit 1(DU1)

Emissions Process Flow Diagram

Page 2 of 8

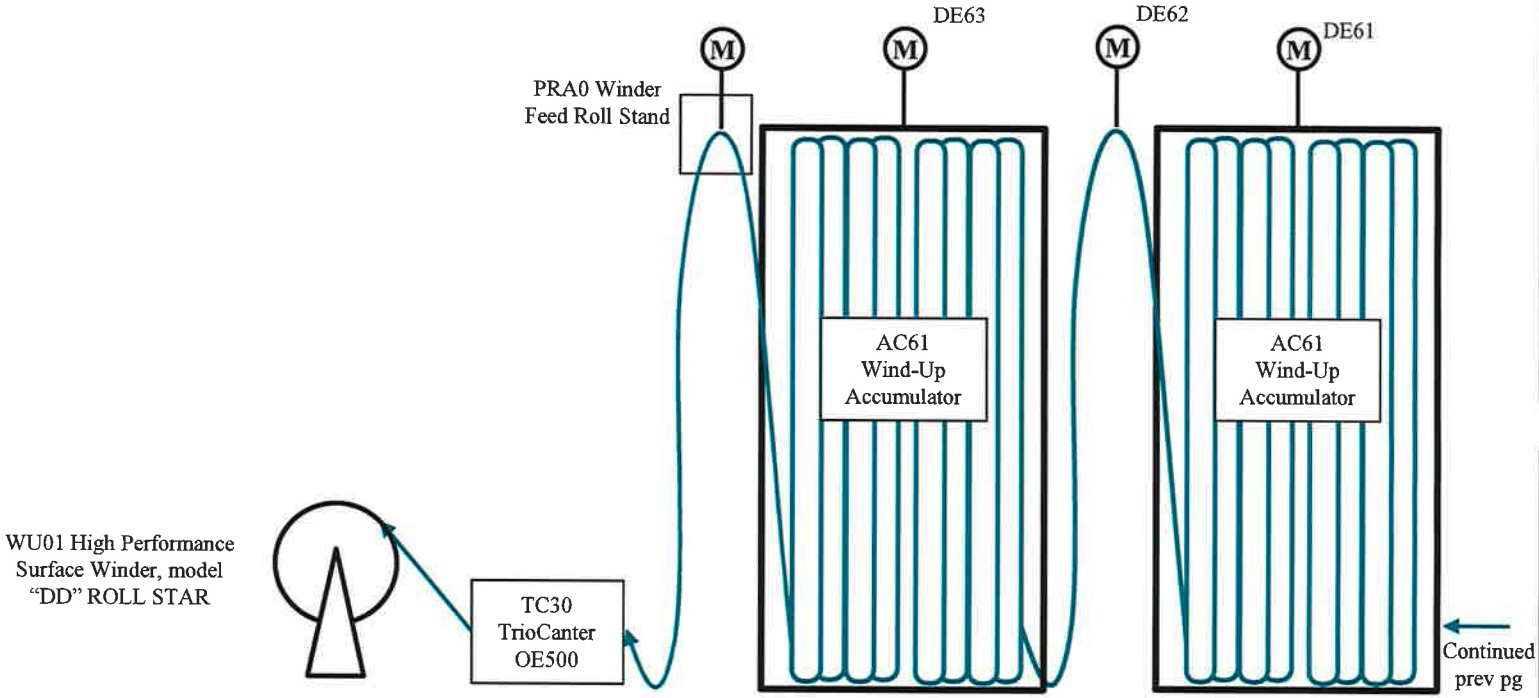


STEVENSEHS CONSULTING

Kordsa, Inc. – Dip and Hot Stretch Unit 1(DU1)

Emissions Process Flow Diagram

Page 3 of 8



STEVENSEHS CONSULTING

Kordsa, Inc. – Dip and Hot Stretch Unit 1(DU1)

Emissions Process
Flow Diagram
Page 4 of 8

SUMMARY OF NEW EMISSIONS SOURCES

KORDSA, INC.	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR
Emissions Source Description	Total PM	Total PM_{10}	Total $PM_{2.5}$	NO_x	CO	SO_2	VOC	HMD	NH_3	Total HAP	Formaldehyde	Styrene	Methanol	Biphenyl	CO_2e
DU1 Ovens	*Included in stack grain loading	0.31	0.31	8.20	13.77	0.10	0.90	--	--	3.09E-01	1.23E-02	--	--	--	19,694.91
DU1 Oven Stacks Particulate	14.09	*Calculated Above	*Calculated Above	--	--	--	--	--	--	--	--	--	--	--	--
DU1 Dewebber Stacks Particulate	5.58	5.58	5.58	--	--	--	--	--	--	--	--	--	--	--	--
DU1 Subtotal	**19.67**	**5.89**	**5.89**	**8.20**	**13.77**	**0.10**	**0.90**	**0.00**	**0.00**	**0.31**	**0.01**	**0.00**	**0.00**	**0.00**	**19694.91**
DU1 Storage Tanks	0	0	0	0	0	0	7.51E-02	0	0	7.51E-02	0	7.51E-02	0	0	0
DU1 OVEN STACKS VOC + NH3	0	0	0	0	0	0	9.36	0	32.09	7.97	0.40	2.41	5.16	0.00	0.00
DU1 DEWEBBER STACKS VOC + NH3	0	0	0	0	0	0	4.37	0	21.39	3.44	0.00	0.00	3.44	0.00	0.00
DU1 Totals and Storage Tanks Combined Emissions Summary	**19.67**	**5.89**	**5.89**	**8.20**	**13.77**	**0.10**	**14.70**	**0.00**	**53.48**	**11.79**	**0.41**	**2.49**	**8.60**	**0.00**	**19694.91**
	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR	TONS/YEAR

PROCESS EQUIPMENT APPLICATION
(Surface Coating Operation)

Form E010A
07/2001

1. Name of Company (as shown on Line 1, Form E001): Kordsa, Inc.

2. Equipment Name (as shown on Line 10, Form E001): DIP UNIT - 1

3. Type of Process: Dip Coating and Hot Stretch Process

4. Type of Coating(s) Used (if paint, specify lacquer, enamel or primer): Latex, Ammonia, Formaldehyde, caustic, and various additives

5. Date of installation, initial start-up, or alternation (such that potential emissions were increased) or equipment or device for which permit is applied for:
November 2023

6. Amount of coating used per day:
15.476 LBS/day avg. 19.344 LBS/day max. gallons (This includes all thinners and solvents used.)

7. Control Equipment Data:
A ☑ Emissions Uncontrolled B ☐ Dry Filter Size of Each Filter: _____ No. of Filters: _____
C ☐ Water Wash Booth -Pump Capacity: _____ Gallons per minute
D ☐ Other -Specify: _____ (File Form E107)

8. Control Equipment Efficiency for each pollutant emitted by this equipment. (Enter zero(s) if A is checked in Item 7).

		Efficiency (%)
Other:	Hydrocarbons	0

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9. A. Method of Application
1. ☐ Pressure Atomization 2. Electrostatic: ☐ Air 3. ☐ Hot Airless Spray
4. ☐ Air Atomization 5. ☑ Dipping ☐ Disc
6. Other (specify): _____
B. Method of Drying: ☐ Air Dried ☑ Oven-dried or Baked C. Conveyorized: ☐ Yes ☐ No

10. The emissions from this equipment may at times under normal operating conditions cause (check all that apply):
☐ Odors ☐ Property Damage ☑ Health Effects
☐ Eye Irritations ☑ Other nuisances outside plant property ☐ No environmental damage

11. Emission Point Data: Seven Oven Stacks and Two Dewebber Stacks Emission Point Data indicated in PM Calculations Page.

Stack Height (emission point) above ground:	See Attachment	Ft	Volume of gas discharged		
Ground Elevation above sea level at stack base:	690	Ft	to atmosphere:		Cfm
Stack Diameter		Ft	Gas exit Temperature		°F

12. Average Equipment Operating Time:

A.	Daily	20	Hours
B.	Weekly	7	Days
C.	Yearly	50	Weeks

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and correct to the best of my knowledge. **This form must be completely filled out before it is acceptable.**

Mail To:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive, STE 140
Chattanooga, TN 37416 - 3740

Company Official: _____ Signature

Title: Environmental Engineer

Date: 03-17-2023

DO NOT WRITE BELOW THIS LINE

_____ Engineer Approval

This form corresponds to permit number: _____

Special Notations: _____

POLLUTION ESTIMATION FORM

FORM E106
01/2001

1. Name of Company: Kordsa, Inc.
   As shown on Line 1 of Form E001
2. Equipment Name: DIP UNIT - 1 Process Equipment
   As shown on Line 9 of Form E001
3. Type of pollutant for which estimate is made: PM, VOC, and Ammonia (NH3)

4. Pollution Emission Factor (PEF): *See Attached Emissions Calculations
   (Give value & units in lbs/ton, lbs/lb, lbs/gal, gr/ft³, etc.)

   Source of Emission Factor: Engineering Estimate

5. Uncontrolled Pollution Emission Rate:

   _____ X _____ = _____
   (PEF from Item 4) *(Give operating rate for this equipment and the appropriate units in either lbs/hr, tons/hr, gal/hr, or cfm)* (Give value & units)

6. Uncontrolled Emission Rate: _____ Pounds emitted per hour

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and correct to the best of my knowledge. ***This form must be completely filled out before it is processed.***

Mail to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive
Chattanooga, TN 37416

Company Official: J. Miles Jorgensen

Title: Environmental Engineer

Date: 03-17-2023

RECEIVED
CHATT / HAM. CO.

DO NOT WRITE BELOW THIS LINE

MAR 17 2023

_____ Engineer Approval

AIR POLLUTION CONTROL BUREAU

This form corresponds to permit number: _____

Special Notations: _____

Kordsa Inc.
Chattanooga, TN
Dip and Hot Stretch UNIT 1

Hours of Operation 7000

Assumed 1 Dip Unit ***Multiplier*** ***1.25***

By increasing the multiplier to 1.25, the total usages for a single Dip Unit are increased by 25% to allow margin for increases in production and different batch recipes for processing Nylon vs. PET Polymer cord.

Product	Kg/month	Lbs/Year	NH3 Content (wt%)	NH3 USAGE TOTAL	UNITS	Emitted at Dip Tank & Vacuum Dewebber Exhaust Stacks (%)	Emitted at Dip Tank & Vacuum Dewebber Exhaust Stacks (LBS)	Emitted at NG Ovens Stacks (%)	Emitted at NG Ovens Stacks (LBS)	
AMMONIA	13,750.0	363,825.0	29.4%	106,964.6	LBS	40%	42,785.8	60%	64,178.7	
				Maximum Potential Ammonia Emissions			21.39	TONS	32.09	TONS
							6.112	LBS/HR[3]	9.168	LBS/HR[3]

using 2,205 lb/kg

Product	Kg/month	Lbs/Year	VOC Content (wt%)	VOC USAGE TOTAL	UNITS	Emitted at Dip Tank (fug.) & Vacuum Dewebber Exhaust Stacks (%)	Emitted at Dip Tank (fug.) & Vacuum Dewebber Exhaust Stacks (LBS)	Emitted at NG Ovens Stacks (%)	Emitted at NG Ovens Stacks (LBS)	
used w/polyester → VP Latex -1 see Note 2	118,750.0	3,142,125.0	0.35%	10,997.4 · 0.3	LBS	0%	0.0	30%	3,299.2	
used w/nylon → SBR LATEX see Note 2	55,000.0	1,455,300.0	0.35%	5,093.6 · 0.3	LBS	0%	0.0	30%	1,528.1	
VP LATEX -2	0.0	0.0	0.35%	0.0	LBS	0%	0.0	30%	0.0	
ANTIFOAM	625.0	16,537.5	11.00%	1,819.1 · 1	LBS	40%	727.7	60%	1,091.5	
CAUSTIC	625.0	16,537.5	N/A	0.0	LBS	40%	0.0	60%	0.0	
Grilbond G1701 (1)	2,125.0	56,227.5	0.00%	0.0	LBS	40%	0.0	60%	0.0	
ADHPROMOT - 2	0.0	0.0	5.00%	0.0	LBS	40%	0.0	60%	0.0	
CARBONBLACK - 1	875.0	23,152.5	N/A	0.0	LBS	40%	0.0	60%	0.0	
Arcawax C	125.0	3,307.5	4.90%	162.1 · 1	LBS	40%	64.8	60%	97.2	
Grilbond IL-6 60% LF	8,750.0	231,525.0	0.00%	0.0	LBS	40%	0.0	60%	0.0	
Grilbond G1701 (2)	4,375.0	115,762.5	0.00%	0.0	LBS	40%	0.0	60%	0.0	
Natural LATEX	10,000.0	264,600.0	0.00%	0.0	LBS	40%	0.0	60%	0.0	
RESORCINOL	6,250.0	165,375.0	0.50%	826.9 · 1	LBS	40%	330.8	60%	496.1	
Zinc - Acetate	0.0	0.0	not known	0.0	LBS	40%	0.0	60%	0.0	
4 times more used w/nylon → FORMALDEHYDE SOL'N (CRC-935-7) see Note 1	8,125.0	214,987.5	37.00%	79,545.4 · 0.01	LBS	0%	0.0	1%	795.5	
			8.00%	17,199.0 · 1	LBS	40%	6,879.6	60%	10,319.4	
Modified rf resin	13,750.0	363,825.0	0.50%	1,819.1 · 1	LBS	40%	727.7	60%	1,091.5	
	0.0	0.0	0.00%	0.0	LBS	40%	0.0	60%	0.0	
CARBONBLACK - 2	15,000.0	396,900.0	N/A	0.0	LBS	40%	0.0	60%	0.0	
				VOC USAGE TOTAL			POTENTIAL VOC EMISSIONS TOTAL			
				58.7	TONS	UNITS 1&2	4.37	TONS	9.36	TONS
							1.247	LBS/HR[3]	2.674	LBS/HR[3]

Total Dip Sol'n LBS	6,829,988	annually

According to Kordsa's Laurel Hill, NC facility

13,722122 tons VOC/year

Note 1
Formaldehyde is a coatings reactant which is virtually all consumed in process. Based upon source monitoring performed June, 1990 by Entropy Environmentalists, Inc. of Research Triangle Park, NC, 0.5% of formaldehyde charged to the system is released to the atmosphere. This data would also incorporate formaldehyde generated from combustion of Natural Gas. Formaldehyde is purchased as 37% solution in water. By assuming that 1.0% of Formaldehyde charged to the system is released to the atmosphere - we are able to account for any fugitive emissions from storage tanks or equipment leaks.

Note 2
Styrene: Vinylpyridine SBR Latex is purchased as a coating agent for the fabric. Per the manufacturer, styrene monomer is typically 0.35% by weight of the dry latex (dry weight). Latex solution is 40% solids, 60% liquid. Research by the industry show approximately 70% of the residual monomer is trapped within the interstital latices of the polymer matrix and does not release except upon destruction of the latices.

(1,037,375 kg emitted/month)

Note 3
VOC and HAPs Hourly Emissions Rates (LBS/HR) = Total Emissions (LBS/YR) / 7,000 (HR/YR)

nylon up to 30% of time (4 ovens)
polyester at least 70% of time (7 ovens)

Kordsa Inc.
Chattanooga, TN
Dip and Hot Stretch UNIT 1

Product	Lbs/Year	HAP Content Styrene	HAP Emissions Styrene (LBS)	HAP Content Formaldehyde	HAP Emissions Formaldehyde (LBS)[See Note 1]	HAP Content Methanol	HAP Emissions Methanol (LBS)[See Note 1]
VP Latex -1 see Note 2	3,142,125.0	0.35%	3,299.2	N/A	N/A	N/A	N/A
SBR LATEX see Note 2	1,455,300.0	0.35%	1,528.1	N/A	N/A	N/A	N/A
VP LATEX -2	0.0	0.35%	0.0	N/A	N/A	N/A	N/A
ANTIFOAM	16,537.5	N/A	N/A	N/A	N/A	N/A	N/A
CAUSTIC	16,537.5	N/A	N/A	N/A	N/A	N/A	N/A
Grilbond G1701 (1)	56,227.5	N/A	N/A	N/A	N/A	N/A	N/A
ADHPROMOT - 2	0.0	N/A	N/A	N/A	N/A	N/A	N/A
CARBONBLACK - 1	23,152.5	N/A	N/A	N/A	N/A	N/A	N/A
Arcawax C	3,307.5	N/A	N/A	N/A	N/A	N/A	N/A
Grilbond IL-6 60% LF	231,525.0	N/A	N/A	N/A	N/A	N/A	N/A
Grilbond G1701 (2)	115,762.5	N/A	N/A	N/A	N/A	N/A	N/A
Natural LATEX	264,600.0	N/A	N/A	N/A	N/A	N/A	N/A
RESORCINOL	165,375.0	N/A	N/A	N/A	N/A	N/A	N/A
Zinc - Acetate	0.0	N/A	N/A	N/A	N/A	N/A	N/A
FORMALDEHYDE SOL'N (CRC-935-7) see Note 1	214,987.5	N/A	N/A	37%	795.5	N/A	N/A
Modified rf resin	363,825.0	N/A	N/A	N/A	N/A	8.00%	17,199.0
		N/A	N/A	N/A	N/A	N/A	N/A
CARBONBLACK - 2	396,900.0	N/A	N/A	N/A	N/A	N/A	N/A
			TOTAL HAPS EMISSIONS				
			2.41	TONS	0.40	TONS	8.60	TONS
			0.690	LBS/HR[3]	0.114	LBS/HR[3]	2.457	LBS/HR[3]

FUEL BURNING EQUIPMENT APPLICATION
A separate form must be filed for each stack or emission point.

FORM E011
01/2001

1. Name of Company: Kordsa, Inc.
As shown on Line 1 of Form E001

2. Equipment Name: Ovens for DIP UNIT-1
As shown on Line 9 of Form E001

3. Stack Designation: H1EX, H2EX, H3EX, H4EX, H5EX, H6EX, H7EX
If there is more than one stack at this location, provide a written or numeric designation to identify each stack.

4. Control Equipment Data:

- [X] Emissions Uncontrolled
- [ ] Electrostatic Precipitator (File Form E104)
- [ ] Baghouse (File Form E102)
- [ ] Inertial Separators (File Form E105)
- [ ] Wet Collecting Device (File Form E103)
- [ ] Other (Specify): _____

5. Control Equipment Efficiency:
Enter the control equipment efficiency for each pollutant emitted by this equipment as determined on the appropriate Form E102, E103, E104, E105, E107, or enter zeros if "A" is checked in Item 4.

Pollutant	% Efficiency
Particulates	0
PM_{10}	0
SO_x	0
NO_x	0
CO	0
VOC	0
Other:	

6. Emissions Estimation:

		File Form E110 for each fuel used					
		Fuel No. 1		*Fuel No. 2*		*Fuel No. 3*	
Particulate Matter (Form E110, Item 6)	Uncontrolled	0.36	Lbs/hr	N/A	Lbs/hr	N/A	Lbs/hr
	Actual[1]	N/A	Lbs/hr		Lbs/hr		Lbs/hr
	Estimated[2]	0.36	Lbs/hr		Lbs/hr		Lbs/hr
SO_x (Form E110, Item 7)	Uncontrolled	0.03	Lbs/hr		Lbs/hr		Lbs/hr
	Actual[1]	N/A	Lbs/hr		Lbs/hr		Lbs/hr
	Estimated[2]	0.03	Lbs/hr		Lbs/hr		Lbs/hr
PM_{10}	Uncontrolled	0.09	Lbs/hr		Lbs/hr		Lbs/hr
	Actual[1]	N/A	Lbs/hr		Lbs/hr		Lbs/hr
	Estimated[2]	0.09	Lbs/hr		Lbs/hr		Lbs/hr
NO_x (Form E110, Item 9E)	Uncontrolled	36.6	ppm		ppm		ppm
	Actual[1]	N/A	ppm		ppm		ppm
	Estimated[2]	36.6	ppm		ppm		ppm
Other Air Contaminants (Specify) VOC	Uncontrolled	0.26	Lbs/hr		Lbs/hr		Lbs/hr
	Actual[1]	N/A	Lbs/hr		Lbs/hr		Lbs/hr
	Estimated[2]	0.26	Lbs/hr		Lbs/hr		Lbs/hr

1. *Submit stack test report with full details.*
2. *Estimate the emissions using the formula below*

$$\text{Estimated Emissions (lbs/hr, ppm)} = \frac{\text{100\%-Control Efficiency (\%)}}{\text{100\%}} \times \text{Uncontrolled Emissions}$$

Company Name: Kordsa, Inc. Equipment Name: Ovens for DIP UNIT-1

7. Equipment Data:

Manufacturer of Equipment: Maxon

Date of Manufacture: 2023 Date of Installation: November 2023

Boiler No.		Fuel Type	Rated Capacity 10^6 BTU/hr. Input	Type of Firing	Fuel Consumption			Percent Content		Heating Content of Fuel	(%) Excess Air
					Ave.	Max.	Annual	Sulfur	Ash		
H1BU H2BU H3BU H4BU H5BU H6BU H7BU	Primary: Normal Operating Fuel(s)	Natural Gas	6.826 6.83 each 47.78 Total	Direct	46,845 SCF/ HR	46,845 SCF/ HR	327.92 MMCF 7,000 hr/yr			1,020 BTU/SCF	
	Standby: Fuel(s) used in emergency only	N/A									
	Primary: Normal Operating Fuel(s)										
	Standby: Fuel(s) used in emergency only										

a. If more than one boiler per stack, list a separate code number to represent each individual boiler.
b. List all fuels used.
c. Give rated or maximum input capacity, whichever is greater.
d. Specify the type of firing for each fuel used.
e. Indicate consumption of each fuel used in tons/hr, gal/hr, or ft^3/hr.
f. Indicate annual consumption of each fuel used in tons/yr, gal/yr, or ft^3/yr.
g. The average sulfur and ash content of each fuel must be included – This information may be obtained from the fuel supplier.
h. Indicate the heating content of each fuel in BTU/ton, BTU/gal, or BTU/ft^3 – This information may be obtained from the fuel supplier.

	Space Heating	Process Heating	Other (Describe)
Percent (%)of Load Used		100%	

8. Emissions Impact:

Those emissions indicated in Item 6 mat at times under normal operating conditions cause (check one or more):

☐ Odors	☒ Health Effects
☐ Eye Irritations	☒ Other nuisances outside of plant property
☐ Property Damage	☐ No environmental damage

9. Emission Point Data:

Stack Height (emission point) above ground:	128	Ft
Ground Elevation above sea level at stack base:	690	Ft
Stack Diameter:	*See	Ft
Volume of gas discharged into atmosphere:	Attachment	Cfm
Gas exit temperature:		°F

10. Average Equipment Operating Time:

Daily:	20	Hours
Weekly:	7	Days
Yearly:	50	Weeks

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge. ***This form must be completely filled out before it will be processed.***

Company Official J. Miles Jorgensen

Mail to:
CHATTANOOGA-HAMILTON
COUNTY AIR POLLUTION
CONTROL BUREAU
6125 Preservation Drive
Chattanooga, TN 37416

Title Environmental Engineer

Date 03-17-2023

Do not write below this line

Engineer Approval

Lbs/hr Allowable particulate emissions

Lbs/10^6 BTU allowable SO_x emissions

ppm allowable NO_x emissions

UTM Coordinate of Company: EW NS

This form corresponds to permit number:

Special Notations:

POLLUTION ESTIMATION FORM
(Fuel Burning Equipment)

FORM E110
01/2002

1. Name of Company: Kordsa, Inc.
(As shown on Line 1 of Form E001)

2. Equipment Name: DIP UNIT - 1 (H1BU, H2BU, H3BU, H4BU, H5BU, H6BU, H7BU)
(As shown on Line 10 of Form E001)

3. Percent excess air used in fuel burning (make allowances for leaks around doors and other openings): 15%

4. Type of Fuel (file Form E110 for each fuel used): Natural Gas

5. Source of Emission Factors: AP-42 (See Attached Emissions Calculations)

6. Uncontrolled Particulate Emission Rate:

Particulate Emission Factor: See Attached Calculations
(lbs/ton; lbs/10^3 gal; lbs/10^6 ft^3)

Maximum Fuel Consumption Rate (tons/hr; gal/hr; ft^3/hr)	X	Particulate Emission Factor	=	Uncontrolled Particulate Emission Rate	Lbs/hr

7. Uncontrolled Sulfur Oxide (SO_x) Emission Rate:

SO_x Emission Factor: See Attached Calculations
Lbs/ton; lbs/10^3 gal; lbs/10^6 ft^3

Maximum Fuel Consumption Rate (tons/hr; gal/hr; ft^3/hr)	X	SO_x Emission Factor	=	Uncontrolled SO_x Emission Rate	Lbs/hr

8. Uncontrolled Hydrocarbon (HC) Emission Rate:

HC Emission Factor: See Attached Calculations
Lbs/ton; lbs/10^3 gal; lbs/10^6 ft^3

Maximum Fuel Consumption Rate (tons/hr; gal/hr; ft^3/hr)	X	HC Emission Factor	=	Uncontrolled HC Emission Rate	Lbs/hr

9. Uncontrolled Nitrogen Oxides (NO_x) Emission Rate:

A. NO_x Emission Factor: See Attached Calculations
Lbs/ton; lbs/10^3 gal; lbs/10^6 ft^3

B.

Maximum Fuel Consumption Rate (tons/hr; gal/hr; ft^3/hr)	X	NO_x Emission Factor	=	Uncontrolled NO_x Emission Rate	Lbs/hr

10. NO_x Emission Rate in PPM by Volume at STP:

Cubic feet per hour (CFH) of Exhaust Gases at 15% Excess Air:

A. V (See Table A) X _____ (Maximum Fuel Consumption Rate 10^6 BTU/hr) = _____ (Exhaust Rate) CFH

B. Attached (Uncontrolled NO_x (Item 9B)) Lbs/hr ÷ _____ (CFH of Exhaust Gas (Item 10A)) = _____ Lb/ft^3 NO_x

C. PPM = (8.37×10^6) X _____ (Lb/ft^3 NO_x (Item 10B)) = Attached (PPM at STP and 15% Excess Air (NO_x calculated as NO_2))

Table A	
Fuel	V
Bituminous Coal	11700
Fuel Oil	11400
Natural Gas	11200
Wood	12800

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge. ***This form must be completely filled out before it will be acceptable.***

Mail to:
CHATTANOOGA-HAMILTON COUNTY
AIR PULLUTION CONTROL BUREAU
6125 Preservation Drive
Chattanooga, TN 37416

J. Miles Jorgensen
Company Official

Environmental Engineer
Title

03-17-2023
Date

Do Not Write Below This Line

_____ Engineer Approval

This form corresponds to permit number: _____

Special Notations: _____

_____

Kordsa Inc.

Chattanooga, TN

Dip and Hot Stretch UNIT 1

Operating hours	7,000	hr/yr
Ground Elevation for building	690	Feet

Emission Point I.D.	Stack Height** (Feet)	Flow Rate (ACFM)	Area* (ft^2)	Exit Velocity (ft/sec)	Exit Temp (F)[6]	Moisture (%)[6]	Flow Rate (DSCFM)[1]	Exhaust PM Conc. (gr/dscf)[4,5]	UNIT 1 PM Emissions[2,3] lb/hr	ton/yr
H1EX	128	5,297	12.96	6.8	320	0.35%	3,587	0.020	0.61	2.15
H2EX	128	5,297	12.96	6.8	320	0.32%	3,588	0.020	0.62	2.15
H3EX	128	5,297	12.96	6.8	446	0.34%	3,088	0.020	0.53	1.85
H4EX	128	5,297	12.96	6.8	446	0.32%	3,088	0.020	0.53	1.85
H5EX	128	5,297	12.96	6.8	248	0.30%	3,953	0.020	0.68	2.37
H6EX	128	5,297	8.66	10.2	446	0.31%	3,088	0.020	0.53	1.85
H7EX	128	5,297	8.66	10.2	446	0.29%	3,089	0.020	0.53	1.85
Deweb Zn 1*	128	14,113	4.19	56.1	102.11	0.24%	13,275	0.007	0.7965	2.75
Deweb Zn 2*	128	14,047	4.19	55.8	83.44	0.23%	13,668	0.007	0.8200	2.83

use 8,760 hr/yr for potential emissions

2.692499
2.693326
2.318121
2.318647
2.967988
2.318872
2.319323
3.488512
3.591924

Example Calculations and Notes:

1. Flow Rate (DSCFM) = (ACFM x ((460 + 70)/(460+Exit Temp)))*(1 - Moisture Content)
2. PM Emissions (lb/hr) = DSCFM x Exhaust PM Conc. x 60 (min/hr) x (1 lb / 7000 grains)
3. PM Emissions (tpy) = (PM Emissions (lb/hr) x (8,760) (hr/yr)) / (2000 (lb/ton))
4. Exhaust grain loading PM Conc. for 7 Oven Stacks assumed 0.02 gr/dscf based on 2014 Stack Test at Kordsa's Laurel Hill, NC facility at the RTO Inlet location grain loading not more than 0.017.
5. Exhaust grain loading PM Conc. for 2 Dewebber stacks assumed = total of 3 roof vents total solid and condensible particulate grain loadings at Kordsa's Laurel Hill, NC facility based on 2005 stack test.
6. Exhaust Temperature (F) and Moisture (%) based on stack data for this project provided by Kordsa Inc. - February 2023.

*** NOTE FOR THE STACK DIMENSIONS:** There will be 7 stacks for 7 ovens having the following dimensions: **5 of them are (3.93feet*3.298feet) and 2 of them are (3.28feet x 2.64feet)**. At this stage, since the piping between the ovens and the stacks has not been determined yet, we cannot say that which stack belongs to which oven for now.

The Dewebber Equipment Stacks may include a maximum of 4 exhaust stacks (2 stacks per Dewebber) or a minimum of 2 exhaust stacks (1 stack per Dewebber). Each stack will have the same dimensions of (1.96feet x 2.14feet). If 4 exhaust stacks are included in the final design, the total flow rate shown above will be split between stacks such that the total flow rate equals the amount shown in the above table.

**** Stack Heights shown are estimated 5 ft above the roof height of 123 ft.**

Kordsa Inc.
Chattanooga, TN
Dip and Hot Stretch UNIT 1
Emission Source: Ovens for New Dip Unit 1
H1BU, H2BU, H3BU, H4BU, H5BU, H6BU, AND H7BU

Emission Point: **H1EX, H2EX, H3EX, H4EX, H5EX, H6EX, H7EX**

The ovens burn only Natural Gas as fuel.

Operating Parameters

Firing Rate Per Oven	6.83 MMBtu/hr	2 MW each oven	
Fuel Type	Natural Gas		
Total Maximum Firing Rate	47.78 MMBtu/hr	Exhaust Rate 535,158	(11200 x Maximum Firing Rate) CFH
Maximum Average Operating hours	7,000 hr/yr		

(Actual Potential Operating hours may exceed 20 hr/day or 50 week/year)

use 8,760 hr/yr for potential emissions

	Natural Gas
Maximum Annual Fuel Usage	327.92 MMCF
Hourly Usage	46,845 SCF/Hr

Emission Calculations

Emission Factors for Natural Gas Combustion [1,2]

	lb/10^6 scf	lb/MMBtu-HHV	
Particulate Matter (PM_{Total})	7.6	0.0075	AP-42
Particulate Matter (PM_{Cond})	5.7	0.0056	AP-42
Particulate Matter (PM_{Filter})[3]	1.9	0.0019	AP-42
Nitrogen Oxides (NO_x)	50	0.0490	AP-42 Low NOx Burners
Carbon Monoxide	84	0.0824	AP-42
Sulfur Dioxide (SO_2)	0.6	0.0006	AP-42
VOC	5.5	0.0054	AP-42
Carbon Dioxide (CO_2)	120,000	117.65	40 CFR Subpart 98 Table C-1
Methane (CH_4)	2.25	0.0022	40 CFR Subpart 98 Table C-2
Nitrous Oxide (N_2O)	0.22	0.0002	40 CFR Subpart 98 Table C-2
Lead	5.00E-04		AP-42
Benzene	2.10E-03		AP-42
Formaldehyde	7.50E-02		AP-42
Hexane	1.80		AP-42
Napthalene	6.10E-04		AP-42
Total Selected Metals (TSM)	0.00572		AP-42 Tables 1.4-2 & 1.4-4

Natural Gas Emissions (per Oven)

	Maximum [4] lb/yr	Annual [5] ton/year	lb/hr	lb/day
Particulate Matter (PM_{Total})	356.02	0.18	0.05	1.22
Particulate Matter (PM_{10f})	89.01	0.04	0.01	0.31
Particulate Matter ($PM_{2.5f}$)	89.01	0.04	0.01	0.31
Particulate Matter (PM_{Cond})	267.02	0.13	0.04	0.92
Nitrogen Oxides (NO_x)	2,342.25	1.17	0.33	8.03
Carbon Monoxide	3,934.99	1.97	0.56	13.49
Sulfur Dioxide (SO_2)	28.11	0.01	0.00	0.10
Combustion VOC	257.65	0.13	0.04	0.88
Carbon Dioxide (CO_2)	5,621,411.76	2,810.71	803.06	19,273.41
Methane (CH_4)	105.40	0.05	0.02	0.36
Nitrous Oxide (N_2O)	10.31	0.01	0.00	0.04
CO_2 Equivalent (CO_2eq)[6]		2,813.56	803.87	19,292.98

Natural Gas Emissions (TOTAL)

	Maximum [4] lb/yr	Annual [5] ton/year	lb/hr	lb/day
Particulate Matter (PM_{Total})	2,492.16	1.25	0.36	8.54
Particulate Matter (PM_{10f})	623.04	0.31	0.09	2.14
Particulate Matter ($PM_{2.5f}$)	623.04	0.31	0.09	2.14
Particulate Matter (PM_{Cond})	1,869.12	0.93	0.27	6.41
Nitrogen Oxides (NO_x)	16,395.78	8.20	2.34	56.21
Carbon Monoxide	27,544.92	13.77	3.93	94.44
Sulfur Dioxide (SO_2)	196.75	0.10	0.03	0.67
Combustion VOC	1,803.54	0.90	0.26	6.18
Carbon Dioxide (CO_2)	39,349,882	19,675	5,621	134,914
Methane (CH_4)	737.81	0.37	0.11	2.53
Nitrous Oxide (N_2O)	72.14	0.04	0.01	0.25
CO_2 Equivalent (CO_2eq)[6]	--	19,694.91	5,627.12	135,051
Lead	0.16	8.20E-05	2.34E-05	0.00
Benzene	0.69	3.44E-04	9.84E-05	0.00
Formaldehyde	24.59	1.23E-02	3.51E-03	0.08
Hexane	590.25	0.30	8.43E-02	2.02
Napthalene	0.20	1.00E-04	2.86E-05	0.00
Total Selected Metals (TSM)	1.87	9.37E-04	2.68E-04	0.01

PPM_{NOx}
36.6

Example Calculations/Notes:

(1) Compilation of Air Pollutant Emission Factors, AP-42, Supplement D, Fifth Edition, Section 1.4, Tables 1.4-1 and 1.4-2, July 1998, Small Boilers< 100 MMBtu/hr and Supplement E, Fifth Edition, Section 1.3, Table 1.3-1

(2) Per AP-42, Table 1.4-1 and 1.4-2, to convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to lb/MMBtu, divide by 1,020.

(3) Assume $PM_{Filt} = PM_{2.5}$, PM_{10}

(4) Maximum Emissions (lb/hr) = Emission Factor (lb/MMscf) * Natural Gas Usage (MMCF) and Emission Factor (lb/1000 gal) * Fuel Usage (1000 gal)

(5) Annual Emissions (tpy) = Annual Fuel Usage (MMCF or 1000 gal) * Emission Factor (lb/MMCF or lb/1000 gal) / 2,000 (lb/ton)

(6) CO_2 Equivalent (CO_2eq) = CO_2 + [GWP_{CH4} * CH_4] + [GWP_{N2O} * N_2O]

(7) Summary of Emissions: Hourly emissions = maximum burner rating for 7 ovens x emission factors
Annual Emissions = Maximum Annual Natural Gas usage x emission factors

(8) GWP_{CH4} = 25

GWP_{N2O} = 298

40 CFR Subpart 98 Table A-1

PROCESS EQUIPMENT APPLICATION

FORM E010
07/2000

1. ***Name of Company*** (as shown on Line 1, Form E001): Kordsa

2. ***Equipment Name*** (as shown on Line 10, Form E001): DIP UNIT - 1

3. ***Installation Date:*** November 2023 4. ***Type of Process:*** Material Storage Tanks

5. ***Major Raw Materials Used:*** Ammonia - 2 Storage Tanks (AST-1 and AST-2)

6. ***Process Weight:*** 363,825 LBS/Year (Approx. 52 LBS/Hr) Pounds per hour
This is the total weight of all materials introduced into the process.

7. ***Control Equipment***

- [x] Emissions Uncontrolled
- [ ] Baghouse (File Form E102)
- [ ] Wet Collecting Device (File Form E103)
- [ ] Inertial Separators (File Form E105)
- [ ] Electrostatic Precipitator (File Form E104)
- [ ] Other – Specify: _____

8. ***Control Efficiency***

Enter the control efficiency for each pollutant emitted by this equipment (for appropriate Forms E102, E103, E104, E105, E107, or enter zeros if the emissions are uncontrolled as noted in Item 7.

Pollutant	% Efficiency
Particulates	0
SO_x	0
NO_x	0
CO	0
Hydrocarbons	0
Other:	

9. ***Emissions Summary***

Enter the amount of each pollutant listed in pounds per hour.

Pollutant	Uncontrolled Emissions (File Form E106)	Actual Emissions (Stack Test Report)		Estimated Emissions (See Formula A)
Total Suspended Particulate	0	N/A		0
PM10	0	N/A		0
Sulfur Oxides	0	N/A	OR	0
Nitrogen Oxides (as NO_2)	0	N/A		0
Other (specify)	Included in NH3 Mass Bal.	N/A		Included in NH3 Mass Bal.
NH3				

Formula A: Estimated Emissions = $\frac{(100\% - \text{Control Efficiency (\%)})}{100\%}$ X Uncontrolled Emissions

10. ***Environmental Impact***

Those emissions indicated in Item 9 may at times under normal operating conditions cause (check all that apply):

☐ Odors ☐ Eye Irritations ☐ Property Damage ☐ Health Effects

☐ Other nuisances outside of plant property ☑ No environmental damage

11. ***Emission Point Data***

Stack Height (emission point) above ground: N/A Ft.
Ground Elevation above sea level at stack base: _____ Ft.
Stack Diameter: _____ Ft.

Volume of gas discharged into atmosphere: _____ cfm
Gas exit temperature: _____ °F

12. ***Ave. Operating Time***

Daily: 20 hours Weekly: 7 Days Yearly: 50 Weeks

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge.

J. Miles Jorgensen
Company Official

Environmental Engineer
Title

03-17-2023
Date

CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive, Suite 140
Chattanooga, TN 37416-3740

PROCESS EQUIPMENT APPLICATION

FORM E010
07/2000

1. ***Name of Company*** (as shown on Line 1, Form E001): Kordsa, Inc.

2. ***Equipment Name*** (as shown on Line 10, Form E001): DIP UNIT - 1

3. ***Installation Date:*** November 2023 4. ***Type of Process:*** Material Storage Tanks

5. ***Major Raw Materials Used:*** Formaldehyde - 2 Storage Tanks (FST-1 and FST-2)

6. ***Process Weight:*** 214,988 LBS/Year (Approx. 31 LBS/Hr) Pounds per hour
This is the total weight of all materials introduced into the process.

7. ***Control Equipment***

- [x] Emissions Uncontrolled
- [ ] Baghouse (File Form E102)
- [ ] Wet Collecting Device (File Form E103)
- [ ] Inertial Separators (File Form E105)
- [ ] Electrostatic Precipitator (File Form E104)
- [ ] Other – Specify: _____

8. ***Control Efficiency***

Enter the control efficiency for each pollutant emitted by this equipment (for appropriate Forms E102, E103, E104, E105, E107, or enter zeros if the emissions are uncontrolled as noted in Item 7.

Pollutant	% Efficiency
Particulates	0
SO_x	0
NO_x	0
CO	0
Hydrocarbons	0
Other:	

9. ***Emissions Summary***

Enter the amount of each pollutant listed in pounds per hour.

Pollutant	Uncontrolled Emissions (File Form E106)	Actual Emissions (Stack Test Report)		Estimated Emissions (See Formula A)
Total Suspended Particulate	0	N/A		0
PM10	0	N/A		0
Sulfur Oxides	0	N/A	OR	0
Nitrogen Oxides (as NO_2)	0	N/A		0
Other (specify)	Included in VOC Mass Bal.	N/A		Included in VOC Mass Bal
VOC				

Formula A: $\text{Estimated Emissions} = \frac{(100\% - \text{Control Efficiency (\%)})}{100\%} \times \text{Uncontrolled Emissions}$

10. ***Environmental Impact***

Those emissions indicated in Item 9 may at times under normal operating conditions cause (check all that apply):

☐ Odors ☐ Eye Irritations ☐ Property Damage ☑ Health Effects

☑ Other nuisances outside of plant property ☐ No environmental damage

11. ***Emission Point Data***

Stack Height (emission point) above ground: N/A Ft.
Ground Elevation above sea level at stack base: _____ Ft.
Stack Diameter: _____ Ft.
Volume of gas discharged into atmosphere: _____ cfm
Gas exit temperature: _____ °F

12. ***Ave. Operating Time***

Daily: 20 hours Weekly: 7 Days Yearly: 50 Weeks

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge.

J. Miles Jorgensen
Company Official

Environmental Engineer
Title

03-17-2023
Date

CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive, Suite 140
Chattanooga, TN 37416-3740

PROCESS EQUIPMENT APPLICATION

FORM E010
07/2000

1. ***Name of Company*** (as shown on Line 1, Form E001): Kordsa, Inc.

2. ***Equipment Name*** (as shown on Line 10, Form E001): DIP UNIT - 1

3. ***Installation Date***: November 2023

4. ***Type of Process***: Material Storage Tanks

5. ***Major Raw Materials Used***: VP-Latex - 4 Storage Tanks (VP-LST-1, VP-LST-2, VP-LST-3, VP-LST-4)

6. ***Process Weight***: 3.1 Turnovers/Year each tank (See Attached) Pounds per hour
   This is the total weight of all materials introduced into the process.

7. ***Control Equipment***

- [x] Emissions Uncontrolled
- [ ] Baghouse (File Form E102)
- [ ] Wet Collecting Device (File Form E103)
- [ ] Inertial Separators (File Form E105)
- [ ] Electrostatic Precipitator (File Form E104)
- [ ] Other – Specify:

8. ***Control Efficiency***

Enter the control efficiency for each pollutant emitted by this equipment (for appropriate Forms E102, E103, E104, E105, E107, or enter zeros if the emissions are uncontrolled as noted in Item 7.

Pollutant	% Efficiency
Particulates	0
SO_x	0
NO_x	0
CO	0
Hydrocarbons	0
Other:	

9. ***Emissions Summary***

Enter the amount of each pollutant listed in pounds per hour.

Pollutant	Uncontrolled Emissions (File Form E106)	Actual Emissions (Stack Test Report)		Estimated Emissions (See Formula A)
Total Suspended Particulate	0	N/A		0
PM10	0	N/A		0
Sulfur Oxides	0	N/A		0
Nitrogen Oxides (as NO_2)	0	N/A	OR	0
Other (specify)	See Attached	N/A		See Attached
VOC				

Formula A:

$$\text{Estimated Emissions} = \frac{(100\% - \text{Control Efficiency (\%)})}{100\%} \times \text{Uncontrolled Emissions}$$

10. ***Environmental Impact***

Those emissions indicated in Item 9 may at times under normal operating conditions cause (check all that apply):

☐ Odors ☐ Eye Irritations ☐ Property Damage ☑ Health Effects

☑ Other nuisances outside of plant property ☐ No environmental damage

11. ***Emission Point Data***

Stack Height (emission point) above ground: N/A Ft.
Ground Elevation above sea level at stack base: _____ Ft.
Stack Diameter: _____ Ft.

Volume of gas discharged into atmosphere: _____ cfm
Gas exit temperature: _____ °F

12. ***Ave. Operating Time***

Daily: 20 hours Weekly: 7 Days Yearly: 50 Weeks

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge.

J. Miles Jorgensen
Company Official

Environmental Engineer
Title

03-17-2023
Date

CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive, Suite 140
Chattanooga, TN 37416-3740

PROCESS EQUIPMENT APPLICATION

FORM E010
07/2000

1. ***Name of Company*** (as shown on Line 1, Form E001): Kordsa Inc.

2. ***Equipment Name*** (as shown on Line 10, Form E001): DIP UNIT - 1

3. ***Installation Date***: November 2023

4. ***Type of Process***: Material Storage Tanks

5. ***Major Raw Materials Used***: SBR-Latex - 1 Storage Tank (SBR-LST1)

6. ***Process Weight***: 5.5 Turnovers/Year (See Attached) Pounds per hour
   This is the total weight of all materials introduced into the process.

7. ***Control Equipment***

- [x] Emissions Uncontrolled
- [ ] Baghouse (File Form E102)
- [ ] Wet Collecting Device (File Form E103)
- [ ] Inertial Separators (File Form E105)
- [ ] Electrostatic Precipitator (File Form E104)
- [ ] Other – Specify:

8. ***Control Efficiency***

Enter the control efficiency for each pollutant emitted by this equipment (for appropriate Forms E102, E103, E104, E105, E107, or enter zeros if the emissions are uncontrolled as noted in Item 7.

Pollutant	% Efficiency
Particulates	0
SO_x	0
NO_x	0
CO	0
Hydrocarbons	0
Other:	

9. ***Emissions Summary***

Enter the amount of each pollutant listed in pounds per hour.

Pollutant	Uncontrolled Emissions (File Form E106)	Actual Emissions (Stack Test Report)		Estimated Emissions (See Formula A)
Total Suspended Particulate	0	N/A		0
PM10	0	N/A		0
Sulfur Oxides	0	N/A	OR	0
Nitrogen Oxides (as NO_2)	0	N/A		0
Other (specify)	See Attached	N/A		See Attached
VOC				

Formula A: $\text{Estimated Emissions} = \frac{(100\% - \text{Control Efficiency (\%)})}{100\%} \times \text{Uncontrolled Emissions}$

10. ***Environmental Impact***

Those emissions indicated in Item 9 may at times under normal operating conditions cause (check all that apply):

☐ Odors ☐ Eye Irritations ☐ Property Damage ☑ Health Effects

☑ Other nuisances outside of plant property ☐ No environmental damage

11. ***Emission Point Data***

Stack Height (emission point) above ground: N/A Ft.
Ground Elevation above sea level at stack base: _____ Ft.
Stack Diameter: _____ Ft.

Volume of gas discharged into atmosphere: _____ cfm
Gas exit temperature: _____ °F

12. ***Ave. Operating Time***

Daily: 20 hours Weekly: 7 Days Yearly: 50 Weeks

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and complete to the best of my knowledge.

J. Miles Jorgensen
Company Official

Environmental Engineer
Title

03-17-2028
Date

CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive, Suite 140
Chattanooga, TN 37416-3740

POLLUTION ESTIMATION FORM

FORM E106
01/2001

1. Name of Company: Kordsa, Inc.
   As shown on Line 1 of Form E001
2. Equipment Name: Storage Tanks for DIP-1
   As shown on Line 9 of Form E001
3. Type of pollutant for which estimate is made: VOC and Ammonia (NH3)

4. Pollution Emission Factor (PEF): *See Attached Emissions Calculations
   (Give value & units in lbs/ton, lbs/lb, lbs/gal, gr/ft³, etc.)

   Source of Emission Factor: Engineering Estimate

5. Uncontrolled Pollution Emission Rate:

   _____ (PEF from Item 4) X _____ (Give operating rate for this equipment and the appropriate units in either lbs/hr, tons/hr, gal/hr, or cfm) = _____ (Give value & units)

6. Uncontrolled Emission Rate: _____ Pounds emitted per hour

This is to certify that I am familiar with the operations concerning this equipment and that the information provided on this application is true and correct to the best of my knowledge. ***This form must be completely filled out before it is processed.***

Mail to:
CHATTANOOGA-HAMILTON COUNTY
AIR POLLUTION CONTROL BUREAU
6125 Preservation Drive
Chattanooga, TN 37416

Company Official: J. Miles Jorgensen

Title: Environmental Engineer

Date: 03-17-2023

DO NOT WRITE BELOW THIS LINE

RECEIVED
TON CO.

_____ Engineer Approval

MAR 17 2023

AIR POLLUTION
CONTROL BUREAU

This form corresponds to permit number: _____

Special Notations: _____

Kordsa Inc.
Chattanooga, TN
Storage Tanks for Dip and Hot Stretch Unit 1

Tank ID	Tank Description	Tank Construction	Volume (gal)	Throughput (gal/yr)	Turnovers (N)	Product Stored	Total Losses (tpy)	Vapor Recovery[1] (Y/N)	VOC Emissions (tpy)
VP-LST-1	VP Latex Storage Tank 1	SS - insulated	28,879.22	356,632.25	3.1	VP-Latex	1.52E-02	N	1.52E-02
VP-LST-2	VP Latex Storage Tank 2	SS - insulated	28,879.22		3.1	VP-Latex	1.52E-02	N	1.52E-02
VP-LST-3	VP Latex Storage Tank 3	SS - insulated	28,879.22		3.1	VP-Latex	1.52E-02	N	1.52E-02
VP-LST-4	VP Latex Storage Tank 4	SS - insulated	28,879.22		3.1	VP-Latex	1.52E-02	N	1.52E-02
SBR-LST-1	SBR Latex Storage Tank 1	SS - insulated	28,879.22	158503.75	5.5	SBR Latex	1.43E-02	N	1.43E-02
TOTAL							7.51E-02		7.51E-02

Kordsa Inc.
Chattanooga, TN
VERTICAL FIXED ROOF TANKS[1]

Process[2]	Tank #	Tank Description	Material Stored	Annual Usages (gal/yr)	Tank Volume (gal)	N Turnovers (Potential)
Dip & Hot Stretch	VP-LST-1	VP Latex Storage Tank 1	VP-Latex	356,632.3	28,879.2	3.1
Dip & Hot Stretch	VP-LST-2	VP Latex Storage Tank 2	VP-Latex		28,879.2	3.1
Dip & Hot Stretch	VP-LST-3	VP Latex Storage Tank 3	VP-Latex		28,879.2	3.1
Dip & Hot Stretch	VP-LST-4	VP Latex Storage Tank 4	VP-Latex		28,879.2	3.1
Dip & Hot Stretch	SBR-LST-1	SBR Latex Storage Tank 1	SBR Latex	158,503.8	28,879.2	5.5

Constants:

1	K_P = working loss product factor, Equation (1-31), Organic Liquids.
1357	I = daily total solar insolation factor, Btu/(ft^2 day), Table 7.1-7, Chattanooga, TN
0.68	α = tank paint solar absorptance, dimensionless, Table 7.1-6, Medium Gray, Good Condition.
520.8	T_{AA} = daily average ambient temperature, °R, Equation (1-27).
529.8	T_{LA} = daily average liquid surface temperature, °R, Equation (1-26), Note 2.
523.9	T_B = liquid bulk temperature, °R. Equation (1-28).
0.033	K_E = vapor space expansion factor (dimensionless). Equation (1-5)
75%	For tanks that maintain a consistent liquid level, withdrawal losses are reduced.

Notes:
(1) Compilation of Air Pollutant Emission Factors, AP-42, Supplement D, Fifth Edition, Chapter 7.1, "Organic Liquid Storage," (11/06)
(2) Storage Tanks will be utilized and piped to service both Dip and Hot Stretch Units 1 & 2.
(3) N = number of turnovers per year @ basis.
(4) Conversion factor = 42 gallons per barrel (bbl).
(5) Q = annual net throughput (bbl/yr) = tank volume (bbl) x N). Equation (1-29).
(6) L_S = standing storage loss, lb/year. Equation (1-2).
(7) L_W = working losses, lb/year. Equation (1-29).
(8) L_T = total losses, lb/year = L_S + L_W. Equation (1-1).
(9) H_{VO} = vapor space outage, ft. Equation (1-15). Utilizes the maximum H_{RO}, cone vs. dome.
(10) H_R (Cone) = tank roof height, ft, Equation (1-17).
(11) H_{RO} (Cone) = roof outage, ft. Equation (1-16).
(12) R_R = tank dome roof radius, ft. Equation (1-19).
(13) H_R (Dome) = tank roof height, ft, Equation (1-19).
(14) H_{RO} (Dome) = roof outage, ft. Equation (1-18).
(15) K_N = working loss turnover (saturation) factor, dimensionless. Equation (1-29).
(16) P_{VA} = vapor pressure at daily average liquid surface temperature, psia.
(17) M_V = vapor molecular weight, lb/lb-mole.
(18) V_v = vapor space volume, ft^3, see Equation (1-3).
(19) H_{eq} = average liquid height, ft.
(20) W_V = stock vapor density lb/ft^3.
(21) K_S = vented vapor saturation factor, dimensionless. Equation (1-20)

Kordsa Inc.
Chattanooga, TN
VERTICAL FIXED ROOF TANKS[1]

Process[2]	Tank #	Tank Description	Consistent Liquid Level (Y/N)	Product Stored	D Diameter (ft)	H Height (ft)	Tank Volume (ft^3)	Tank Volume (gal)	Tank Capacity[4] (bbls)
Dip & Hot Stretch	VP-LST-1	VP Latex Storage Tank 1	N	VP-Latex	13.12	28.54	3,860.86	28,879	688
Dip & Hot Stretch	VP-LST-2	VP Latex Storage Tank 2	N	VP-Latex	13.12	28.54	3,860.86	28,879	688
Dip & Hot Stretch	VP-LST-3	VP Latex Storage Tank 3	N	VP-Latex	13.12	28.54	3,860.86	28,879	688
Dip & Hot Stretch	VP-LST-4	VP Latex Storage Tank 4	N	VP-Latex	13.12	28.54	3,860.86	28,879	688
Dip & Hot Stretch	SBR-LST-1	SBR Latex Storage Tank 1	N	SBR Latex	13.12	28.54	3,860.86	28,879	688

Constants:

1	K_P = working loss product factor, Equation (
1357	I = daily total solar insolation factor, Btu/(ft^2
0.68	α = tank paint solar absorptance, dimensior
520.8	T_{AA} = daily average ambient temperature, °I
529.8	T_{LA} = daily average liquid surface temperatu
523.9	T_B = liquid bulk temperature, °R. Equation (
0.033	K_E = vapor space expansion factor (dimensi
75%	For tanks that maintain a consistent liquid le

Notes:
(1) Compilation of Air Pollutant Emission Factors, AP-42, Su
(2) Storage Tanks will be utilized and piped to service both D
(3) N = number of turnovers per year @ basis.
(4) Conversion factor = 42 gallons per barrel (bbl).
(5) Q = annual net throughput (bbl/yr) = tank volume (bbl) x N
(6) L_S = standing storage loss, lb/year. Equation (1-2).
(7) L_W = working losses, lb/year. Equation (1-29).
(8) L_T = total losses, lb/year = $L_S + L_W$. Equation (1-1).
(9) H_{VO} = vapor space outage, ft, Equation (1-15). Utilizes tl
(10) H_R (Cone) = tank roof height, ft, Equation (1-17).
(11) H_{RO} (Cone) = roof outage, ft. Equation (1-16).
(12) R_R = tank dome roof radius, ft. Equation (1-19).
(13) H_R (Dome) = tank roof height, ft, Equation (1-19).
(14) H_{RO} (Dome) = roof outage, ft. Equation (1-18).
(15) K_N = working loss turnover (saturation) factor, dimensior
(16) P_{VA} = vapor pressure at daily average liquid surface ter
(17) M_V = vapor molecular weight, lb/lb-mole.
(18) V_v = vapor space volume, ft^3, see Equation (1-3).
(19) H_{eq} = average liquid height, ft.
(20) W_V = stock vapor density lb/ft^3.
(21) K_S = vented vapor saturation factor, dimensionless. Equ

Kordsa Inc.

Chattanooga, TN

VERTICAL FIXED ROOF TANKS[1]

Process[2]	Tank #	Tank Description	Q[5] Throughout (bbls/yr)	L_S[6] Standing Loss (lbs/yr)	L_W[7] Working Loss (lbs/yr)	L_T[8] Total Loss (lbs/yr)	L_T Total Loss (tpy)
Dip & Hot Stretch	VP-LST-1	VP Latex Storage Tank 1	2,123	21.7	8.7	30.4	0.0152
Dip & Hot Stretch	VP-LST-2	VP Latex Storage Tank 2	2,123	21.7	8.7	30.4	0.0152
Dip & Hot Stretch	VP-LST-3	VP Latex Storage Tank 3	2,123	21.7	8.7	30.4	0.0152
Dip & Hot Stretch	VP-LST-4	VP Latex Storage Tank 4	2,123	21.7	8.7	30.4	0.0152
Dip & Hot Stretch	SBR-LST-1	SBR Latex Storage Tank 1	3,774	16.7	11.9	28.7	0.0143

H_{VO}[9]	H_R[10] (Cone)	H_{RO}[11] (Cone)
18.65	0.41	0.14
18.65	0.41	0.14
18.65	0.41	0.14
18.65	0.41	0.14
18.65	0.41	0.14

0.07515 ton/year

Constants:

1	K_P = working loss product factor, Equation (
1357	I = daily total solar insolation factor, Btu/(ft^2
0.68	α = tank paint solar absorptance, dimension
520.8	T_{AA} = daily average ambient temperature, °F
529.8	T_{LA} = daily average liquid surface temperatu
523.9	T_B = liquid bulk temperature, °R. Equation (
0.033	K_E = vapor space expansion factor (dimensi
75%	For tanks that maintain a consistent liquid le

Notes:

(1) Compilation of Air Pollutant Emission Factors, AP-42, Su
(2) Storage Tanks will be utilized and piped to service both D
(3) N = number of turnovers per year @ basis.
(4) Conversion factor = 42 gallons per barrel (bbl).
(5) Q = annual net throughput (bbl/yr) = tank volume (bbl) x N
(6) L_S = standing storage loss, lb/year. Equation (1-2).
(7) L_W = working losses, lb/year. Equation (1-29).
(8) L_T = total losses, lb/year = L_S + L_W. Equation (1-1).
(9) H_{VO} = vapor space outage, ft, Equation (1-15). Utilizes th
(10) H_R (Cone) = tank roof height, ft, Equation (1-17).
(11) H_{RO} (Cone) = roof outage, ft. Equation (1-16).
(12) R_R = tank dome roof radius, ft. Equation (1-19).
(13) H_R (Dome) = tank roof height, ft, Equation (1-19).
(14) H_{RO} (Dome) = roof outage, ft. Equation (1-18).
(15) K_N = working loss turnover (saturation) factor, dimensior
(16) P_{VA} = vapor pressure at daily average liquid surface ten
(17) M_V = vapor molecular weight, lb/lb-mole.
(18) V_v = vapor space volume, ft^3, see Equation (1-3).
(19) H_{avg} = average liquid height, ft.
(20) W_V = stock vapor density lb/ft^3.
(21) K_S = vented vapor saturation factor, dimensionless. Equ

Kordsa Inc.

Chattanooga, TN

VERTICAL FIXED ROOF TANKS[1]

Process[2]	Tank #	Tank Description	R_R[12] (ft)	H_R[13] (Dome)	H_{RO}[14] (Dome)	K_N[15]	P_{VA}[16]	M_v[17]	V_v[18]	H_{avg}[19]	Wv[20]	K_S[21]
Dip & Hot Stretch	VP-LST-1	VP Latex Storage Tank 1	6.56	6.56	4.37	1.00	2.00E-02	205.00	2,522.13	14.27	7.21E-04	0.98
Dip & Hot Stretch	VP-LST-2	VP Latex Storage Tank 2	6.56	6.56	4.37	1.00	2.00E-02	205.00	2,522.13	14.27	7.21E-04	0.98
Dip & Hot Stretch	VP-LST-3	VP Latex Storage Tank 3	6.56	6.56	4.37	1.00	2.00E-02	205.00	2,522.13	14.27	7.21E-04	0.98
Dip & Hot Stretch	VP-LST-4	VP Latex Storage Tank 4	6.56	6.56	4.37	1.00	2.00E-02	205.00	2,522.13	14.27	7.21E-04	0.98
Dip & Hot Stretch	SBR-LST-1	SBR Latex Storage Tank 1	6.56	6.56	4.37	1.00	2.00E-02	158.20	2,522.13	14.27	5.57E-04	0.98

Constants:

1	K_P = working loss product factor, Equation (
1357	I = daily total solar insolation factor, Btu/(ft^2
0.68	α = tank paint solar absorptance, dimension
520.8	T_{AA} = daily average ambient temperature, °F
529.8	T_{LA} = daily average liquid surface temperatu
523.9	T_B = liquid bulk temperature, °R. Equation (
0.033	K_E = vapor space expansion factor (dimensi
75%	For tanks that maintain a consistent liquid le

Notes:

(1) Compilation of Air Pollutant Emission Factors, AP-42, Su
(2) Storage Tanks will be utilized and piped to service both D
(3) N = number of turnovers per year @ basis.
(4) Conversion factor = 42 gallons per barrel (bbl).
(5) Q = annual net throughput (bbl/yr) = tank volume (bbl) x N
(6) L_S = standing storage loss, lb/year. Equation (1-2).
(7) L_W = working losses, lb/year. Equation (1-29).
(8) L_T = total losses, lb/year = L_S + L_W. Equation (1-1).
(9) H_{VO} = vapor space outage, ft, Equation (1-15). Utilizes th
(10) H_R (Cone) = tank roof height, ft, Equation (1-17).
(11) H_{RO} (Cone) = roof outage, ft. Equation (1-16).
(12) R_R = tank dome roof radius, ft. Equation (1-19).
(13) H_R (Dome) = tank roof height, ft, Equation (1-19).
(14) H_{RO} (Dome) = roof outage, ft. Equation (1-18).
(15) K_N = working loss turnover (saturation) factor, dimensior
(16) P_{VA} = vapor pressure at daily average liquid surface ten
(17) M_V = vapor molecular weight, lb/lb-mole.
(18) V_v = vapor space volume, ft^3, see Equation (1-3).
(19) H_{avg} = average liquid height, ft.
(20) W_V = stock vapor density lb/ft^3.
(21) K_S = vented vapor saturation factor, dimensionless. Equ

Horizontal Fixed Roof Tanks.
Assume - no significant emissions from storage tanks for Ammonia or Caustic. All Ammonia losses assumed in process mass balance. Storage Tank for Formaldehyde would have emissions from standing and loading losses - however Kordsa assumes all emissions are accounted for in the process mass balance calculations