Eversoft Fibre and Foam Ltd.

Toxic Reduction Act Public Report

2014 Reporting Year

1.0 Facility General Information

Company Name	Eversoft Fibre and Foam Ltd.
Company Address	173 Bartley Drive Toronto, Ontario M4A 1E6
Facility Address	173 Bartley Drive Toronto, Ontario M4A 1E6
Facility Contact	John Bethune Process Manager Phone: 416-755-4288 Fax: 416-755-4348 Email: john_b@eversoft.ca
NPRI ID	11756
NAICS Code	337214 – Office Furniture (Except Wood) Manufacturing
Primary Operation	Manufacturing polyurethane flexible foam for used in office furniture through a process of mixing two chemical reagents.
Number of Employees	100
Facility Coordinates expressed in UTM	Easting 636097 Northing 4842251

1.1 Facility Toxic Substances

Substance	Chemical Abstract Number (CAS)
Methylenebis(phenylisocyanate)	101-68-8
Polymeric diphenylmethane diisocyanate	9016-87-9

2.0 Facility Toxic Substance Accounting

Substance	Used (Tonnes)	Created (Tonnes)	Contained in Product (Tonnes)	Released, Disposed of and Transferred (Tonnes)
Methylenebis(phenylisocyanate)	>10 to 100	0	0	0.011
Polymeric diphenylmethane diisocyanate	>10 to 100	0	0	0.015

3.0 Facility's Objective and Targets

The Objectives of the Plans are as follows:

- To outline the Facility's position that no toxic substance reduction options can be identified for the toxic substances; and
- Document how the Facility has fulfilled the applicable requirements under the TRA and O. Reg. 455/09 with respect to each toxic substance covered.

4.0 Facility Progress in Toxic Substance Reduction

Table 4.1 – Methylenebis(phenylisocyanate) (CAS 101-68-8)

Year	Substance	Amount Used (T)	Change (%)	Change (T)	Amount Released (T)	Change (%)	Change (T)
2013	Methylenebis (phenylisocyanate)	>10 to 100	19.63↑	7.5↑	0.011	0.0↑	0.00↑
2014	Methylenebis (phenylisocyanate)	>10 to 100			0.011		

Table 4.2 – Polymeric diphenylmethane diisocyanate Comparison (CAS# 9016-87-9)

Year	Substance	Amount Used (T)	Change (%)	Change (T)	Amount Released (T)	Change (%)	Change (T)
2013	Polymeric diphenylmethane diisocyanate	>10 to 100	26.95↑	3.8↑	0.015	0.0↑	0.00↑
2014	Polymeric diphenylmethane diisocyanate	>10 to 100			0.015		

5.0 Certification

In accordance with S.19 of O. Reg. 455/09, the highest ranking employee at the facility electronically certified the annual reports. The following is a copy of the electronic certification.

Input/Output Balance 2014

This record is to determine whether the sums of the inputs in the foam making process approximately equals the sum of the outputs.

Input/Output Balance Equation for MDI:

Use + Creation = Transformed + Destroyed + Contained in Product + On-site or Off-site Release + (to Air, Land, Water) + Off-Site Transfers (for Treatment, Recycling)

Therefore:

U (tonnes)	=	A (tonnes)	+	D (tonnes)
45.68	=	0.0111		45.67
45.68	=	45.68		

Unaccounted Material: 0 tonnes

Comment on Input/Output Balance Results

The input/output balance is zero in this case, because the destroyed (**D**) portion is assumed to be the difference between the amount input from the chemical receiving process (**U**) and the amount released to air (**A**). According to the MSDS of the final moulded foam, no toxic substances remain after the curing process. The input/output balance results are considered to be reasonable and acceptable.

Input/Output Balance Equation for PMDI:

Use + Creation = Transformed + Destroyed + Contained in Product + On-site or Off-site Release + (to Air,

Therefore:

U (tonnes)	=	A (tonnes)	+	D (tonnes)
17.92	=	0.0151	+	17.90
17.92	=	17.92		

Unaccounted Material: 0 tonnes

Comment on Input/Output Balance Results

The input/output balance is zero in this case, because the destroyed (**D**) portion is assumed to be the difference between the amount input from the chemical receiving process (**U**) and the amount released to air (**A**). According to the MSDS of the final moulded foam, no toxic substances remain after the curing process. The input/output balance results are considered to be reasonable and acceptable.

Tracking and Quantification Methods 2014

All calculations are based on the information contained in the Annual Chemical Inventory List digital file. The Annual Chemical Inventory List contains all inventory of the toxic chemicals and total purchased quantities for the year.

Rubiflex SS 31885
First component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 278,360

RU6798R
First component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 20,140

RU6857
First component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 89,770

EB-364-85M-E TO REPLACE RU6857
First component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 1,000

RU6206R
First component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 1,080

RU5164
First component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 1,650

RU6796R
First component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 2,500

These components of the process do not contain any toxic substances, however it is used in the engineering estimate calcluations for the final air emissions of the toxic substances.

SUPRASEC 7507
Second component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 163,350

Name	CAS No.	% by Weight
Methylene Diphenylene Diisocyanate (MDI)	101-68-8	30-60
Polymeric Diphenylmethane Diisocyanate	9016-87-9	13-30

RU6880T

Second component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 41,560

Name	CAS No.	% by Weight
Diphenylmethane 4,4' - diisocyanate (MDI)	101-68-8	<60
High oligomers of MDI	9016-87-9	<10
MDI homopolymers	39310-05-9	<20
MDI prepolymer	*	0-25

*One or more of the following: 9048-57-1, 52409-10-6, 59675-67-1, 25766-14-7

HRA-M140-26

Second component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 1,880

Name	CAS No.	% by Weight
Diphenylmethane 4,4' - diisocyanate (MDI)	101-68-8	60-80
Modified MDI	Proprietary	10-20
MDI Mixed Isomers	26447-40-5	1-5

RU5115T

Second component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 900

Name	CAS No.	% by Weight
Diphenylmethane 4,4' - diisocyanate (MDI)	101-68-8	<65
Polymethylene poly(phenylisocyanate)	9016-87-9	>25
Polyurethane prepolymer of MDI and polyether polyol and/or gly	*	0-20

*One or more of the following: 9048-57-1, 52409-10-6, 59675-67-1, 25766-14-7

RU6206T

Second component in Polyurethane Flexible Foam

Approx. quantity used by facility (lbs): 1,850

Name	CAS No.	% by Weight
Diphenylmethane 4,4' - diisocyanate (MDI)	101-68-8	<20
Organic ester (trade secret)		>60
Polyurethane prepolymer of MDI and polyether polyol and/or gly	9048-57-1	10-30

The Amount that Enters the Process: U

Quantification Method

Source-specific information (MSDS containing MDI concentrations in, and densities of Suprasec 7507, RU5115T, RU6206T, HRA-M140-26 and RU6880T)

Inventory records (quantity of Suprasec 7507, RU6880T, RU5115T, HRA-M140-26and RU6206T used in 2014)

Best Available Method Rational

MDI concentrations and product densities: MSDS information showing constituent concentrations and product dendities is a source of data that is highly reliable. No other alternatives were identified during the evaluation of best available methods that would yeild a higher level of data quality or reliability. MSDS records are a common method of obtaining highly reliable data in a cost effective manner, and in no situations that this facility is aware of would another alternative be recommended to provide a higher level of data reliability.

MDI quantities: Quantities of the First and Second components that are used in the process are recorded by the process personnel. The monthly inventory is recorded along with the monthly purchase and an annual total is calculated. This data is therefore considered to be very reliable. A continuous monitoring system was considered for tracking the quantity of MDI entering the process. The cost associated with an automated system would be too costly and would only generate a nominal increase in data reliability.

The following calculations were used to determine the quantities of MDI entering the process and the air emissions.

Mass Balance to determine quantity of MDI entering the process, U.

Calculate MPO quantity from the form:

$$M_Y = Q*p*W_Y/100$$

Where
M_Y : Total quantity of compound Y, kg
Q : Total annual consumption of form material, litres
p : Density of form, kg/L
W_Y : Percent by weight of form, %

Suprasec 7507
Density of form (kg/L): Specific Gravity * 1kg/litres
1.19

Amount used annually: 62,264.13 Litres

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * MDI content(%)/100
33,342.44 kg

RU6880T
Density of form (kg/L): Specific Gravity * 1kg/litres
1.22

Amount used annually: 15,451.88 Litres

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * Part 1A content(%)/100
11,310.78 kg

HRA-M140-26
Density of form (kg/L): Specific Gravity * 1kg/litres
1.22

Amount used annually: 698.98 Litres

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * Part 1A content(%)/100
596.93 kg

RU5115T
Density of form (kg/L): Specific Gravity * 1kg/litres
1.2

Amount used annually: 340.19 Litres

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * Part 1A content(%)/100
265.35 kg

RU6206T
Density of form (kg/L): Specific Gravity * 1kg/litres
1.2

Amount used annually: 699.29 Litres

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * Part 1A content(%)/100
167.83 kg

Toxic Substance	CAS	Amount Entering Process (U) (tonnes)	Air Release (A) (tonnes)
Methylene Diphenylene Diisocyanate (MDI)	101-68-8	45.68	0.011

Amount of Air Release during the Process, A

Quantification Method

Engineering Estimates (specific to the polyurethanes industry)

Best Available Method Rational

Engineering Estimates: Air emissions for MDI were calculated using industry specific calculations provided by the Center for the Polyurethanes industry. The methodologies used to estimate releases were developed using standard techniques. Site specific information was used in the provided calculations to determine an estimate of MDI release. Since this estimation method is based on industry specific calculations, it is considered to yeild average quality and reliable data. Alternative method would consist of continuous monitoring. This alternative would yeild higher quality data, however it is not economically viable.

The folowing engineering estimate calculations were used to estimate the emissions of MDI from the process of foam moulding. The worst case scenario has been used for any estimates.

Process Emissions:
The formula to estimate emissions for a closed system given that the foam density is used.
The equation is:

$L_{fd} = V_{air} * (1/359) * (273.15/T_{proc}) * (V_{mdi} /760) * M_W * K_{mdi}$

where

L_{fd}	emission from enclosed process in lb/yr
V_{air}	annual volume of displaced air in ft^3/yr (# of units per year * average volume per unit)
T_{proc}	process temp. in Kelvin. Maximum temp. of the MDI "tack free" time
VP_{mdi}	vapour pressure of MDI in mm Hg at process temperature
M_w	250.26, molecular weight of MDI
K_{mdi}	adjustment factor to the vapour pressure that is a function of MDI concentration in the feedstock and the temperature
359	molar volume of an ideal gas in cubic feet/lb-mole @0^oC and 1-atmosphere

Therefore

V_{air} =	116,239	cubic feet
T_{proc} =	302.6	Kelvin
VP_{mdi} =	1.7805E-05	mm Hg
M_w =	250.26	
K_{mdi} =	0.51	

Therefore

L_{fd} =	8.74E-04	lbs/year
L_{fd} =	3.96E-04	kg

Line 1 Process Emissions:

V_{air} =	2,098	cubic feet
T_{proc} =	298.15	Kelvin
VP_{mdi} =	1.02E-05	mm Hg
M_w =	250.26	
K_{mdi} =	0.65	

Therefore

L_{fd} =	1.17E-05	lbs/year
L_{fd} =	5.32E-06	kg

Lines 2 and 3 Process Emissions:

V_{air} =	7,180	cubic feet
T_{proc} =	298.15	Kelvin
VP_{mdi} =	1.02E-05	mm Hg
M_w =	250.26	
K_{mdi} =	0.65	

Therefore

L_{fd} =	4.01E-05	lbs/year
L_{fd} =	1.82E-05	kg

Line 4

Mixes RU5164, RU6796, RU6206 Polyol with RU5115 and 6206 MDI mixture

Process Emissions (RU5164 and RU5115 mixture):

V_{air} =	500	cubic feet
T_{proc} =	298.15	Kelvin
VP_{mdi} =	1.02E-05	mm Hg
M_w =	250.26	
K_{mdi} =	0.74	

Therefore

L_{fd} =	3.18E-06	lbs/year
L_{fd} =	1.44E-06	kg

Process Emissions (RU6206R and 6206T mixture):

V_{air} =	43	cubic feet
T_{proc} =	298.15	Kelvin
VP_{mdi} =	1.02E-05	mm Hg
M_w =	250.26	
K_{mdi} =	0.29	

Therefore

L_{fd} =	1.07E-07	lbs/year
L_{fd} =	4.87E-08	kg

Fugitive Emissions: Measured

The fugitive emission are estimated using the following expression:

$L_{fg} = C_{mdi} * (V_B / 359) * N_{year} * (273.15 / T_{amb}) * M_W * K_f$

Where	L_{fg}	fugitive emissions in lb/year
	C_{mdi}	average MDI concentration, in ppmv, in the air within the building
	V_B	volume of the workspace building in cubit feet
	N_{year}	number of air exchanges per year
	T_{amb}	ambient temperature in Kelvin
	M_W	molecular weight of MDI
	K_f	adjustment factor to the MDI concentrations in the building air
	359	molar volume of an ideal gas in cubic feet/lb-mole @0^{o}C and 1-atmosphere

Therefore

C_{mdi} =	1.00E-09	ppm
V_B =	1800000	cubit feet
N_{year} =	19176.54	four exhaust hoods in the faciity, rated at 5515 cfm**
T_{amb} =	294.82	Kelvin
M_W =	250.26	
K_f =	1.1	

Therefore

L_{fg} =	24.523	lbs/year
L_{fg} =	11.124	kg

The Amount that Enters the Process: U

Quantification Method

Source-specific information (MSDS containing PMDI concentrations in, and densities of Suprasec 7507, RU5115T, and RU6880T)

Inventory records (quantity of Suprasec 7507, RU6880T, and RU5115T used in 2013)

Best Available Method Rational

PMDI concentrations and product densities: MSDS information showing constituent concentrations and product dendities is a source of data that is highly reliable. No other alternatives were identified during the evaluation of best available methods that would yeild a higher levele of data quality or reliability. MSDS records are a common method of obtaining highly reliable data in a cost effective manner, and in no situations that this facility is aware of would another alternative be recommended to provide a higher level of data reliability.

PMDI quantities: Quantities of the Rubiflex and Suprasec that are used in the process are recorded by the process personnel. The monthly inventory is recorded along with the monthly purchase and an annual total is calculated. This data is therefore considered to be very reliable. A continuous monitoring system was considered for tracking the quantity of PMDI entering the process. The cost associated with an automated system would be too costly and would only generate a nominal increase in data reliability.

The following calculations were used to determine the quantities of PMDI entering the process and the air emissions.

Mass Balance to determine quantity of PMDI entering the process, U.

Suprasec 7507

Calculate MPO quantity from the form:

$$M_Y = Q*p*W_Y/100$$

Where M_Y : Total quantity of compound Y, kg
Q : Total annual consumption of form material, litres
p : Density of form, kg/L
W_Y : Percent by weight of form, %

Density of form (kg/L): Specific Gravity * 1kg/litres
1.19

Amount used annually: 62,264.13 Litres

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * PMDI content(%)/100
15,930.28 kg

RU6880T

Density of form (kg/L): Specific Gravity * 1kg/litres
1.22

Amount used annually: 15,451.88 L

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * Part 1A content(%)/100
1,885.13 kg

RU5115T

Density of form (kg/L): Specific Gravity * 1kg/litres
1.2

Amount used annually: 340.19 L

Quantity of MPO Compound: Amount used annually(L) * Density(kg/L) * Part 1A content(%)/100
102.06 kg

Reporting Threshold Consideration

Contaminant	CAS	Amount Entering Process (U) (tonnes)	Air Release (A) (tonnes)
Polymeric Diphenylmethane Diisocyanate	9016-87-9	17.92	0.015

Amount of Air Release during the Process, A

Quantification Method

Engineering Estimates (specific to the polyurethanes industry)

Best Available Method Rational

Engineering Estimates: Air emissions for PMDI were calculated using industry specific calculations provided by the Center for the Polyurethanes industry. The methodologies used to estimate releases were developed using standard techniques. Site specific information was used in the provided calculations to determine an estimate of PMDI release. Since this estimation method is based on industry specific calculations, it is considered to yeild average quality and reliable data. Alternative method would consist of continuous monitoring. This alternative would yeild higher quality data, however it is not economical viable.

The folowing calculations are used to estimate the emissions of PMDI (9016-87-9) from the process of foam moulding. The worst case scenario has been used for any estimates.

Process Emissions:
The formula to estimate emissions for a closed system given that the foam density is used.
The equation is:

$L_{fd} = V_{air} * (1/359) * (273.15/T_{proc}) * (Vp_{mdi} /760) * M_w * K_{pmdi}$

where

L_{fd}	emission from enclosed process in lb/yr
V_{air}	annual volume of displaced air in ft^3/yr (# of units per year * average volume per unit)
T_{proc}	process temp. in Kelvin. Maximum temp. of the PMDI "tack free" time
VP_{pmdi}	vapour pressure of MDI in mm Hg at process temperature
M_w	molecular weight of PMDI
K_{pmdi}	adjustment factor to the vapour pressure that is a function of PMDI concentration in the feedstock and the temperature
359	molar volume of an ideal gas in cubic feet/lb-mole @0^oC and 1-atmosphere

Therefore

V_{air} =	116,239	cubic feet
T_{proc} =	302.6	Kelvin
VP_{pmdi} =	1.7805E-05	mm Hg
M_w =	340	
K_{pmdi} =	0.115	

Therefore

L_{fd} =	2.68E-04	lbs/year
L_{fd} =	1.21E-04	kg

Line 1 Process Emissions:

V_{air} =	2,060	cubic feet
T_{proc} =	298.15	Kelvin
VP_{pmdi} =	1.02E-05	mm Hg
M_w =	340	
K_{pmdi} =	0.2	

Therefore

L_{fd} =	4.81E-06	lbs/year
L_{fd} =	2.18E-06	kg

Lines 2 and 3 Process Emissions:

V_{air} =	7,120	cubic feet
T_{proc} =	298.15	Kelvin
VP_{pmdi} =	1.02E-05	mm Hg
M_w =	340	
K_{pmdi} =	0.2	

Therefore

L_{fd} =	1.66E-05	lbs/year
L_{fd} =	7.54E-06	kg

Line 4

Mixes RU5164, RU6796, RU6206 Polyol with RU5115 and 6206 MDI mixture

Process Emissions (RU5164 and RU5115 mixture):

V_{air} =	500	cubic feet
T_{proc} =	298.15	Kelvin
VP_{pmdi} =	1.02E-05	mm Hg
M_w =	340	
K_{pmdi} =	0.34	

Therefore

L_{fd} =	1.99E-06	lbs/year
L_{fd} =	9.01E-07	kg

Fugitive Emissions: Measured

The fugitive emission are estimated using the following expression:

$$L_{fg} = C_{pmdi} * (V_B / 359) * N_{year} * (273.15 / T_{amb}) * M_W * K_f$$

Where

L_{fg}	fugitive emissions in lb/year
C_{pmdi}	average MDI concentration, in ppmv, in the air within the building
V_B	volume of the workspace building in cubit feet
N_{year}	number of air exchanges per year
T_{amb}	ambient temperature in Kelvin
M_W	molecular weight of PMDI
K_f	adjustment factor to the MDI concentrations in the building air
359	molar volume of an ideal gas in cubic feet/lb-mole @0^oC and 1-atmosphere

Therefore

C_{pmdi} =	1.00E-09	ppm
V_B =	1800000	cubit feet
N_{year} =	19176.54	four exhaust hoods in the faciity, rated at 5515 cfm**
T_{amb} =	294.82	Kelvin
M_W =	340	
K_f =	1.1	

Therefore

L_{fg} =	33.317	lbs/year
L_{fg} =	15.113	kg

Storage losses related to working and breathing are considered negligible.

**Line 1 exhaust runs 8hrs/day, Lines 2&3 run 16hrs/day, Line 4 runs 240 hrs/year

Therefore:	10440	hours/year
	626400	min/year
Total air moved annually in cubic feet:	3.4518E+10	ft^3
therefore:		
N_{year} =	19177	

Report Submission and Electronic Certification

NPRI - Electronic Statement of Certification

Specify the language of correspondence

English

Comments (optional)

I hereby certify that I have exercised due diligence to ensure that the submitted information is true and complete. The amounts and values for the facility(ies) identified below are accurate, based on reasonable estimates using available data. The data for the facility(ies) that I represent are hereby submitted to the programs identified below using the Single Window Reporting Application.
I also acknowledge that the data will be made public.
Note: Only the person identified as the Certifying Official or the authorized delegate should submit the report(s) identified below.

Company Name

Eversoft Fibre and Foam Ltd.

Certifying Official (or authorized delegate)

Julie Farr

Report Submitted by

Julie Farr

I, the Certifying Official or authorized delegate, agree with the statements above and acknowledge that by pressing the "Submit Report(s)" button, I am electronically certifying and submitting the facility report(s) for the identified company to its affiliated programs.

ON MOE TRA - Electronic Certification Statement

Annual Report Certification Statement

TRA Substance List

CAS RN	Substance Name
101-68-8	Methylenebis(phenylisocyanate)
9016-87-9	Polymeric diphenylmethane diisocyanate

Company Name

Eversoft Fibre and Foam Ltd.

Highest Ranking Employee

Julie Farr

Report Submitted by

Julie Farr

I, the highest ranking employee, agree with the certification statement(s) above and acknowledge that by checking the box I am electronically signing the statement(s). I also acknowledge that by pressing the 'Submit Report(s)' button I am submitting the facility record(s)/report(s) for the identified facility to the Director under the Toxics Reduction Act, 2009. I also acknowledge that the Toxics Reduction Act, 2009 and Ontario Regulation 455/09 provide the authority to the Director under the Act to make certain information as specified in subsection 27(5) of Ontario Regulation 455/09 available to the public.

Submitted Report

Period	Submission Date	Facility Name	Province	City	Programs
2014	27/05/2015	Eversoft	Ontario	Toronto	NPRI,ON MOE TRA

Note: If there is a change in the contact information for the facility, a change in the owner or operator of the facility, if operations at the facility are terminated, or if information submitted for any previous year was mistaken or inaccurate, please update this information through SWIM or by contacting the National Pollutant Release Inventory directly.