

# TOXIC SUBSTANCE REDUCTION PLAN SUMMARY FOR ACETONE (CAS # 67- 64-1)

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TALMOLDER INC.

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As required by O. Reg. 455/09

Dec 6,2013

This Toxic Reduction Plan Summary accurately reflects the Toxic Substance Reduction Plan Dated December 6, 2013 that was prepared by Talmolder Inc. As required by Ontario Regulation 455/09.

## 1 STATEMENT OF INTENT AND OBJECTIVE OF THE PLAN

Talmolder Inc. (Talmolder) is a leader in the manufacturing and engineering of specialty molded foam products. During its operation; Talmolder uses Acetone in order to flush the fluid from the Low-Pressure dispensing machines. The flushing fluid used at Talmolder is a proprietary mix developed that replaced the use of Methylene Chloride, which is considered a Hazardous Air Pollutant (HAP)<sup>1</sup> by the EPA. The EPA also considers the following risk associated with Methylene Chloride: *“The acute (short-term) effects of methylene chloride inhalation in humans consist mainly of nervous system effects including decreased visual, auditory, and motor functions, but these effects are reversible once exposure ceases. The effects of chronic (long-term) exposure to methylene chloride suggest that the central nervous system (CNS) is a potential target in humans and animals. Human data are inconclusive regarding methylene chloride and cancer. Animal studies have shown increases in liver and lung cancer and benign mammary gland tumors following the inhalation of methylene chloride”*.

This facility does not create Acetone; therefore this plan will not address reducing its creation. Talmolder will strive to eliminate the use of toxic substances at the facility; this plan will determine the technical and economic feasibility of each option to determine which are viable for implementation at this time

Talmolder’s target is to reduce the use of Acetone by 20% in 8 to 12 months mainly by the replacement of a Low-Pressure mixing head dispensing machine to a High-Pressure one.

## 2 DESCRIPTION OF TOXIC SUBSTANCE FOUND AT TALMOLDER

There are six substances that are contained in Phase II that require the development of a toxic substance reduction plan based on the criteria set out in the Toxic Reductions Act, 209 and Ontario Regulation 455/09.

These substances are:

Pentane (CAS# 109-66-0)

- Used as blowing agent in the production of polyurethane foams
- The quantification method is mass balance
- Has unique direct and indirect costs

Acetone (CAS# 67-64-1)

- Used as cleaner agent and to flush supply lines
- The quantification method is mass balance
- Has unique direct and indirect costs

Solvent naphtha light aliphatic (CAS# 64742-89-8)

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<sup>1</sup> Manual Best Practices for Pollution Prevention in the Slabstock and Molded Flexible Polyurethane Foam Industry, US EPA, September 1996

- Used as mold release applied manually
- The quantification method is mass balance
- Has unique direct and indirect costs

Stoddard solvent (CAS# 8052-41-3)

- Used as mold release applied manually
- The quantification method is mass balance
- Has unique direct and indirect costs

Methylenebis (phenylisocyanate) (CAS# 101-68-8)

- Used as reactant in the production of polyurethane foam
- The quantification method is mass balance
- Has unique direct and indirect costs

Polymeric diphenylmethane diisocyanate (CAS# 9016-87-9)

- Used as reactant in the production of polyurethane foam
- The quantification method is mass balance
- Has unique direct and indirect costs

### 3 FACILITY INFORMATION

Facility name	Talmolder Inc.	
Address	325 Limestone Crescent Downsview, Ontario, M3J 2R1 Canada	
NPRI Identification number	5933	
Two Digit NAICS Code	32	Manufacturing
Four Digit NAICS Code	3261	Plastic Product Manufacturing
Six Digit NAICS Code	326150	Urethane and Other Foam Product (except Polystyrene) Manufacturing
Number of Full-time Employees	79	
UTM Spatial Coordinates	UTM Zone	17T
	Easting	621950
	Northing	4848789
	Latitude	43.7823
	Longitude	-79.4851
	Datum	1983

#### 3.1 Owner of the facility information

Name:	The Milestone Group
Address:	1600 Steeles Avenue, Suite 200 Concord, Ontario, L4K 4M2
Phone Number	905-738-1838
Fax Number	905-738-3846
E-mail	john.dilorenzo@milestonegroup.ca

### 3.2 Operator of the Facility Information

Facility name	Talmolder Inc.
Address	325 Limestone Crescent Downsview, Ontario, M3J 2R1 Canada
Phone Number	416-736-1991
Fax Number	416-736-7942
E-mail	harry@talmolder.com

### 3.3 Highest Ranking Employee at the Facility Information

Name:	Harindran Nionathan
Position	Manager of Operations
Address	325 Limestone Crescent Downsview, Ontario, M3J 2R1 Canada
Phone Number	416-736-1991
Fax Number	416-736-7942
E-mail	harry@talmolder.com

### 3.4 Parent Company Information

Legal Name:	Global Upholstery Co Inc
Address	560 Supertest Road Downsview, Ontario, M3J 2M6
Percentage of Facility owned	100%
CRA Business Number	100157486

### 3.5 Toxic Substances for Which Facility Must Prepare Plan

Substance 1 (other plan)	Pentane
CAS Number	109-66-0
Substance 2 (this plan)	Acetone
CAS Number	67-64-1
Substance 3 (other plan)	Solvent naphtha light aliphatic
CAS Number	64742-89-8
Substance 4 (other plan)	Stoddard solvent
CAS Number	8052-41-3
Substance 5 (other plan)	Methylenebis (phenylisocyanate)
CAS Number	101-68-8
Substance 6 (other plan)	Polymeric diphenylmethane diisocyanate
CAS Number	9016-87-9

### 3.6 Plan Contacts

Plan prepared and certified by:

Planner License

Address

German Rincon

TSRP0197

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Canada

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Plan Coordinator

Vadim Bytensky

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## 4 IDENTIFICATION AND ANALYSIS OF TOXIC SUBSTANCE REDUCTION OPTIONS FOR ACETONE

This plan will generate possible options for toxic reduction in seven categories: Material or Feedstock Substitution Options, Product Design or Reformulation, Equipment or Process Modification, Spill and Leak Prevention, Onsite Reuse or Recycling, Improved Inventory Management or Purchasing Techniques, Training or Improved Operating Practices.

### 4.1 Material or Feedstock Substitution Options

#### 4.1.1 Using water based flushing agent

Acetone is being used at Talmolder in order to flush lines on LP dispensing machines. A water based substitute was experimented on at Talmolder, however, since water can also be used as a foaming agent in the manufacturing of molded foams, once the mixing head was flushed with the water based agent, the operator of the machine had to wait until the head was dry, otherwise it would risk that the water would react with the new Isocyanate and Resin coming into the head. The presence of this water in the head caused the product to have very different specifications than required.

### 4.2 Product Design or Reformulation

#### 4.2.1 Offer Foams that use Water as a Blowing Agent and Flush Lines with Water Based Flushing Agent

Foams sold at Talmolder offer very specific characteristics to its clients in terms of softness, flexibility, resistance, strength, durability and many others. By reformulating the product, Talmolder would not be able to continue offering these characteristics. This alternative is linked to the use of water as a blowing agent. Which as seen before does not meet the quality requirements offered by the products at Talmolder.

On the other hand, Talmolder manufactures each product by using proprietary mixes. Such blends are the result of many years of experience and experimentation, invested in creating products with specific strength and durability. Therefore they are the optimal combination of all the components and any change would diminish the quality of the product offered.

In any case, by using water-based flushing agents in order to flush the machine heads, the problem would remain, because the water that does not evaporate in the head will react with the Isocyanate and the Resin disrupting the production. Once again here Talmolder is using the best-known practices, because it is not using Methylene Chloride.

### 4.3 Equipment or Process Modification

#### 4.3.1 Changing all the remaining Low-Pressure Dispensing Machines to High-Pressure

At the time the company uses a mix of High-pressure and low-pressure dispensing machines. According to the EPA<sup>2</sup>: “*In a high pressure system, impingement of the high pressure streams within the mix head mixes the raw materials. The low pressure system relies on a rotating mixer within the mix head to blend the raw materials*”. High-pressure dispensing machines inject a determined amount of mix in the mold at high pressure according to the specific product; therefore very little waste is produced since the amounts are almost exact. Low-pressure dispensing machines dispense a fixed amount of mix according to each product, however, the operator starts by emptying a small amount of the mix in a bin or disposal container before pouring the mix in the mold. After the operator finishes pouring the right amount in the mold, he or she moves the head over to the bin in order to dispose of the final product contained in the mixer as well as the solvent used by the head in order to flush the mix. The solvent used in order to flush the mixing heads contains Acetone.

This process accounts for almost 100% of the acetone used in the facility. Right now 5 low-pressure machines are still in use. Since HP lines need no flushing, Acetone use would be reduced by 20% per each LP machine that is replaced.

##### 4.3.1.1 Estimated reductions

Since there are 5 low-pressure (LP) machines and the flushing operation accounts for almost 100% of the use of Acetone at Talmolder, every machine replaced reduce about 20% of the use of acetone. Therefore the reduction would be:

Reduction of Acetone used per machine replaced =  $7776 * 20\% = 1555 \text{ kg}$

### 4.4 Spill and Leak Prevention

#### 4.4.1 Change remaining regular pumps for magnetic coupling pumps

Talmolder has been in the process of replacing regular pumps with magnetic coupling ones, which will reduce the leak potential to almost zero. The packing in the current pumps with mechanical couplings is eroded rapidly by the abrasive action of the components in the fluids that are pumped. In particular it has been determined that pigments are extremely hard on the said seals. Therefore it is necessary to replace such packing every two months in order to avoid leaks through the shafts. This process takes two technicians four hours, plus about \$200 worth of materials.

Additionally, even though the pipes have presented no spills; there is always the possibility of leaks on the lines. Therefore Talmolder will implement immediately a procedure as per

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<sup>2</sup> Manual Best Practices for Pollution Prevention in the Slabstock and Molded Flexible Polyurethane Foam Industry, US EPA, September 1996

lines will be inspected every two weeks in order to keep all the hoses, pipes, accessories and other components in good condition.

#### *4.4.1.1 Estimated reductions*

Due to the constant maintenance performed in the current pumps, it is considered that less than 1% of fluid is lost through the shafts, therefore if the change were to be made, the only savings in Acetone would be less than 78 kg per year, however it is something to be taken into account, because compliance rules regarding other materials such as Isocyanate are very restrictive, therefore this is an option that will be completed within a couple of years as funding becomes available.

In order to calculate the amount of Acetone saved via this option we will assume that 1% of all fluid that is moved by the pumps is lost through the shafts. Therefore:

Reduction of Acetone use:  $7776 \text{ kg} * 0.01 = 78 \text{ kg}$



## Onsite Reuse or Recycling

### 4.4.2 Installation of a Acetone Recovery system

Talmolder has investigated the installation of an acetone recovery system. However this option has been discarded because the amount of Acetone used per shot is very small relative and evaporates really quickly. Also there 5 LP machines all over the plant, which makes it difficult to store the acetone in a central location, either the operator would have to spend time putting the cap on the disposal bins every time a shot is made and removing it every time a new shot is performed at the end of the shift or when the bin is full, the bin should be transported to a central location to empty it with the other bins; risking a spill or an safety incident in the process.

On the other hand, each time a LP mixing head is flushed, the solvent is mixed with many other components such as Pentane and Resin and Polyurethane, therefore it will be necessary to separate the resulting mix in its original components in order to reuse them.

#### 4.4.2.1 Estimated reductions

Acetone reduction by means of onsite reuse and recycling would mean buying an acetone recycler. These recyclers claim to recover 95% of the solvent added. However, since acetone is lost since the flushing occurs until the operator closes the disposal bin and every time that the operators opens the bin for the new shot, we will assume that about 50% of the Acetone can be recovered.

Acetone reduction trough onsite reuse and recycling=  $50\% * 7776 = 3888$  kg

## 4.5 Improved Inventory Management or Purchasing Techniques

No options were identified. Since the company already purchases only the required materials which are used immediately. Also the company is in continuous communication with its providers in order to supply its needs.

## 4.6 Training or Improved Operating Practices

### 4.6.1 Training employees on improved dispensing practices

Since it is not possible to change some of the LP dispensers, it is necessary to train the employees into reducing the waste as much as possible.

#### 4.6.1.1 Estimated reductions

Since the amount used to flush the mixing heads is fixed, there should be no savings trough training, however Talmolder provide training to its employees for safety and compliance reasons.

Reduction of Acetone use:  $7776 \text{ kg} * 0\% = 0$  kg



## 5 IMPLEMENTATION OF OPTIONS FOR REDUCTION OF THE USE OF ACETONE AT THE FACILITY

In order to reduce the use of Pentane at the facility, Talmolder has implemented the option described in 4.3.1 as Equipment or Process Modification and the option described on 4.4.1 as Spill and Leak Prevention.

Talmolder already has a HP machine ready for installation, therefore in within the year it is expected that one of the LP machines will be replaced. Table 1 presents a summary of the implementation of the option mentioned on 6.3.1. for the replacement of one machine.

Table 1 Description and Timetable for Implementation of Option 6.3.1

Step	Description	Estimated Timeline
1	Quotations with different suppliers	2 Month
2	Test and presentation by supplier	2 Month
3	Installation of HP machine	2-4 Months
4	Calibration of equipment and training	2-4 Months

We can also see in Table 2 a detail of the estimated reduction per such implementation

Table 2 Estimate of Reduction of Pentane by Implementation of Option 6.3.1

Type	Estimated Reduction in kg	Anticipated Date
Use	57	8-12 months
Creation	0	8-12 months
Release to Air	57	8-12 months
Release to Water	0	8-12 months
Release to Land	0	8-12 months
Disposal off-site	0	8-12 months
Disposal on-site	0	8-12 months
Transfer off-site for recycling	0	8-12 months
Contained in Product	0	8-12 months

Talmolder is also in the process of replacing the remaining mechanical coupling pumps with magnetic coupling ones. The time frames for this are more difficult to estimate, since they depend on the funding that Talmolder can obtain. Table 3 and Table 4 present the timetable and estimated reductions for such option per pump replaced, however at this point in time it is difficult to determine when it would be possible to implement such option.

Table 3 Description and Timetable for Implementation of Option 6.4.1

Step	Description	Estimated Timeline
1	Quotations with different suppliers	1 Month
2	Test and presentation by supplier	1 Month
3	Installation of new pump	1 Month
4	Calibration of equipment and training	1 Month

Table 4 Estimate of Reduction of Pentane by Implementation of Option 6.4.1

Type	Estimated Reduction in kg	Anticipated Date
Use	13	4-6 months
Creation	0	4-6 months
Release to Air	13	4-6 months
Release to Water	0	4-6 months
Release to Land	0	4-6 months
Disposal off-site	0	4-6 months
Disposal on-site	0	4-6 months
Transfer off-site for recycling	0	4-6 months
Contained in Product	0	4-6 months

## **6 PLANNER RECOMMENDATIONS AND RATIONALE**

It is clear that Talmolder is committed to the reduction of use of Toxics, however the quality and durability requirements of its products do not allow exploring any other alternative than the ones described in this Toxic Substance Reduction Plan. For that reason I have no recommendations at the moment.

## 7 PLAN CERTIFICATIONS FOR ACETONE

### 7.1 CERTIFICATION BY THE HIGHEST RAKING EMPLOYEE

As of December 6, 2013. I Harindran Nianathan, certify that I have read the toxic substance reduction plan for the toxic substance referred to below and am familiar with its contents, and to my knowledge the plan is factual and accurate and complies with the *Toxics Reduction Act, 2009* and Ontario Regulation 455/09 (General) made under that Act

Acetone




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Harindran Nianathan  
Manager of Operations  
Talmolder Inc.

### 7.2 CERTIFICATION BY LICENSED PLANNER

As of December 6, 2013. I German Rincon, certify that I am familiar with the processes at Talmolder Inc. That use the toxic substance referred to below, that I agree with the reductions referred to in subparagraphs 7 iii, iv and v of subsection 4 (1) of the *Toxics Reductions Act, 2009* that are set out in the plan dated December 27, 2012 and that the plan complies with that Act and Ontario Regulation 455/09 (General) made under that Act.

Acetone



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German Rincon [Planner License # TSRP0197]  
General Manager  
EC<sup>2</sup> Environmental and Chemical Consulting