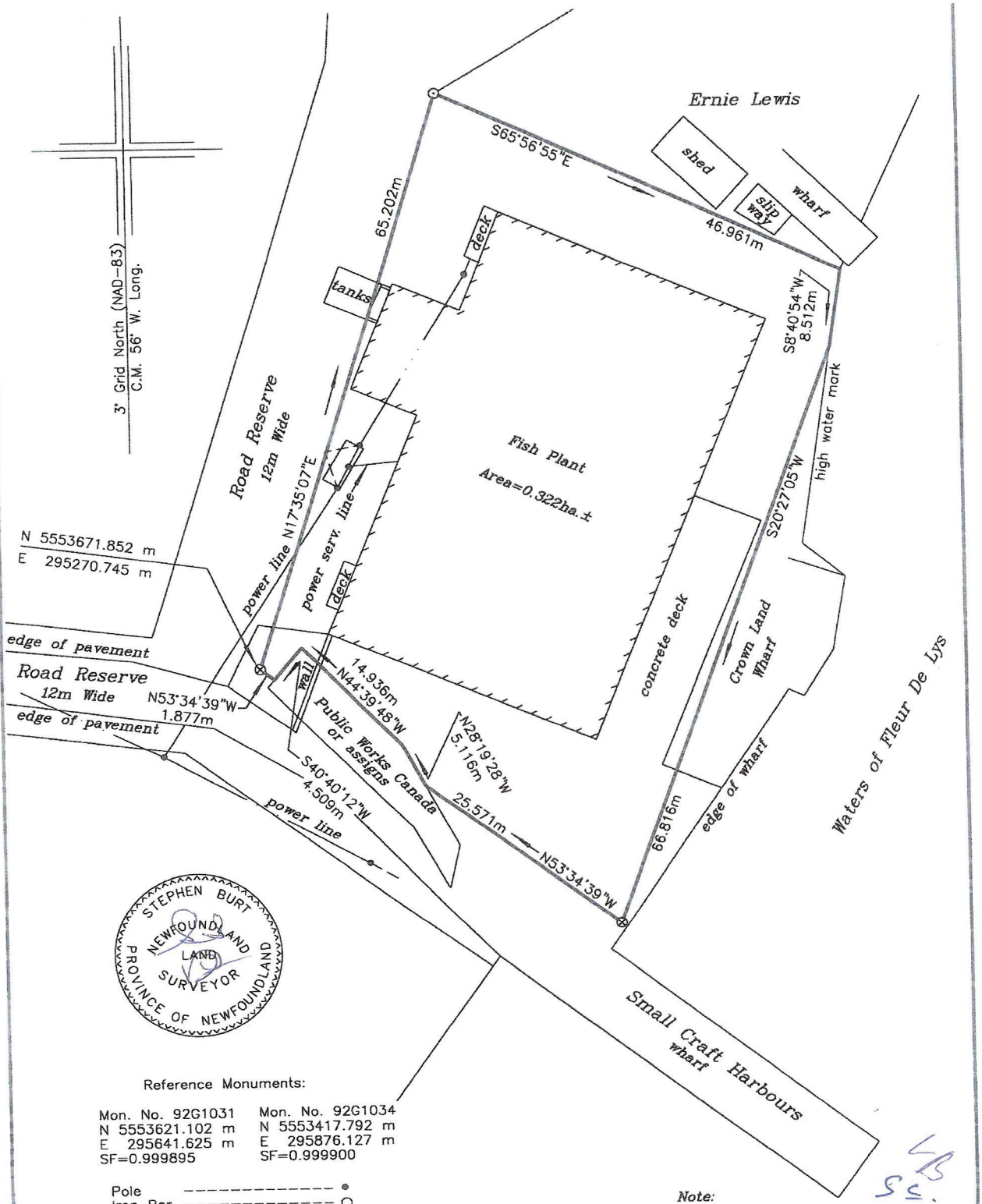
APPENDIX A



Reference Monuments:

Mon. No. 92G1031	Mon. No. 92G1034
N 5553621.102 m	N 5553417.792 m
E 295641.625 m	E 295876.127 m
SF=0.999895	SF=0.999900

Pole ——————— •
Iron Bar ——————— ○
Capped Iron Bar ——————— ⊙
Concrete Nail ——————— ⊗
Survey Spike ——————— ◎
Fence Lines ——— ——— x ——— x ———

Note:

Monumentation to be installed when snow conditions permit.

NOTES

THIS PLAN CERTIFIES THE INFORMATION SHOWN AS OF APRIL 1, 2009 AND ONLY AS OF THAT DATE.

ALL DISTANCES SHOWN ARE METRIC GRID DISTANCES, EXCEPT WHERE OTHERWISE NOTED.

STEPHEN BURT SURVEYS LTD.
KING'S POINT, NL

SURVEY PLAN OF LAND FOR THE
NORTHEAST COAST SEALERS' CO-OPERATIVE
SOCIETY, LIMITED
FLEUR DE LYS, NL

Drawn: S. Burt	Scale: 1:500
Survey: S. Burt	Date: April 2, 2009
Checked:	Dwg. No.: 2009-010-1

SCHEDULE "A"

Description of land for the Northeast Coast Sealers' Co-operative Society, Limited
Fleur De Lys, NL

All that piece or parcel of land situate and being at Fleur De Lys, in the Electoral District of Baie Verte-Springdale, Province of Newfoundland and Labrador, abutted and bounded as follows, that is to say:

Beginning at a concrete nail set on the easterly limit of a Road Reserve, twelve metres wide, the said point having Three Degree Modified Transverse Mercator Projection (NAD 83) grid coordinates of north 5553671.852 metres and east 295270.745 metres;

Thence running along the said easterly limit of a Road Reserve, twelve metres wide, north seventeen degrees thirty-five minutes seven seconds east sixty-five decimal two zero two metres;

Thence running by land of Ernie Lewis south sixty-five degrees fifty-six minutes fifty-five seconds east forty-six decimal nine six one metres;

Thence running along the westerly shoreline of the Waters of Fleur de Lys, at high water mark, to a point which bears south eight degrees forty minutes fifty-four seconds west eight decimal five one two metres;

Thence running by Crown Land south twenty degrees twenty-seven minutes five seconds west sixty-six decimal eight one six metres;

Thence running along the northerly limit of a Road Reserve, twelve metres wide, north fifty-three degrees thirty-four minutes thirty-nine seconds west twenty-five decimal five seven one metres;

Thence running by land of Public Works Canada or assigns north twenty-eight degrees nineteen minutes twenty-eight seconds west five decimal one one six metres,

Thence continuing by land of Public Works Canada or assigns north forty-four degrees thirty-nine minutes forty-eight seconds west fourteen decimal nine three six metres,

And thence continuing by land of Public Works Canada or assigns south forty degrees forty minutes twelve seconds west four decimal five zero nine metres;

Thence running along the said northerly limit of a Road Reserve, twelve metres wide, north fifty-three degrees thirty-four minutes thirty-nine seconds west one decimal eight seven seven metres, more or less, to the point of beginning.

.....2

UB
SC

Containing an area of 0.322 hectares, more or less, and being more particularly shown on the diagram annexed hereto;

All bearings being referred to the meridian of fifty-six degrees west longitude of the Modified Three Degree Transverse Mercator Projection (NAD 83), and all distances shown being grid distances.

April 2, 2009.

Appendix B

45524

THUNDER BAY CHEMICALS LTD

1100 Kam Road, Thunder Bay, Ontario P7E 6T7
Phone (807) 622-3741 Fax (807) 622-7544

TECHNICAL DATA SHEET

ALUMINUM SULPHATE SOLID

General Characteristics

Chemical Formula	$Al_2(SO_4)_3 \cdot N\ H_2O$ N = Between 14 and 16 molecules of water
Appearance	White solid, ground
Bulk Density, loose	0.88 g/cc (55 lb/cu ft)
Bulk Density, packed	1.22 g/cc (76 lb/cu ft)
Cubic Capacity - piled bags	0.64 cu m/MT (25 cu ft/ST)

Parameters	Specification	Typical
Aluminum - Total available as Al_2O_3	17.0% min	17.2%
Iron - Total as Fe_2O_3	--	0.01%
Insoluble materials	0.15% max	0.05%
Basicity - as Al_2O_3	0.3% min	0.4%

Size Distribution - Mesh Size	Specification	Typical
on 4	nil	nil
Through 4 on 9	2%	10% max
Through 9 on 35	55%	--
Through 35 on 100	--	--
Through 100	--	--
Through 100 on 200	35%	--
Through 200	8%	12% max

Thunder Bay Chemicals Solid Aluminum Sulphate, available in ground form, finds major application in pulp and paper mills and water purification plants. It is also used in the treatment of leather, textiles, wallboard gypsum and as a component in fire-retardant agents.

NSF®
Certified to ANSI/NSF 60

Thunder Bay Chemicals Aluminum Sulphate Solid meets the American Water Works Association Standard Specification AWWA B403-03.

Thunder Bay Chemical has been NSF Certified since 1997. The maximum use dosage in drinking water is 150 mg/L according to NSF Standard 60.

Specifications apply to lot quantities. Quality analyses are carried out on representative samples of lot quantities.

Shipping
Thunder Bay Chemicals Aluminum Sulphate Solid is supplied in 44 lb bags on 2,200 lbs stretch wrapped pallets, 1 tonne minibulk bags, and bulk pneumatic trailers. Thunder Bay Chemicals Ground Aluminum Sulphate is normally shipped in 44,000 lb truckload quantities.

Les Produits Chimiques Amplex Ltée
Amplex Chemical Products Ltd.
600 Ave. Delmar
Pointe-Claire Québec Canada H9R 4A8
Tel : (514) 630-3309 Fax (514) 630-5951

Specifications List

Product Name	: Aluminium Sulfate
Product Code	: 8004
Revision Date	: 01-01-2002
Revision Number	: 2

Product Specifications

Available aluminum (as Al2O3)	Min. 17.0 %
Alkalinity (as Al2O3)	Min. 0.30 %
Fe2O3	Max. 0.014 %
Insoluble matters	Max. 0.30 %
tained on #4 USSS	Traces
Through #4, retained on #9 USSS	Max. 10 %
Through #200 USSS	Max. 12 %

SECTION I PRODUCT INFORMATION

PRODUCT IDENTIFIER	:	**ALUMINIUM SULFATE**
CHEMICAL NAME AND SYNONYMS	:	Dry Alum
IDENTIFICATION NUMBER	:	Not regulated
PRODUCT USE	:	Pulp & paper, waste treatment.

SUPPLIER : Amplex Chemical Products Ltd.
ADDRESS : 600 Delmar Avenue
Pointe-Claire, QC
H9R 4A8
TELEPHONE : (514) 630-3309

EMERGENCY: **Newalta Industrial Services Inc.**
24H NUMBER : 1-800-567-7455

SECTION II HAZARDOUS INGREDIENTS

INGREDIENT	CONC.	CAS NUMBER	LD50(rat-oral)	LC50(rat-ihl)
Aluminium Sulfate	60 - 100%	10043-01-3	6207 mg/kg	Not available

SECTION III WHMIS CLASSIFICATION

CLASS D2B

SECTION IV PHYSICAL DATA

PHYSICAL STATE	Solid	pH (WATER=7)	3.7 @ 1% solution
ODOUR AND APPEARANCE	White to creamy white granules or powder	SPECIFIC GRAVITY (WATER=1)	2,7
ODOUR THRESHOLD	Odourless	VAPOUR DENSITY	Not available
BOILING POINT	Not available	VAPOUR PRESSURE	Not available
FREEZING POINT	650 - 770°C	EVAPORATION RATE	Not available
COEFFICIENT OF WATER/OIL DISTRIBUTION	Not available		

SECTION V FIRE OR EXPLOSION

CONDITION OF FLAMMABILITY: Non flammable.

MEANS OF EXTINCTION: Use extinguishing media appropriate for surrounding fire. Never use water directly on burning produce as aluminum sulfate reacts with water and produces sulfuric acid. For fire fighting wear NIOSH approved self-contained breathing apparatus.

FLASH POINT	Not applicable	AUTO-IGNITION TEMPERATURE	Not applicable
UPPER FLAMMABLE LIMIT	Not applicable	MECHANICAL IMPACT SENSITIVITY	Not available
LOWER FLAMMABLE LIMIT	Not applicable	STATIC DISCHARGE SENSITIVITY	Not available

HAZARDOUS COMBUSTION PRODUCTS: At temperatures above 770 °C, sulfur oxide gases and aluminium gas are released. The sulfuric trioxide is a toxic, corrosive oxidizer.

SECTION VI REACTIVITY DATA

CHEMICAL INSTABILITY CONDITIONS: Stable.

INCOMPATIBLE SUBSTANCES AND CONDITIONS OF REACTIVITY: Alkalies and water reactive materials such as oleum causes exothermic reactions. Water or high humidity may provoke hydrolysis and formation of sulfuric acid. In aqueous solution, lowers pH.

HAZARDOUS DECOMPOSITION PRODUCTS: At temperatures above 770 °C, sulfur oxide gases and aluminium gas are released. The sulfuric trioxide is a toxic, corrosive oxidizer.

SECTION VII TOXICOLOGICAL PROPERTIES

SKIN CONTACT/ABSORBTION: May cause skin irritation, especially upon repeated or prolonged contact, or when moisture is present.

EYE CONTACT: May irritate or cause severe burns to the eyes.

INHALATION: Dust or mist inhalation may irritate nose, throat and lungs. Its buffered acidic action can be irritating to the mucous membranes.

INGESTION: May irritate the gastrointestinal tract and cause nausea, vomiting and purging. Large quantities: Ulceration of the mucous membranes of the mouth, throat, nose and lungs. Kidney damage, haemorrhagic gastroenteritis, and severe thirst.

ACUTE/ CHRONIC EXPOSURE EFFECTS: Repeated or prolonged contact may cause dermatitis. Toxicity risks are higher for persons suffering from kidney ailments when ingested in large or chronic quantities.

EXPOSURE LIMIT	2 mg/m^3	SHORT TERM EXPOSURE LIMIT	Not available
CARCINOGENICITY	Not available	SENSITIZATION TO PRODUCT	Not available
TERATOGENICITY	Not available	MUTAGENICITY	Not available
SYNERGISTIC PRODUCTS	Not available	REPRODUCTIVE TOXICITY	Not available
IRRITANCY OF PRODUCT	Yes		

SECTION VIII PREVENTIVE MEASURES

PROTECTIVE GLOVES: Wear impervious gloves.

EYE PROTECTION: For dusty or misty conditions or when handling solutions where there is reasonable probability of eye contact, wear chemical safety goggles and a hard hat. Under these conditions, do not wear contact lenses.

RESPIRATORY PROTECTION: For dusty or misty conditions, wear a NIOSH approved dust or mist respirator.

OTHER PROTECTIVE EQUIPMENT: Wear full protective clothing, including long sleeved shirt and trousers for routine handling. These should be exchanged for impervious clothing for handling solutions and where there is repeated or prolonged contact. Eyewash facility should be provided in storage and general work area.

ENGINEERING CONTROLS: Provide exhaust ventilation in places where dust or mist conditions prevail. TLV levels may be exceeded without detectable indication.

PROCEDURES TO BE FOLLOWED IN CASE OF SPILL OR LEAK: Use a vacuum and transfer to a tight closed container minimizing clouds of dust. Recycle if possible. Avoid sewers and surface water. Give a strong, astringent taste to water. In high concentration, it

can raise the percentage of lead in the water, especially if pipes are made of lead.

WASTE DISPOSAL: Disposal must be consistent with the requirements of the local and/or Provincial and/or Federal waste disposal authorities.

HANDLING AND STORAGE PROCEDURES: Avoid clouds of dust when handling. Avoid prolonged or repeated contact with skin. Keep in a sheltered and dry area, away from bases. Do not store in steel containers due to corrosion risks.

SPECIAL SHIPPING INFORMATION:

Shipping Name: ALUMINIUM SULFATE
Class/Division : Not regulated

SECTION IX FIRST AID MEASURES

SKIN: Remove contaminated clothing. Wash with plenty of soap and running water. Get medical attention if irritation persists.

EYES: Flush promptly with plenty of running water, continuing at least 15 minutes lifting eyelids. Get medical attention.

INHALATION: Promptly remove to fresh air. Restore and/or support breathing. Consult a physician for observation and treatment.

INGESTION: If conscious, immediately give 2 to 4 glasses of water. DO NOT induce vomiting and DO NOT give bicarbonate to neutralize. Get medical attention promptly. Never give anything by mouth to an unconscious or convulsing person.

SECTION X PREPARATION INFORMATION

PREPARED BY : Amplex Chemical Products Ltd.
TELEPHONE : (514) 630-3309
DATE : March 8th , 2011

MATERIAL SAFETY DATA SHEET

SECTION I - PRODUCT INFORMATION

PRODUCT IDENTIFIER : **SODIUM SULPHATE ANHYDROUS GRANULAR**
CHEMICAL NAME AND SYNONYMS : Sodium sulfate
IDENTIFICATION NUMBER : Not regulated
PRODUCT USE : Industrial use

SUPPLIER : Amplex Chemical Products Ltd.
ADDRESS : 600 Delmar Avenue
Pointe-Claire, QC
H9R 4A8
TELEPHONE : (514) 630-3309.

EMERGENCY: **NEWALTA INDUSTRIAL SERVICES**
24H NUMBER : 1-800-567-7455

SECTION II - HAZARDS IDENTIFICATION

- NOT CONTROLLED UNDER WHMIS -

SECTION III - HAZARDOUS INGREDIENTS

INGREDIENT	SYNONYMS	CAS NUMBER	CONCENTRATION*
Sodium sulfate	Sodium sulfate anhydrous	7757-82-6	99 - 100 %

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.

SECTION IV - FIRST AIDS

EYES: Immediately flush eyes with copious quantities of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Call a physician.

SKIN: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash contaminated clothing before reusing.

INHALATION: Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Call a physician.

INGESTION: If conscious, wash out with mouth with water. Have conscious person drink 2 -3 glasses of water. DO NOT induce vomiting. Never give anything by mouth to an unconscious or convulsing person. Call a physician.

NOTE TO PHYSICIAN: Treat symptomatically.

SECTION V - FIRE FIGHTING MEASURES

EXTINGUISH MEDIA: Use extinguish media appropriate for surrounding materials.

UNSUITABLE EXTINGUISH MEDIA: Not applicable

SPECIFIC HAZARD: Not available

HAZARDOUS COMBUSTION PRODUCTS: Sulfur oxides, sodium oxides.

SPECIAL PROTECTIVE EQUIPMENT: Use self-contained breathing apparatus and full protective clothing

FIRE FIGHTING INSTRUCTIONS: Not available..

SECTION VI - ACCIDENTAL RELEASE MEASURES

PERSONAL PRECAUTIONS: Wear respirator, protective clothing, and gloves.
ENVIRONMENTAL PRECAUTIONS: Do not flush into sewers or waterways

CLEANUP PROCEDURE: Dike or contain spill. Sweep up and place in a container for disposal.

SECTION VII - HANDLING AND STORAGE

HANDLING: Do not breathe mists. Do not ingest. Do not get in eyes, on skin, or on clothing. Wash well after use. Do not allow smoking and food consumption while handling.

STORAGE: Store in a cool, dry and well ventilated area. Keep container tightly closed. Keep away from heat, sparks and flame. Protect against physical damage. Store away from incompatible materials. Avoid moisture contamination. Prolonged storage may result in lumping or caking.

STORAGE INCOMPATIBILITY: Not available.

SECTION VIII - PERSONAL EXPOSURE CONTROL

EXPOSURE LIMITS:

CHEMICAL NAME	TYPE	EXPOSURE LIMIT	SOURCE
Sodium sulfate	TWA*	Not available	Not available
	STEL**	Not available	Not available

*** TWA: Time-weighted average** ****STEL: Short term exposure limit**

ENGINEERING CONTROLS: Local exhaust ventilation is recommended.

PROTECTIVE CLOTHING: Wear an impermeable apron and boots.

HAND PROTECTION: Wear protective gloves . Prior to use, user should confirm impermeability.

EYE PROTECTION: Safety glasses with side shields are recommended. Contact lenses should not be worn when working with this material.

RESPIRATORY PROTECTION: No specific guidelines available. Wear a NIOSH approved equipment according to the concentrations.

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash station and safety shower is proximal to the work-station location.

SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	Solid	**VAPOR PRESSURE**	Not available
COLOR AND ODOR	White, Odorless	**VAPOR DENSITY** (*air = 1)*	Not available
ODOR THRESHOLD	Not available	**SPECIFIC GRAVITY** (*water = 1)*	2.68
pH (*water = 7*)	6-10	**SOLUBILITY**	Water
MELTING / FREEZING POINT	884°C	**FLAMMABILITY**	Not flammable
BOILING POINT	Not available	**FLASH POINT**	Not available
DECOMPOSITION TEMPERATURE	Not available	**AUTO-IGNITION TEMPERATURE**	Not available
EVAPORATION RATE (*n-butylacetate = 1*)	Not available	**LOWER FLAMMABLE LIMIT**	Not available
PARTITION COEFFICIENT *n-octanol / water*	Not available	**UPPER FLAMMABLE LIMIT**	Not available

SECTION X - STABILITY AND REACTIVITY

CHEMICAL STABILITY: Stable

INCOMPATIBLE MATERIALS: Strong oxidizers

CONDITIONS TO AVOID: Not available.

HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

MECHANICAL IMPACT SENSITIVITY: Not available

STATIC DISCHARGE SENSITIVITY: Not available

VIBRATION SENSITIVITY: Not available

HAZARDOUS DECOMPOSITION PRODUCTS: Sulfur oxide, Sodium oxides.

SECTION XI - TOXICOLOGICAL PROPERTIES

ROUTES OF ENTRY: Ingestion.

ACUTE HEALTH EFFECTS:

SKIN CONTACT: May cause mechanical irritation.

EYE CONTACT: May cause mechanical irritation.

INHALATION: May cause mechanical irritation.

INGESTION: May cause irritation of the gastro-intestinal tract. Symptoms may include diarrhea.

CHRONIC HEALTH EFFECTS:

SKIN CONTACT: Not available.

EYE CONTACT: Not available

INHALATION: Not available

INGESTION: Not available

CARCINOGENICITY	Not available	**MUTAGENICITY**	Not available
TERATOGENICITY	Not available	**REPRODUCTIVE TOXICITY**	Not available

TOXICITY DATAS:

CHEMICAL NAME	LD 50 - (rat - oral)	LC 50 - (rat - inh)
Sodium sulfate	5 989 mg/kg	Not available

SECTION XII - ECOLOGICAL INFORMATION

ECOTOXICITY: Not available.

PERSISTENCE AND DEGRADABILITY: Not available

BIOACCUMULATIVE POTENTIAL: Not available

MOBILITY IN SOIL: Not available

OTHER HAZARDOUS EFFECTS: Not available

SECTION XIII - DISPOSAL CONSIDERATIONS

GENERAL INFORMATION: Dispose of in accordance with federal, provincial and local regulation.

DISPOSAL METHODS: Dispose of waste material at an approved waste treatment/disposal facility.

MATERIAL SAFETY DATA SHEET

SECTION XIV - TRANSPORT INFORMATION

SHIPPING NAME	HAZARD CLASS	UN NUMBER	PACKING GROUP
Sodium sulphate anhydrous granular	Not regulated	Not regulated	Not regulated

MARINE POLLUTANT: Not available

SPECIAL INSTRUCTIONS: Not available

SECTION XV - REGULATORY INFORMATION

CANADA:CEPA - NSNR: This material is included on the DSL under the CEPA

SECTION XVI - PREPARATION INFORMATION

PREPARED BY : Amplex Chemical Products Ltd.
TELEPHONE : (514) 630-3309
MODIFICATIONS : MSDS with 16 sections

SECTION I PRODUCT INFORMATION

PRODUCT IDENTIFIER : **HYDRATED LIME**
CHEMICAL NAME AND SYNONYMS : Calcium hydroxide, calcium hydrate, slaked lime, caustic lime
IDENTIFICATION NUMBER : Not regulated
PRODUCT USE : Industrial use

SUPPLIER : Amplex Chemical Products Ltd.
ADDRESS : 600 Delmar Avenue
Pointe-Claire, QC
H9R 4A8
TELEPHONE : (514) 630-3309

EMERGENCY: **Newalta Industrial Services Inc.**
24H NUMBER : 1-800-567-7455

SECTION II HAZARDOUS INGREDIENTS

INGREDIENT	CONC.	CAS NUMBER	LD50(rat-oral)	LC50(rat-ihl)
CALCIUM HYDROXIDE	> 92%	1305-62-0	7340 mg/kg	Not available
CRYSTALLINE SILICA, QUARTZ	> 0.1%	14808-60-7	Not available	Not available

SECTION III WHMIS CLASSIFICATION

CLASSE E

CLASSE D2A / D2B

SECTION IV PHYSICAL DATA

PHYSICAL STATE	Solid	**pH** (water=7)	12.45
ODOUR AND APPEARANCE	White granules or powder, slight earthy odour.	**SPECIFIC GRAVITY**	2,3-2.4
ODOUR THRESHOLD	Not applicable	**VAPOUR DENSITY**	Not applicable
BOILING POINT	Not applicable	**VAPOUR PRESSURE**	Not applicable
MELTING POINT	Not applicable	**EVAPORATION RATE**	Not applicable
COEFFICIENT OF WATER/OIL DISTRIBUTION	Not available		

SECTION V FIRE OR EXPLOSION

CONDITION OF FLAMMABILITY: Not flammable.

MEANS OF EXTINCTION: Use extinguishing media appropriate to surrounding fire conditions.

FLASH POINT	Not applicable	**AUTO-IGNITION TEMPERATURE**	Not available
UPPER FLAMMABLE LIMIT	Not applicable	**MECHANICAL IMPACT SENSITIVITY**	Not available
LOWER FLAMMABLE LIMIT	Not applicable	**STATIC DISCHARGE SENSITIVITY**	Not available

HAZARDOUS COMBUSTION PRODUCTS: None.

SECTION VI REACTIVITY DATA

CHEMICAL INSTABILITY CONDITIONS: Absorbs carbon dioxide in the air to form calcium carbonate.

INCOMPATIBLE SUBSTANCES AND CONDITIONS OF REACTIVITY: Water, strong acids (violent reaction with generating heat and possible explosion in confined area), maleic anhydride, ethanol, fluorine, hydrogen fluoride, boron tri-fluoride, chlorine tri-fluoride, phosphorus pentoxide. Explosive when mixed with nitro organic compounds.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition at 540°C will produce calcium oxide and water.

SECTION VII TOXICOLOGICAL PROPERTIES

SKIN CONTACT/ABSORPTION: Irritation of skin and mucous.

EYE CONTACT: Eye irritation, intense watering of the eyes, possible lesions, possible blindness when exposed for prolonged period.

INHALATION: Dust and mists may cause irritation of breathing passages, cough, sneezing.

INGESTION: If ingested, pain, vomiting blood, diarrhea, collapse, drop in blood pressure (indicates perforation of esophagus or stomach).

ACUTE/CHRONIC EXPOSURE EFFECTS: Excessive inhalation of dust may result in respiratory disease, including silicosis, pneumoconiosis and pulmonary fibrosis.

EXPOSURE LIMIT	Not available	**SHORT TERM EXPOSURE LIMIT**	Not available
CARCINOGENICITY	Yes (suspected)	**SENSITIZATION TO PRODUCT**	Not available
TERATOGENICITY	Not available	**MUTAGENICITY**	Not available
SYNERGISTIC PRODUCTS	Not available	**REPRODUCTIVE TOXICITY**	Not available
IRRITANCY OF PRODUCT	Yes		

SECTION VIII PREVENTIVE MEASURES

PROTECTIVE GLOVES: Wear rubber gloves.

EYE PROTECTION: Wear chemical goggles.

RESPIRATORY PROTECTION: Use respirator approved by NIOSH/MSHA for silica or toxic dust when the concentration is high. For very high or unknown concentrations, wear full face positive pressure SABA or self contained breathing apparatus.

OTHER PROTECTIVE EQUIPMENT: Boots, full cover clothing. Safety showers and eye bath. Contact lenses should not be worn when working with this chemical.

PROCEDURES TO BE FOLLOWED IN CASE OF SPILL OR LEAK: Avoid dust accumulations. Sweep or shovel material into waste container. Collect and contain in suitable disposal containers.

WASTE DISPOSAL: In accordance with Municipal, Provincial, and Federal regulations.

HANDLING AND STORAGE PROCEDURES: Avoid contact with eyes, skin, and clothing. Avoid breathing dust or mist. Wash thoroughly after handling. Store in a cool and dry area. Protect containers from physical damage.

SPECIAL SHIPPING INFORMATION:

Shipping Name: Not regulated
Class/Division : Not regulated

SECTION IX FIRST AID MEASURES

SKIN: Carefully and gently brush the contaminated body surfaces in order to remove all traces of lime. Remove all lime-contaminated clothing. Rinse contaminated area with lukewarm water for 15 to 20 minutes. Get medical attention.

EYES: Flush with large amounts of running water for at least 15 minutes, lifting eyelids to ensure rinsing of entire surface of the eye lids with water. Get medical attention.

INHALATION: Remove victim to fresh air. Apply artificial respiration and/or cardiopulmonary resuscitation (CPR) if necessary. Keep warm. Get medical attention immediately.

INGESTION: Do not induce vomiting. If victim is conscious, give 300 ml of water, diluted vinegar (½) or fruit juice. Get medical attention immediately.

SECTION X PREPARATION INFORMATION

PREPARED BY	:	Amplex Chemical Products Ltd.
TELEPHONE	:	(514) 630-3309
DATE	:	January 4th , 2013.

Montréal : (514) 761-3339 Canada & USA : 1-800-565-7888 Québec : 1-800-363-0230
constant@constantamerica.com www.constantamerica.com

MATERIAL SAFETY DATA SHEET / FICHE SIGNALÉTIQUE

POLYFLO SERIES

HAZARD RATING / INDICE DE RISQUE

HEALTH HAZARD / RISQUE POUR LA SANTÉ	(2)
FIRE HAZARD / INFLAMMABILITÉ	(1)
REACTIVITY / RÉACTIVITÉ	(1)
PERSONAL PROTECTION / PROTECTION PERSONNELLE	(R)

HAZARD CODE/CODE DE RISQUE : 4-SEVERE /TRÈS ÉLEVÉ; 3-SERIOUS/ÉLEVÉ; 2-MODERATE/MODÉRÉ; 1-SLIGHT/PEU ÉLEVÉ; 0-MINIMAL/MINIME

SECTION I: PRODUCT IDENTIFICATION / IDENTIFICATION DU PRODUIT

TRADE NAME AND SYNONYMS APPELLATION COMMERCIALE ET SYNONYMES	CHEMICAL FORMULA FORMULE CHIMIQUE	MATERIAL USE UTILISATION DE LA MATIÈRE
POLYFLO SERIES	**Proprietary**	**Flocculant (Anionic) (1000 is nonionic)**
108, 11, 15, 17, 308 508,708, 6000,540, 490 LTR, 475 LA, 470 LA, 460 LA, 460 LTR, 540 L, 450 L, 980, 990, 1000	***Propriétaire***	***Floculant (Anionique) (1000 est nonionique)***

SECTION II: HAZARDOUS INGREDIENTS OF MATERIAL / INGRÉDIENTS DANGEREUX DE LA MATIÈRE

HAZARDOUS INGREDIENTS INGRÉDIENTS DANGEREUX	% Wt. % Poids	CAS. NO. NO. CAS	TLV (ACGIH) TLV (ACGIH)	LD_{50} DI_{50}
Mineral oil ***Huile minérale***	**10-40**	**64742-47-8**	**>8000 mg/kg (Oral-Rat)**	
Proprietary surfactants ***Agents tensioactifs propriétaires***	**1-10**	**N.A.V.**	**N.A.V.**	

The balance of ingredients are not hazardous. / *Les autres ingredients ne sont pas dangereux.*

N/A	**=**	**Not applicable / Non applicable**	**N.AV.**	**=**	**Not available / Non disponible**

The balance of ingredients are not hazardous. / ***Les autres ingredients ne sont pas dangereux.***

N/A =	**Not applicable / Non applicable**	**N.AV. =**	**Not available / Non disponible**

SECTION III: PHYSICAL DATA OF MATERIAL / CARACTÉRISTIQUES PHYSIQUES DE LA MATIÈRE

PHYSICAL STATE / ÉTAT PHYSIQUE	pH (Sol. 0.5 %)	ODOUR AND APPEARANCE / ODEUR ET APPARENCE	
Liquid *Liquide*	7-9 ± 0.1	Faint - Milky white opaque *Faible - Blanc laiteux opaque*	
% VOLATILE (BY VOL.) % VOLATILITÉ (PAR VOL.)	SPECIFIC GRAVITY (25°C) DENSITÉ SPÉCIFIQUE	VAPOUR PRESSURE (mmHg) TENSION DE LA VAPEUR	VAPOUR DENSITY (air=1) DENSITÉ DE LA VAPEUR
N.A.V.	1.014-1.10 ± 0.010	N.AV	N.AV.
EVAPORATION RATE (ether=1) TAUX D'ÉVAPORATION	BOILING POINT (°C) PT. D'ÉBULLITION	FREEZING POINT (°C) PT. DE CONGÉLATION	SOLUBILITY IN WATER (20°C) SOLUBILITÉ DANS L'EAU
1.44	100	0	Complete / *Complète*

SECTION IV: FIRE AND EXPLOSION HAZARD / RISQUES D'INCENDIE ET D'EXPLOSION

FLAMMABILITY / INFLAMMABILITÉ **None / Aucune**

IF YES, UNDER WHAT CONDITIONS? SI OUI, DANS QUELLES CONDITIONS? N/A

MEANS OF EXTINCTION / MOYENS D'EXTINCTION

Carbon dioxide foam. DO NOT DOUSE OR SPRAY WITH WATER.

Mousse à bioxyde de carbone. NE PAS COUVRIR OU ARROSER AVEC DE L'EAU.

FLASHPOINT (°C) AND METHOD

POINT D'ÉCLAIR (°C) ET LA MÉTHODE DE DÉTERMINATION

> 100

LOWER EXPLOSION LIMIT (% BY VOLUME)

SEUIL MINIMAL D'INFLAMMABILITÉ (% PAR VOLUME)

1.0

UPPER EXPLOSION LIMIT (% BY VOLUME)

SEUIL MAXI. D'INFLAMMABILITÉ (% PAR VOLUME)

N/A

HAZARDOUS COMBUSTION PRODUCTS

PRODUITS DE COMBUSTION DANGEREUX

Carbon and nitrogen oxides.

Oxydes de carbone et d'azote.

SPECIAL PROCEDURES / PROCÉDURE SPÉCIALE A SUIVRE

Wear full respiratory and personal protection if exposed to combustion products or working in confined spaces.

Porter un appareil respiratoire autonome et des vêtements de protection complète lors des expositions aux produits de combustion ou lors du travail dans les espaces restreints

SECTION V: REACTIVITY DATA / DONNÉES SUR LA RÉACTIVITÉ

CHEMICAL STABILITY / STABILITÉ CHIMIQUE **YES/*OUI***

IF NO, UNDER WHAT CONDITIONS? / SI NON, DANS QUELLES CONDITIONS?

INCOMPATIBILITY TO OTHER SUBSTANCES / INCOMPATIBILITÉ AVEC D'AUTRES SUBSTANCES **YES / *OUI***

IF SO, WHICH ONES? SI OUI, AVEC LESQUELLES?

Strong oxidizing.

Les oxydants forts..

REACTIVITY AND UNDER WHAT CONDITIONS / RÉACTIVITÉ - DANS QUELLES CONDITIONS?

Presence of strong oxidizing agents.

La présence d'agents oxydants puissants.

HAZARDOUS DECOMPOSITION PRODUCTS / PRODUITS DE DÉCOMPOSITION DANGEREUX

Carbon and nitrogen oxides.

Oxydes de carbone et d'azote.

SECTION VI: TOXICOLOGICAL PROPERTIES / PROPRIÉTÉS TOXICOLOGIQUES

ROUTE OF ENTRY / VOIE D'ADMINISTRATION

Skin contact / *Contact avec la peau* — **Ingestion**

Eye contact / *Contact oculaire* — **Inhalation**

EFFECTS OF ACUTE EXPOSURE TO MATERIAL / EFFETS DE L'EXPOSITION AIGUË À LA MATIÈRE

SKIN / PEAU: **May cause severe irritation.**
Peut provoquer de l'irritation et des brûlures et des blessures graves.

EYES / YEUX: **May cause severe irritation or cause burns.**
Peut provoquer de l'irritation.

INHALATION: **Vapors and mists are irritating to the lungs.**
Les vapeurs et la bruine peuvent irriter les poumons.

INGESTION: **May cause gastroenteritis.**
Peut provoquer de la gastroentérite.

CARCINOGENICITY, REPRODUCTIVE EFFECTS, TERATOGENICITY, MUTAGENICITY/
CANCÉROGÈNICITÉ, EFFETS NOCIFS SUR LA REPRODUCTION, TÉRATOGÈNICITÉ, MUTAGÈNICITÉ **None** / *Aucun*

SECTION VII: PREVENTIVE MEASURES / MESURES PRÉVENTIVES

PERSONAL PROTECTIVE EQUIPMENT / ÉQUIPEMENT DE PROTECTION PERSONNELLE

GLOVES (SPECIFY) / GANTS (PRÉCISER)
Rubber
Caoutchouc

EYES (SPECIFY) / YEUX (PRÉCISER)
Anti-splash goggles
Lunette de sécurité étanche

RESPIRATORY (SPECIFY) / APPAREIL RESPIRATOIRE (PRÉCISER)
Adequate ventilation. Use a NIOSH/MSHA approved respirator when necessary following manufacturers recommendations.
Ventilation adéquate. Utiliser un respirateur approuvé NIOSH/CSST lorsque nécessaire en suivant les recommandations du fabricant.

OTHER (SPECIFY) / AUTRES (PRÉCISER)
Rubber boots and full suit. Shower and eye wash facilities should be accessible.
Bottes de caoutchouc et vêtements de protection complète. Douche et bain pour les yeux doivent être faciles d'accès.

ENGINEERING CONTROLS (e.g. VENTILATION, ENCLOSED PROCESS SPECIFY)
MÉCANISMES TECHNIQUES (ex. : VENTILATION, OPÉRATION EN MILIEU FERMÉ, PRÉCISER)
Adequate ventilation. Eyewash station.
Ventilation adéquate. Douche oculaire.

LEAKS AND SPILLS PROCEDURE / PROCÉDURE EN CAS DE FUITE OU DE DÉVERSEMENT
Sweep up or vacuum material and dispose according to local regulations. DO NOT IRRIGATE.
Balayer ou aspirer puis disposer selon la réglementation locale. NE PAS ARROSER.

WASTE DISPOSAL / ÉLIMINATION DES RÉSIDUS
May be incinerated with domestic waste. Observe local regulations.
Incinérer avec les déchets domestiques. Observer la réglementation locale.

HANDLING PROCEDURES AND EQUIPMENT / MÉTHODES ET ÉQUIPEMENT POUR LA MANUTENTION
Avoid splashing. AVOID CONTACT WITH WATER. Slippery when wet.
Éviter les éclaboussures. EVITER LE CONTACT AVEC L'EAU. Glissant lorsque mouillé.

STORAGE REQUIREMENTS / EXIGENCES D'ENTREPOSAGE
Keep in cool, well-ventilated area away from heat and sparks. Keep containers closed when not in use.
Keep containers closed when not in use Store above the freezing point of water and below 40°C. KEEP PRODUCT DRY.
Garder le contenant fermer lorsqu'il n'est pas utilisé. Entreposer au dessus du point de congélation de l'eau et sous 40°C. GARDER LE PRODUIT SEC

SPECIAL SHIPPING INFORMATION / RENSEIGNEMENTS SPÉCIAUX POUR L'EXPÉDITION
Avoid freezing, overheating
Éviter le gel, le surchauffage.

SECTION VIII: FIRST AID MEASURES / PREMIERS SOINS

EYES / YEUX: Immediately flush eyes with large amounts of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Washing eyes within 1 minute is essential to achieve maximum effectiveness. Seek medical attention immediately.
Rincer immédiatement et abondamment les yeux avec de l'eau pendant au moins 15 minutes en tenant les paupières écartées pour assurer un rinçage complet. Le rinçage des yeux en moins d'une minute est essentiel pour assurer un résultat maximal. Consulter un médecin immédiatement.

SKIN / PEAU: Wash immediately with plenty of water and soap. Remove contaminated clothing and footwear. Wash clothing before re-use. Discard footwear that has been contaminated on the inner surface. Seek medical attention immediately.
Laver immédiatement avec beaucoup d'eau et du savon. Enlever les vêtements et les chaussures souillés. Laver les vêtements avant de les réutiliser. Jeter les chaussures qui ont été souillées à l'intérieur. Consulter un médecin immédiatement.

INHALATION: Remove to fresh air. If symptoms persist, consult a physician.
Amener la personne à l'air frais. Si les symptômes persistent, consulter un médecin.

INGESTION: If swallowed, DO NOT induce vomiting. Give large quantities of water. If vomiting occurs spontaneously, keep airways clear. Seek medical attention. Never give anything by mouth to an unconscious person.
Si avalé, NE PAS provoquer de vomissements. Faire boire beaucoup d'eau Si des vomissements spontanés se produisent, garder les voies respiratoires dégagées .Consulter un médecin..Ne jamais donner quelque chose par la bouche à une personne inconsciente.

SECTION IX: EMERGENCY NUMBERS / NUMEROS D'URGENCE

CANUTEC: (613) 996-6666
Collect calls accepted
Appel à frais virés acceptés

SECTION X: W.H.M.I.S. Class(es) : D2B (Chronic effects) / Classe(s) du S.I.M.D.U.T. : D2B (Effets chroniques)

Shipping Name: Not regulated

Transport Non-réglementé

PREPARED BY/PRÉPARÉ PAR	TELEPHONE NUMBER/NUMERO DE TELEPHONE	DATE
Technical Department **Département Technique**	**Mtl: 514-761-3339** **Qué: 1-800-363-0230** **Can & US: 1-800-565-7888**	**August 1st, 2014** **1er août, 2014**

MATERIAL SAFETY DATA SHEET ***September 20, 2010***
LIQUID BRIGHTENER C (B13580)

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

JOS. H. LOWENSTEIN & SONS, INC.
420 Morgan Avenue
Brooklyn, NY 11222

Emergency Telephone No.: Chemtrec 1-800-424-9300
(Lowenstein – Chemtrec Contract # 13402)
Outside the Continental USA: 001-703-527-3887 (call collect)

PRODUCT NAME:	LIQUID BRIGHTENER C (B13580)	CAS NO.:	Mixture
CHEMICAL NAME:	Mixture	EINECS NO:	Mixture
SYNONYMS:	None known		

MSDS DATE:	August 31, 2010	PREPARED BY:	Loretta Orentas	Version:	5.0
PRIOR MSDS DATE:	April 21, 2004	PREPARED BY:	Charles Sokol		

PRODUCT USE: Fur processing

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

May be harmful if swallowed, inhaled or absorbed through the skin. Expected to be a moderate irritant, and a mild to moderate skin irritant. May be a respiratory irritant. Expected to be a combustible liquid. This product is a bluish violet liquid with a mild, weak odor.

HMIS CODES:

HEALTH:	2
FIRE:	2
REACTIVITY:	1
PERSONAL PROTECTION:	J

PRIMARY ROUTES OF EXPOSURE: Skin, eyes, inhalation.

POTENTIAL HEALTH EFFECTS: The health effects of this material are estimated from the available information on the individual components of this mixture.

ACUTE:

May be harmful if swallowed, inhaled or absorbed through the skin. Expected to be a moderate eye irritant, and a mild to moderate skin irritant. May be a respiratory irritant. If absorbed through the skin, it may be a vehicle for carrying other substances. If large quantities are inhaled, it may produce dizziness, headache, nausea, mental confusion and slurred speech.

CHRONIC:

Although not otherwise recognized as an allergen mists of this material might actually worsen lung health problems, such as bronchial asthma, emphysema and chronic bronchitis.

SIGNS & SYMPTOMS OF EXPOSURE:

Skin, eye irritation and dermatitis.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:
Kidney and liver diseases.

CARCINOGENICITY	NTP:	No
	IARC:	No
	OSHA:	No

GHS LABEL SYMBOLS REQUIRED:

- **Skin irritation**
- **Eye irritation**

SECTION 3 - COMPOSITION/INFORMATION ON HAZARDOUS INGREDIENTS

HAZARDOUS COMPONENTS	%	See Section 8 for exposure limits.	CAS NO.
Dipropylene glycol methyl ether	30-50		34590-94-8
Other ingredients	50-70		Mixture

OSHA CLASSIFICATION OF PRODUCT: Hazardous

SECTION 4 - FIRST AID MEASURES

EYES: In case of contact with eyes, rinse immediately for at least 15 minutes and seek medical attention.

SKIN: In case of contact with skin, rinse immediately and wash with soap and water for at least 15 minutes. Seek medical attention if irritation develops.

INHALATION: In case of inhalation, remove to fresh air; administer oxygen if breathing is difficult. If breathing has stopped, apply artificial respiration. Seek immediate medical attention.

INGESTION: In case of ingestion, seek immediate medical attention.

NOTES TO PHYSICIAN: Treat symptomatically.

SECTION 5 - FIRE FIGHTING MEASURES

FLASH POINT (method used): 185-195°F (Not tested - based upon professional judgement.) METHOD: Not applicable

FLAMMABLE LIMITS VOLUME	LEL	UEL
	>2% @ 100°C (estimate)	>15% @ 100°C (estimate)

AUTO-IGNITION TEMPERATURE:..... Not determined.

EXTINGUISHING MEDIA:..... Carbon dioxide, dry chemical powder, water spray, alcohol or polymer foam.

SPECIAL FIRE FIGHTING PROCEDURES:..... The use of a self-contained breathing apparatus is required when fighting fires involving this material. Use water spray to cool near-by containers.

UNUSUAL FIRE & EXPLOSION HAZARDS:..... Organic mists have the potential to be explosive in processes where mists are produced. Misting plus static or flame initiation can lead to explosions. Products of combustion are toxic.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE OF RELEASE OR SPILL: R/Q-None

Turn off all sources of ignition. Ventilate area to prevent vapor buildup. Use non-sparking tools. Ground all equipment to avoid the buildup of static electricity. Wear respirator, chemical safety goggles and rubber gloves. Absorb on sand or vermiculite and place in closed container for disposal. Dike and contain large spills to minimize the quantity of material going into drains. Flush spill area with plenty of water.

SECTION 7 - HANDLING AND STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Keep in a cool place. Keep away from sources of ignition. Keep away from living quarters. Keep container tightly closed. Keep container dry. Keep away from food, drink, and animal feedstock. Handle and open container with care. Do not eat, drink or smoke when handling material. Do not breathe vapor and spray. Avoid contact with skin. Avoid contact with eyes. Wear appropriate safety equipment. Wash after handling.

OTHER PRECAUTIONS:

Eye-wash station/safety shower.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS:

HAZARDOUS COMPONENTS	%	ACGIH TLV	OSHA PEL	CAS NO.
Dipropylene glycol methyl ether	30-50	100 ppm – skin 150 ppm – STEL – skin	100 ppm - skin	34590-94-8
Other ingredients	50-70	None established	None established	Mixture

RESPIRATORY PROTECTION:

A NIOSH/MSHA approved air-purifying respirator may be permissible when aerosol levels are low (e.g. <10 mg/cubic meter). Protection provided by air purifying respirators is limited. An end of service life indicator (ESLI) or a change schedule are required to be sure that cartridges or canisters are replaced prior to the end of their effective service life. Use a positive pressure, supplied air respirator if there is any potential for an uncontrolled release, when exposure levels are not known, or in any other circumstances where air purifying respirators may not provide adequate protection. A program conforming to the requirements of 29CFR1910.134 should be used to control use of all respirators.

VENTILATION: LOCAL: Yes
GENERAL: Yes
SPECIAL: Not applicable

PROTECTIVE GLOVES:..... Impervious.
EYE PROTECTION:..... Chemical goggles.
OTHER PROTECTIVE EQUIPMENT OR CLOTHING: Apron/gauntlets.
WORK/HYGIENIC REQUIREMENTS:..... Wear appropriate equipment. Wash after handling. Eye-wash station and safety shower.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

BOILING POINT:..... Approximately 102°C (water).
MELTING POINT:..... Not determined.
SPECIFIC GRAVITY (water=1):..... 1.03
VAPOR PRESSURE:..... Not determined.
VAPOR DENSITY (air=1)..... >1
SOLUBILITY IN WATER:..... Completely soluble @ 25°C.
REACTIVITY IN WATER:..... Not reactive.
APPEARANCE AND ODOR:..... Bluish violet liquid with mild, weak odor.
FLASH POINT: ..... 185-195°F (professional judgement – not tested)
pH:..... Not determined.
OCTANOL/WATER PARTITION COEFFICIENT:..... Not determined.

SECTION 10 - STABILITY AND REACTIVITY

STABILITY:.....	Stable.
CONDITIONS TO AVOID:.....	None reported.
INCOMPATIBILITY (materials to avoid):.....	Oxidizing/reducing agents.
HAZARDOUS DECOMPOSITION PRODUCTS:.....	CO_x, NO_x, (thermal decomposition).
HAZARDOUS POLYMERIZATION:.....	Will not occur.
CONDITIONS TO AVOID:.....	Not applicable.

SECTION 11 - TOXICOLOGICAL INFORMATION

ACUTE:

Oral LD_{50} (rat):	4300 mg/kg (calculated estimate based upon component information).
Skin Irritation (rabbit):	Mild to moderate irritant (estimate based upon component information).
Eye Irritation (rabbit):	Moderate irritant (estimate based upon component information).

CHRONIC: No information found.

SECTION 12 – ECOLOGICAL INFORMATION

No information found.

SECTION 13 - DISPOSAL CONSIDERATIONS

WASTE DISPOSAL:

This combustible material may be safely burned in a chemical incinerator equipped to prevent the emission of acid gases. Observe all federal, state and local environmental regulations.

RCRA HAZARDOUS WASTE:	No
CERCLA:	No

SECTION 14 - TRANSPORT INFORMATION

DOT REGULATED (Y/N):	Yes * NA# 1993
DOT SHIPPING NAME:	Combustible Liquid, N.O.S. (Contains Dipropylene Glycol Methyl Ether)
DOT HAZARD CLASS:	Class 3
DOT LABEL REQUIRED:	PG III
	* Only truck or rail shipment, entirely within the United States, of containers containing greater than 118 gallons of this material are regulated.
IMO/IATA REGULATED (Y/N):	No R/Q-Not applicable UN# Not applicable
IMO/IATA SHIPPING NAME:	Not applicable
IMO/IATA HAZARD CLASS:	Not applicable
IMO/IATA LABEL REQUIRED:	Not applicable

ADR/RID REGULATED (Y/N): No UN# Not applicable
ADR/RID SHIPPING NAME: Not applicable
ADR/RID HAZARD CLASS, PG: Not applicable
ADR/RID CLASS. CODE: Not applicable
ADR/RID HAZARD ID NO.: Not applicable

SECTION 15 - REGULATORY INFORMATION

NOTE: THE REGULATORY DATA IN THIS SECTION ARE CORRECT AS OF THE MSDS ISSUE DATE.

UNITED STATES
SARA TITLE III, SECTION 302 STATUS: Not regulated
SARA TITLE III, SECTION 311/312 CLASS:

ACUTE	Yes
CHRONIC	No
FIRE HAZARD	Yes
PRESSURE	No
REACTIVE	No

TOXIC SUBSTANCE CONTROL ACT
TSCA 8(b) STATUS: All components of this product are included on the TSCA 8(b) chemical inventory list. This product can be used in industrial applications.

SARA TITLE III SECTION 313 STATUS:.....Not regulated

EUROPEAN UNION (EC)
EINECS/ELINCS CHEMICAL INVENTORY STATUS: All components of this product are included on the EINECS chemical inventory list. This product can be used in industrial applications.

EU DIRECTIVE 2002/61/EC AND GERMAN LAW TRGS-614 STATUS, BANNING CERTAIN AMINES PRODUCED BY THE BREAKDOWN OF PARTICULAR AZO DYES: The product can be used in the EU, as cleavage of the azo bonds in the azo dyes it contains will not produce any of the banned congener amines.

EUROPEAN CLASSIFICATION & LABELING (Based upon Dangerous Substances Directive and Dangerous Preparations Directive – which will be superceded by the EU implementation of GHS [1272/2008/EC])
LABEL SYMBOL(S): Xi
RISK PHRASE: R 36/37/38
SAFETY PHRASE: S 37/39-38

EUROPEAN CLASSIFICATION & LABELING (Based upon the EU implementation of GHS, which will replace the Dangerous Substances Directive and the Dangerous Preparations Directive)

1272/2008/EC (EU GHS) HAZARD CATEGORY	HAZARD CLASSIFICATION	SYMBOL	SIGNAL WORD	HAZARD PHRASES (and codes)
Skin corrosion/irritation	2 (Moderate to severe irritant)	Exclamation point	Warning	Causes skin irritation. (H315)
Serious eye damage/ irritation	2 (Moderate to severe irritant)	Exclamation point	Warning	Causes serious eye irritation. (H319)

CANADA
DSL/NDSL CHEMICAL INVENTORY STATUS: All components of this product are included on the DSL chemical inventory list. This product can be used in industrial applications.

JAPAN
ENCS-METI CHEMICAL INVENTORY STATUS: At least one component of this product is not included on the ENCS-MITI chemical inventory list. This material cannot be used commercially in Japan.

KOREA
ECL CHEMICAL INVENTORY STATUS: At least one component of this product is not included on the ECL chemical inventory list. This product cannot be used in commercial applications.

GHS HAZARD CLASSIFICATIONS:

HAZARD CATEGORY	HAZARD CLASSIFICATION	SYMBOL	SIGNAL WORD	HAZARD PHRASE
Flammable liquids	4* (Combustible)	None	Warning	Combustible liquid.
Acute toxicity - oral	5* (May be harmful)	None	Warning	May be harmful if swallowed.
Skin corrosion/irritation	2 (Moderate to severe irritant)	Exclamation point	Warning	Causes skin irritation.
Serious eye damage/ irritation	2A (Moderate to severe irritant)	Exclamation point	Warning	Causes serious eye irritation.

*Some countries do not recognize this as a GHS hazardous category.

SECTION 16 - OTHER INFORMATION

CHANGES FROM PRIOR VERSION: Minor text updates; expanded regulatory section to include GHS and EU GHS; updated toxicology; updated hazard classifications; format complies with ANSI 2004, GHS, EU 93/112/EC and 2001/58/EC 2004.

Although the information and recommendations set forth herein (hereinafter "Information") are presented in good faith and believed to be as correct as of the date hereof, JOS. H. LOWENSTEIN & SONS, INC. makes no representations as to the completeness or accuracy thereof. Information is supplied upon the condition that receiving same will make their own determination as to its suitability for their purposes prior to use. In no event will JOS. H. LOWENSTEIN & SONS, INC. be responsible for damages of any nature whatsoever resulting from the use of or the reliance upon information. NO REPRESENTATION OR WARRANTIES, EITHER EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS.

MATERIAL SAFETY DATA SHEET

BRUSHING CHINCHILLA A

COMMON NAME: BRUSHING CHINCHILLA A
SYNONYMS: NONE

HMIS
HEALTH: 2
FIRE: 1
REACTIVITY: 1
PERSONAL PROTECTION: H

PROD CAS #: PROPRIETARY

SECTION I

JOS. H. LOWENSTEIN & SONS, INC.
420 Morgan Avenue
Brooklyn, New York 11222

EMERGENCY TELEPHONE NO.: CHEMTREC 800-424-9300
202-483-7616 Outside the Continental USA
(Call Collect)

DATE OF PREPARATION: July 19, 1990
NAME OF PREPARER: Irwin Schwartz

SECTION II - HAZARDOUS COMPONENTS

HAZARDOUS COMPONENTS	%	ACGIH TLV	OSHA PEL	CAS No.
Diethylene Glycol Monoethyl Ether	>1	N/A	N/A	111-90-0

SECTION III - PHYSICAL & CHEMICAL CHARACTERISTICS

BOILING Point:..... 102°C
MELTING POINT:..... N/D
SPECIFIC GRAVITY (Water=1):... N/D
VAPOR PRESSURE:..... =water
VAPOR DENSITY (Air=1):..... 4.63(Glycol Ether)
SOLUBILITY IN WATER:..... COMPLETE
REACTIVITY IN WATER:..... NOT REACTIVE
APPEARANCE AND ODOR:..... Violet blue opaque liquid with no odor.

N/A=Not Applicable N/D=Not Determined

SECTION IV - FIRE & EXPLOSION DATA

FLASH POINT (Method Used): >100°C >212°F METHOD: TAG C.C.
FLAMMABLE LIMITS

VOLUME	LEL	UEL
	1.2	2.2(as Glycol Ether)

AUTO-IGNITION TEMPERATURE:..... N/D
EXTINGUISH MEDIA:..... Carbon dioxide. Dry chemical powder. Water spray. Alcohol or polymer foam.
SPECIAL FIRE FIGHTING PROCEDURES:.. The use of a self-contained breathing apparatus is required when fighting fires involving this material.
UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE

SECTION V - PHYSICAL HAZARDS (Reactivity Data)

STABILITY:..... STABLE
CONDITIONS TO AVOID:..... NONE
INCOMPATIBILTY
(Materials to Avoid):..... Strong alkali at elevated temperatures.
HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of carbon and nitrogen.
HAZARDOUS POLYMERIZATION:..... WILL NOT OCCUR
CONDITIONS TO AVOID:..... NONE REPORTED

SECTION VI - HEALTH HAZARDS

ACUTE:

INGESTION-Intoxication, diziness, drowsiness, headache, nausea, mental confusion, slurred speech and stupor.
SKIN ABSORPTION-No information of adverse effects.
INHALATION-No evidence of adverse effects. Prolonged exposure to mists may result in the inhalation of potentially harmful amounts of material.
EYES-Irritation and swelling of conjunctivitis.

CHRONIC:

NONE REPORTED

SIGNS & SYMPTONS OF EXPOSURE:

INGESTION-Intoxication, diziness, drowsiness, headache, nausea, mental confusion, slurred speech and stupor.
EYES-Irritation and swelling of conjunctivitis.

MEIDCAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

NONE REPORTED

N/A=Not Applicable N/D=Not Determined

CARCINOGENICITY NTP: NO
IARC: NO
OSHA: NO

EMERGENCY & FIRST AID PROCEDURES:

EYES: In case of contact with eyes, rinse immediately for at least 15 minutes and seek medical attention.

SKIN: In case of contact with skin, rinse immediately and wash with soap and water for at least 15 minutes.

INHALATION: In case of inhalation, remove to fresh air, administer oxygen if breathing is difficult. If breathing has stopped, apply artificial respiration. Seek immediate medical attention.

INGESTION: In case of ingestion seek immediate medical attention.

SECTION VII - SPECIAL PRECAUTIONS & SPILL/LEAK PROCEDURES

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE:

Keep in a cool place. Keep away from living quarters. Keep container tightly closed. Keep container in a well ventilated area. Keep away from food, drink and animal feedstock. Keep away from ignition sources. Handle and open container with care. Do not eat, drink or smoke when handling material. Do not breathe vapor, fumes, spray. Avoid contact with skin. Avoid contact with eyes. Wear appropriate safety equipment. Eye wash station and safety shower.

OTHER PRECAUTIONS:

NONE

STEPS TO BE TAKEN IN CASE OF RELEASE OR SPILL:

R/Q-N/A

Absorb on sand or vermiculite and place in closed container for disposal. Wear respirator, chemical safety goggles, rubber boots and heavy rubber gloves. Carefully sweep up and remove. Flush spill area with copious amounts of water. Wash spill site with soap solution.

WASTE DISPOSAL:

Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state and local environmental regulations.

RCRA HAZARDOUS WASTE:

NO

CERCLA-NO

SECTION VIII - PERSONAL PROTECTION/CONTROL

N/A=Not Applicable N/D=Not Determined

RESPIRATORY PROTECTION: NIOSH approved respirator with organic canister.

VENTILATION: LOCAL: YES
GENERAL: YES
SPECIAL: NO

PROTECTIVE GLOVES: PLASTIC
EYE PROTECTION: GOGGLES
OTHER PROTECTIVE EQUIPMENT OR CLOTHING: Eye wash station and safety shower.
WORK/HYGENIC REQUIREMENTS: Do not eat, drink or smoke when handling material. Wear appropriate safety equipment. Wash after handling. Eye wash station and safety shower.

SHIPPING INFORMATION:
DOT REGULATED: NO
SHIPPING NAME: N/A
HAZARD CLASS: N/A
DOT LABEL REQUIRED: N/A

REGULATORY REQUIREMENTS: Section 313 Reporting YES

Contains at Least	% of CAS Number	Chemical Name
30	111-90-0	Glycol Ethers

SARA Hazard Class

ACUTE YES CHRONIC NO FIRE HAZARD NO
PRESSURE NO REACTIVITY NO

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N/A=Not Applicable N/D=Not Determined

BASF

HAZARDS CLASSIFICATIONS

WHMIS: Class: [-], Div.:[ ]; Class: [ ], Div.:[ ]; Class: [ ], Div.:[ ].
Class: [ ], Div.:[ ]; Class: [ ], Div.:[ ]; Class: [ ], Div.:[ ].

TRANSPORTATION:

	UN/NA	CLASS	P.G.	SHIPPING NAME
TDG :	*N/A*			
IATA:	*N/A*			
IMDG:	*N/A*			

Special Provision : *N/A*

WHMIS INFORMATION

N/A

c. = circa; N/D = no data; N/A = not applicable

PREPARATION INFORMATION :

Issued: *1988/11/02* Revised: *1998/07/13* Product Safety Dept., Phone: [416] 675-3611

Supplier: BASF Canada Inc., 345 Carlingview Drive, Toronto, Ontario, M9W 6N9

TO WHOM IT MAY CONCERN

Tarih Referans

ŞİŞECAM

CERTIFICATE OF ANALYSIS

BUYER : **INTERSAC INC.**
19201 CLARK- GARHAM AVE.
BAIE D'URFE- QUEBEC
H9X 3P5 CANADA

PRODUCT : SODA ASH LIGHT

INVOICE NO : SS - 1111110153
PRODUCTION DATE : NOVEMBER 2014
EXPIRY DATE : NOVEMBER 2016
BATCH NO : 11/2014

We hereby certify that goods conform to the following specifications.

Technical Specifications		Nominal Specifications	Actual Results
- Sodium Carbonate	(Na_2CO_3)	99,1 pct.min.	99,70 pct.
- Sodium Chloride	(NaCl)	0,25 pct.max.	0,11 pct.
- Matter insoluble in water		0,01 % max	0,0020 pct.
- Iron Ion	(Fe+3)	0,0015 pct.max.	0,0003 pct.
- Ferro Oxide	(Fe_2O_3)	21,5 ppm.max	4,00 ppm.
- Sulphate	(SO_4)	270 ppm max.	33,00 ppm.
- Density		0.47-0.59 gr/cm3	0,50 gr/cm3
Heavy Metals			
- Copper (Cu)		1 ppm.max	0,00 ppm
- Arsenic (As)		1 ppm.max	0,00 ppm
- Lead (Pb)		2 ppm.max	0,00 ppm
- Mercury (Hg)		0,10 ppm.max	0,00 ppm

SODA SANAYİİ A.Ş.

Adres : Soda Sanayii A.Ş. Kazanlı Mevkii P.K. 654 33004 Mersin / Türkiye
Tel : 0.324 241 66 00
Faks : 0 324 451 28 50 e-mail Soda : soda@sisecam.com
0 324 451 34 40 Kromsan : krom@sisecam.com
Sermayesi : 457.000.000 TL Web : www.sodakrom.com

NATURAL SODA

SODIUM BICARBONATE, U.S.P. Grade #1
CERTIFICATE OF ANALYSIS

LOT NUMBER (packaged): NS10094 1
MANUFACTURING DATE: 10/9/2014
BULK DENSITY (LBS/FT^3): 68.7 lbs/ft^3

Analysis	Specification	Result
Sodium Bicarbonate Assay	99.0%-100.5%	100.1
pH (3% solution)	7.8-8.5	8.1
Chloride	<150 ppm	<150 ppm
Limit of Sulfur Compound	<150 ppm	<150 ppm
Arsenic	<2 ppm	<2 ppm
Cadmium	<1ppm	<1ppm
Copper	<1ppm	<1ppm
Iron	<2ppm	<2ppm
Lead	<2 ppm	<2 ppm
Heavy Metal	<5 ppm	<5 ppm
Loss on Drying	<0.25wt%	<0.25wt%
Identification	Pass/Fail	Pass
Normal Carbonate	Pass/Fail	Pass
Ammonia	Pass/Fail	Pass
Insoluble	Pass/Fail	Pass
Meets USP XXXVI Specifications	Pass/Fail	Pass

Screen Analysis: % Cumulative Retained

USS Screen	Micron	Specification	Result
100	150	0-2	2
200	75	20-50	39
325	45	60-100	75

Expiration Date: Five years from manufacturing date

Analyst: T.J. Meyer
Date: 10/11/2014

Revised August 2014

HEXION™
Specialty Chemicals

MATERIAL SAFETY DATA SHEET

FOR INDUSTRIAL USE ONLY

DESCRIPTION: FORMALDEHYDE 37% M 8%

1. Chemical Product and Company Identification

DESCRIPTION:	**FORMALDEHYDE 37% M 8%**
PRODUCT CODE:	04-0837.-.
PRODUCT TYPE:	FORMALDEHYDE SOLUTION
APPLICATION:	FORMALDEHYDE SOLUTION

Manufacturer/Supplier Information

MSDS prepared by:
Hexion Specialty Chemicals, Inc.
155 West A Street, Bldg. A-1
Springfield, OR
97477

For Emergency Medical Assistance
Call Health & Safety Information Services
1-866-303-6949

For additional health and safety or regulatory information, call (541)744-3256.

2. Composition, Information on Ingredients

The ingredients listed below have been associated with one or more immediate and/or delayed(*) health hazards. Risk of damage and effects depends upon duration and level of exposure. BEFORE USING, HANDLING, OR EXPOSURE TO THESE INGREDIENTS, READ AND UNDERSTAND THE MSDS.

		% by weight
67-56-1	***Methanol**	**5.0 - 10.0**
50-00-0	***Formaldehyde**	**30.0 - 50.0**

Any applicable Canadian trade secret numbers will be listed in Section 15.2.

3. Hazards Identification

3.1 Emergency Overview

Appearance	Clear, colorless liquid
Odor	Pungent

WARNING!
COMBUSTIBLE
May further react at high temperatures to form methanol, formic acid or methylals. At low temperatures will self-polymerize to form paraformaldehyde.
Harmful if inhaled.
Can cause central nervous system depression.
Causes chemical burns to eyes.
May be harmful if swallowed.
Ingestion may cause blindness.
May be harmful if absorbed through skin.

Causes skin irritation.
May cause allergic skin reaction.

NORTH AMERICAN EMERGENCY RESPONSE GUIDE, 2000, NO: 132

HMIS Rating

HEALTH	=	3 (serious)
FLAMMABILITY	=	2 (moderate)
REACTIVITY	=	1 (slight)
CHRONIC	=	*

3.2 Potential Health Effects

Immediate Hazards

INGESTION:	May be harmful if swallowed. Ingestion may cause blindness. Can cause central nervous system depression. If accidentally swallowed, burns or irritation to mucous membranes, esophagus or GI tract can result.
INHALATION:	Harmful if inhaled. Can cause central nervous system depression. Can cause irritation of nose, throat and lungs.
SKIN:	May be harmful if absorbed through skin. Causes irritation.
EYES:	Causes chemical burns.

67-56-1 Methanol
Can cause central nervous system depression. Signs and symptoms may include headache, dizziness, nausea, vomiting, unconsciousness and asphyxiation. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.

Delayed Hazards

67-56-1 Methanol
Possible reproductive disorders from prolonged exposure.
May cause lung damage based on animal data. Pre-existing respiratory disorders may be aggravated by exposure.
May cause liver damage based on animal data.
May cause kidney damage based on animal data.
May cause blindness if swallowed.
-- See Footnote

50-00-0 Formaldehyde

May cause cancer. OSHA regulates formaldehyde as a potential human carcinogen. See the OSHA Formaldehyde Workplace Standard at 29CFR 1910.1048. Rats chronically exposed to 14 ppm formaldehyde contracted nasal cancer. The National Toxicology Program (NTP) has listed formaldehyde as a probable human carcinogen. The International Agency for Research on Cancer (IARC) has concluded formaldehyde is carcinogenic to humans.

Safe handling and use instructions are provided in this MSDS and in the OSHA Formaldehyde Workplace Standard at 29CFR1910.1048. OSHA has identified 0.5 ppm as the "Action Level". Please review and understand the guidance contained in this MSDS and refer to the OSHA Formaldehyde Standard for regulatory requirements that may be applicable to your operation and use.

For further information and a review of various studies, go to www.osha.gov/SLTC/formaldehyde, www.iarc.fr and other authoritative websites.

May cause allergic skin reaction. Some reports suggest that formaldehyde may cause respiratory sensitization, such as asthma, and that preexisting respiratory and skin disorders may be aggravated by exposure.

Footnote: As of the date of issuance of this document, this material has not been listed by NTP, classified by IARC nor regulated by OSHA as a carcinogen.

4. First Aid Measures

INGESTION: If accidentally swallowed, dilute by drinking large quantities of water. If the individual is drowsy or unconscious, do not give anything by mouth. Immediately contact poison control center or hospital emergency room for advice on whether to induce vomiting or for any other additional treatment directions.

INHALATION: If inhaled, remove to fresh air. If not breathing give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Get medical attention immediately.

SKIN: Immediately remove all contaminated clothing, including shoes. Wash the affected area of the body with soap or mild detergent and large quantities of water for at least 20 minutes. Contact a physician if irritation persists. If there are chemical burns, cover the area with sterile, dry dressings and get medical attention immediately.

EYES: Immediately flush eyes with plenty of water for at least 15 minutes. Eyelids should be held apart during irrigation to ensure water contact with entire surface of eyes and lids. Get medical attention immediately.

5. Fire Fighting Measures

Flash point	68 °C (154 °F) Tag Closed Cup ASTM D 56
Lower explosion limit	Approx. 7 % (V)
Upper explosion limit	Approx. 70 % (V)
Autoignition temperature	Approx. 420 °C (788 °F)

COMBUSTIBLE. Keep away from heat and flame.
In case of fire, use water spray, dry chemical, "alcohol" foam or CO2. Use water to keep fire-exposed containers cool.

6. Accidental Release Measures

Always wear appropriate protective equipment. Eliminate all ignition sources and ventilate the area to reduce the potential for exposure, fire and explosion. Recover and reuse as much liquid as possible. Large quantities: Enclose with diking material to prevent seepage into sewer systems, surface/ground water or natural bodies of water. If possible neutralize with dilute(<5%) solutions of ammonium hydroxide, sodium hydroxide, sodium bisulfite or sodium sulfite. Small quantities: Soak up with absorbent material (vermiculite, dry sand, earth) and remove to a chemical disposal area. Follow all emergency notification and reporting regulations.

7. Handling and Storage

7.1 Handling

Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure and removal of the material from eyes, skin and clothing. Wash thoroughly after handling. Always use appropriate Personal Protective Equipment (PPE).

INHALATION:	Do not breathe vapor. Use with adequate ventilation.
SKIN:	Avoid contact with skin and clothing.
EYES:	Do not get in eyes.

7.2 Storage

Storage temperature depends on methanol content and should be controlled to avoid precipitation or vaporization. See technical bulletin for recommended storage temperatures. Remove plug slowly to relieve pressure.
Formaldehyde solutions will start to precipitate paraformaldehyde if stored below their recommended storage temperatures making the freezing point difficult to determine.

8. Exposure Controls/Personal Protection

8.1 Exposure Controls

ENGINEERING CONTROLS: The following exposure control techniques may be used to effectively minimize employee exposure: local exhaust ventilation, enclosed system design, process isolation and remote control in combination with appropriate use of personal protective equipment and prudent work practices. These techniques may not necessarily address all issues pertaining to your operations. We, therefore, recommend that you consult with experts of your choice to determine whether or not your programs are adequate.

If airborne contaminants are generated when the material is heated or handled, sufficient ventilation in volume and air flow patterns should be provided to keep air contaminant concentration levels below acceptable criteria.

8.2 Personal Protection

Where formaldehyde gas concentrations can exceed acceptable criteria, use NIOSH (42 CFR Part 84) approved full-facepiece respiratory protection equipment. Respirators should be selected based on the concentration of formaldehyde in air in accordance with the OSHA Formaldehyde Standard Respiratory Protection requirements at 29CFR 1910.1048γ, and the OSHA Respiratory Protection Standard at 29CFR 1910.134 or other applicable standards or guidelines, including ANSI standards regarding respiratory protection. A full-facepiece respirator with cartridges or canisters specifically approved for formaldehyde may be used for exposure levels up to 7.5 ppm (10 times the PEL). Chemical safety goggles must be worn if there is a possibility of contact with liquid formaldehyde or excessive gas-phase exposures. A full-facepiece respirator complies with this requirement. Wear protective gloves as required to prevent skin contact. Protective gloves must be worn when handling formaldehyde solutions of 1% or higher. Consult your glove manufacturer for specific information on permeation, degradation and breakthrough data to ensure proper selection. Based on available information, butyl, nitrile and Viton appear to be quite impervious to various strengths of formaldehyde solutions. Other glove materials may be equally suitable depending on composition, thickness and use conditions. Where high concentrations of formaldehyde may be present, such as in an emergency, full body protection should be worn. Other protective equipment that must be available when handling formaldehyde solutions of 1% or higher include eye wash fountains and safety showers. Reusable protective clothing should be cleaned and ventilated after any formaldehyde contamination. See the OSHA Formaldehyde Standard requirements at 29CFR 1910.1048(h) Protective Equipment and Clothing and OSHA 29CFR 1910.1048(i) Hygiene Protection for other specific protective measures based on the form of formaldehyde, the conditions of use and the hazards to be prevented.

8.3 Exposure Guidelines

67-56-1	**Methanol**			
ACGIH TLV	8-hr TWA	200 ppm	262 mg/m3	Skin
	STEL (15 min)	250 ppm	328 mg/m3	
OSHA PEL	8-hr TWA	200 ppm	260 mg/m3	
	Remanded TWA	200 ppm	260 mg/m3	Skin; 1989 PEL remanded, but in effect in some states
	Remanded STEL	250 ppm	310 mg/m3	
50-00-0	**Formaldehyde**			
ACGIH TLV	Ceiling	0.3 ppm	0.37 mg/m3	A2 - Suspected Human Carcinogen; SEN
OSHA PEL	8-hr TWA	0.75 ppm	0.9 mg/m3	
	STEL (15 min)	2 ppm	2.5 mg/m3	

9. Physical and Chemical Properties

Appearance	Clear, colorless liquid
Odor	Pungent
Odor threshold	Not available
Specific gravity	1.0916 - 1.0977
pH	2.5 - 4.5 @25 °C (77 °F)
Freezing point	See storage section
Solubility in water	Infinite
Octanol/water partition coefficient	Not available
Vapor pressure	Approx. 40 mm Hg @39 °C (102 °F)
Vapor density	Approx. 1
Evaporation rate	Less than 1 (Butyl Acetate = 1)
Boiling point, 760 mm Hg	Approx. 100 °C (212 °F)

10. Stability and Reactivity

Normally stable, but may further react at high temperatures to form methanol, formic acid or methylals. At low temperatures will self-polymerize to form paraformaldehyde.

Incompatibilities:

Reacts with many compounds. Reaction with phenol, strong acids or alkalis may be violent. Reaction with hydrochloric acid may form bis-chloromethyl ether, an OSHA regulated carcinogen.

Decomposition products may include:

CO, CO2.

Hazardous polymerization:

Will not occur.

11. Toxicological Information

See Section 3 Hazards Identification information.

67-56-1 Methanol
LC50: rat=64,000 mg/l/4 h (Sax)
LD50: Oral-rat= 5,628 mg/kg (Sax); Skin-rabbit= 20,000 mg/kg (Sax)
50-00-0 Formaldehyde
LC50: rat=0.59 mg/l (Sax)
LD50: Oral-rat= 800 mg/kg (Merck); Skin-rabbit= 270 mg/kg (Sax)

12. Ecological Information

Formaldehyde is highly toxic to algae, protozoa and other unicellular organisms and slightly toxic to fish. In the atmosphere the material is rapidly degraded by photolysis and photooxidation. Formaldehyde is mobile in the soil. In water or soil, formaldehyde is biodegraded in a few days. Experiments performed on a variety of fish and shrimp show no bioconcentration of formaldehyde.

Ecotoxicity:
Algae(scenedesmus): toxic: 0.3-0.5 mg/l
Arthropoda(daphnia): toxic: 2 mg/l
Fish (guppies): TLm = 50-200 mg/l

Environmental Fate:
BOD5 = 60% of ThOD = 0.6-1.07 standard dilution at <260 mg/l
Octanol/Water Partition Coefficient = 0.35 (LKOW)

13. Disposal Considerations

Recover free liquid. Absorb residue and dispose of according to local, state/provincial, and federal requirements. Empty container: May contain explosive vapors. DO NOT cut, puncture or weld on or nearby.

14. Transport Information

14.1 U.S. Department of Transportation (DOT)

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulation (CPR) and the MSDS contains all the information required by the CPR.

Class B3
Class D1A
Class D1B
Class D2A
Class D2B
Class E

Canadian Environmental Protection Act (CEPA)

All reportable chemical substances are listed on the Domestic Substances List (DSL) or otherwise comply with CEPA new substance notification requirements.

National Pollutant Release Inventory (NPRI)

This product contains the following chemical(s) subject to the reporting requirements of the Canadian Environmental Protection Act (CEPA) subsection 16(1), National Pollutant Release Inventory.

Methanol	67-56-1	8.02%
Formaldehyde	50-00-0	36.97%

16. Other Information

User's Responsibility

The OSHA Hazard Communication Standard 29CFR 1910.1200 and the Workplace Hazardous Materials Information System (WHMIS) require that the information contained on these sheets be made available to your workers. Educate and train your workers regarding OSHA and WHMIS precautions. Instruct your workers to handle this product properly. Consult with appropriate experts to guard against hazards associated with use of this product and its ingredients.

Disclaimer

SELLER MAKES NO WARRANTY, EXPRESS OR IMPLIED, CONCERNING THE PRODUCT OR THE MERCHANTABILITY OR FITNESS THEREOF FOR ANY PURPOSE, except that the product shall conform to contracted specifications, and that the product does not infringe any valid United States or Canadian patent. No claim of any kind shall be greater in amount than the purchase price of the quantity of product in respect of which damages are claimed. In no event shall Seller be liable for incidental or consequential damages, whether Buyer's claim is based on contract, breach of warranty, negligence or otherwise.

The data provided in this section is for information only and may not be specific to your package size. You will need to apply the appropriate regulations to properly classify your shipment for transportation.

Proper shipping name	FORMALDEHYDE SOLUTION
UN/NA number	2209
Class	8
Packing group	III
Label	8
RQ Ingredients	

14.2 Canadian Transportation of Dangerous Goods (TDG)

Proper shipping name	FORMALDEHYDE SOLUTION
UN number:	2209
Class	Class 8
Packing group	III
Label	8

15. Regulatory Information (Selected Regulations)

15.1 U.S. Federal Regulations

OSHA Hazards Communication Standard 29CFR1910.1200

This material is a "health hazard" and/or a "physical hazard" as determined when reviewed according to the requirements of the Occupational Safety and Health Administration 29 CFR Part 1910.1200 "Hazard Communication" Standard.

SARA Title III: Section 311/312

Immediate health hazard
Delayed health hazard
Fire hazard

SARA Title III: Section 313 and 40 CFR Part 372

This product contains the following toxic chemical(s) subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986, and Subpart C-Supplier Notification Requirement of 40 CFR Part 372.

Methanol	67-56-1	8.02%
Formaldehyde	50-00-0	36.97%

TSCA Section 8(b) Inventory

All reportable chemical substances are listed on the TSCA Inventory. We rely on certifications of compliance from our suppliers for chemical substances not manufactured by us.

15.2 Canadian Regulations

Workplace Hazardous Materials Information System (WHMIS)

DyStar

Material Safety Data Sheet

Protective Clothing	HCS	DOT
	Class: Irritating substance.	

Section I. Product Identification and Uses

Synonyms	Not available.
Common/Trade name	**GELON PK CONC.-R**
Chemical name	Not applicable
Chemical formula	Not applicable
Chemical family	Surfactant Blend.
Manufactured/Supplied	Dystar L.P. 209 Watlington Rd. Reidsville, NC 27320 USA (336) 342-6631
Material uses	Degreasing agent for leather
Validation Date	**Validated on 3/3/2009.**

HMIS	H 2 F 1 R 0 PE B
TSCA	TSCA inventory: All components listed. TSCA 12(b) one time export: Not Listed. TSCA 12(b) annual export notification: Not Listed.
DSL	CEPA DSL: Listed. CEPA NDSL: Not Listed.
CAS#	Mixture.
Code	**FXL-0321**
Molecular weight	Not applicable
Revision Number	1.0

Section IA. First Aid Measures

GELON PK CONC.-R

Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.
Skin contact	Wash with soap and water. Get medical attention if irritation develops or persists.
Hazardous inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.
Hazardous ingestion	If ingested, seek medical advice immediately and show the container or the label.

Section II. Hazardous Ingredients

GELON PK CONC.-R

Name	CAS #	% by Weight	TLV/PEL	LC_{50}/LD_{50}
1) Proprietary ethoxylate 2) Hexylene Glycol	107-41-5	40 - 50 5	Not available. Not available.	Not available. ORAL (LD50): Acute: 3700 mg/kg [Rat]. DERMAL (LD50): Acute: 3200 mg/kg [Rabbit].

Section III. Physical Data

GELON PK CONC.-R

Physical state and appearance	Liquid. (Clear.)	
pH and Solution Conc.	4.6 to 6.6	(10% solution)
Odor threshold	Not available.	
Volatility	40-46%	
Melting point	<0°C (32°F)	
Boiling point	>100°C (212°F)	

Odor	Mild.
Taste	Not available.
Color	Colorless.

Continued on Next Page

Specific gravity	1.03 (Water = 1)
Vapor density	Not available.
Vapor pressure	Not Available
Evaporation rate	Not available.
Viscosity	Not available.
Ionicity (surface active agent)	Non-ionic.
Critical temperature	Not available.
Instability temperature	Not available.
Conditions of instability	None known.
Dispersion properties	Not available.
Solubility	Soluble in water.
VOC's (g/L)(EPA 24/24A)	Not available.
HAPs or TAPs	Clean air act (CAA) 112 accidental release prevention: Not Listed. Clean air act (CAA) 112 regulated flammable substances: Not Listed. Clean air act (CAA) 112 regulated toxic substances: Not Listed.

Section IV. Fire and Explosion Data

GELON PK CONC.-R

The product is:	May be combustible at high temperature.
Auto-ignition temperature	Not available.
Fire degradation products	Not available.
Flash points	CLOSED CUP: Higher than 93.3°C (200°F).
Flammable limits	Not available.
Fire extinguishing procedures	SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.
Flammability	Because of the large amount of water contained in the product, the product might be combustible only after partial or complete evaporation.
Risks of explosion	Product does not have explosive properties.

Section V. Reactivity Data

GELON PK CONC.-R

Stability	Stable.
Freeze/Thaw Stability	Not available.
Hazardous decomp. products	Oxides of carbon Not available.
Degradability	Not available.
Products of degradation	Oxides of carbon Not available. The product itself and its products of degradation are not toxic.
Corrosivity	Not considered to be corrosive for metals and glass.
Reactivity	May react with strong oxidizing agents.

Continued on Next Page

Section VI. Toxicological Properties — GELON PK CONC.-R

Routes of entry	Eye contact. Skin contact. Inhalation. Ingestion.
TLV	Refer to Section II. Hazardous Ingredients.
Toxicity to animals	Not available.
Chronic effects on humans	**CARCINOGENIC EFFECTS**: No carcinogenic substances as defined by IARC, NTP and/or OSHA. **DEVELOPMENTAL TOXICITY**: Not toxic.
Acute effects on humans	This product may irritate eyes upon contact. Mist or vapor generated during processing may cause respiratory tract irritation. Acute ingestion may result in mild gastrointestinal distress. Harmful if absorbed through the skin.
Aquatic Toxicity (LC50)	Not available.

Section VII. Preventive Measures — GELON PK CONC.-R

Waste information	This material, as received, is not expected to be a hazardous waste under RCRA. Waste management should be in compliance with federal, state, and local regulatory requirements.
Waste stream	Not available.
Storage	Store and use away from heat, sparks, open flame, or any other ignition source. Keep container tightly closed in a cool, well-ventilated place.
Precautions	Avoid contact with skin and eyes. Avoid breathing vapors or spray mists. Store and use away from heat, sparks, open flame, or any other ignition source. After handling, always wash hands thoroughly with soap and water. Keep container tightly closed in a cool, well-ventilated place.
Small spill and leak	Absorb with an inert material and place in an appropriate waste disposal container.
Large spill and leak	Stop leak if without risk. Eliminate all sources of ignition. Absorb with an inert material and put the spilled material in an appropriate waste disposal.
Protective clothing in case of large spill	Splash goggles. Gloves. Boots. Full suit. Wear appropriate respirator when ventilation is inadequate.

Section VIII. Classification — GELON PK CONC.-R

DOT	Not a DOT controlled material (United States).
	
	Not applicable
	Not regulated. RQ Not available. Not available.
Maritime transportation	Not pollutant.
HCS	Class: Irritating substance. Not available.
Federal and State Regulations	Note: California Prop. 65 requires the listing of reportable chemicals that is believed to exist in this product at any detected, or suspected, level no matter how minute.

Continued on Next Page

Illinois chemical safety act: Hexylene Glycol.
Rhode Island RTK hazardous substances: Hexylene Glycol.
Pennsylvania RTK: Hexylene Glycol.
Florida: Hexylene Glycol
Massachusetts RTK: Hexylene Glycol.
Massachusetts spill list: Hexylene Glycol.
New Jersey: Hexylene Glycol.

CERCLA: Hazardous substances.: Not Listed.

SARA 313 toxic chemical notification and release reporting: Not Listed.

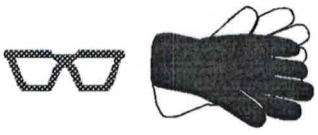
Not available.

International Lists Not available.

Section IX. Protective Clothing

GELON PK CONC.-R

Safety glasses. Gloves (impervious).



Section X. Other Information

GELON PK CONC.-R

References Not available.

Special Test Results	Not available.	Not available.	Not available.	Not available.
	Not available.	Not available.	Not available.	Not available.

Validated by Sandy Carter on 3/3/2009.

Verified by Sandy Carter.

Printed 3/3/2009.

CHEMTREC (24 HR) 1-800-424-9300

JohnsonDiversey

Spectrum (SU 319)

Concentrated Neutral Quaternary Sanitizer

Purpose and Use

Spectrum is a concentrated neutral liquid quaternary ammonium sanitizer providing effective bacteriological control in a wide variety of beverage, dairy and food processing operations.

Features/ Benefits

• Liquid formulation:	Mixes immediately and can be controlled automatically. Easily dispensed for accuracy and control.
• Broad spectrum kill:	Blend of two quats more effectively controls bacteria, yeasts and molds.
• Residual properties:	Produces bacteriostatic effect to retard bacterial growth.
• Natural deodorizer:	Leaves cleaned areas smelling fresh by eliminating odours.
• Heat stable:	Suitable for warm and hot application where necessary.
• Non-corrosive:	Can be used on all surfaces.

Discussion

Spectrum is a versatile sanitizer containing a blend of two highly effective quaternary ammonium compounds. It provides excellent bacteriological control while helping to eliminate objectionable odours.

Spectrum can be used for general sanitizing of equipment and surfaces and is particularly effective for controlling molds on walls and floors. **Spectrum** is also effective in recirculating water systems, cooling towers, sweet water systems, brewery pasteurizers, can warmers, etc., by both shock and continuous treatment methods.

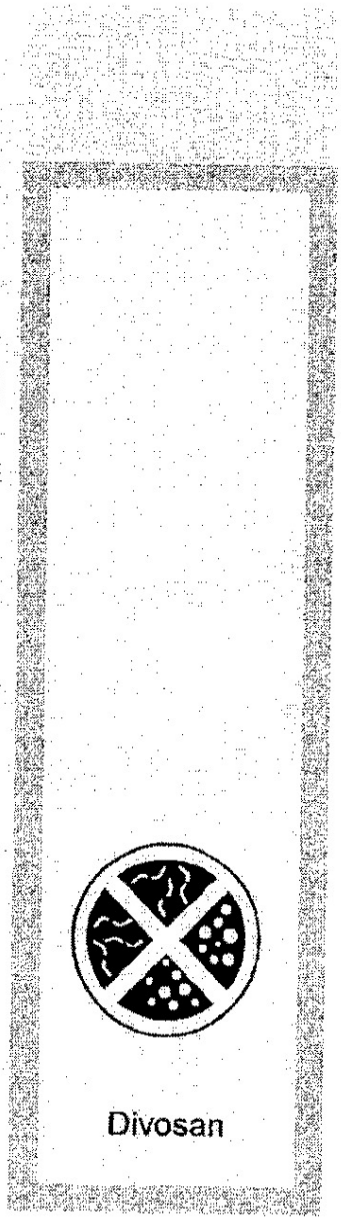
Since it is non-corrosive, **Spectrum** is an ideal sanitizer to use in a total environmental hygiene sanitation program for sanitizing all exterior surfaces, walls, floors and drains for the continuous control of bacteria such as *Listeria*.

Authorization

Canadian Regulatory Status:

The Bureau of Chemical Safety, Health Protection Branch, and Agri-Food Safety & Strategies Division, Food Protection and Inspection Branch has indicated that when **Spectrum** is used in accordance with label directions, there will be no objection to its use in plants under their jurisdiction.

Spectrum is a registered hard surface sanitizer (PCP #15248) under the auspices of the Post Control Products Division of the Production and Marketing Branch, Agriculture Canada.



Spectrum (SU 319)

Microbiocidal Efficacy

Spectrum at 2.2 mL/L (1 fl. oz./3 Imp. gal.) passes the A.O.A.C. Germicidal and Sanitizer Procedure in Water Hardness of 500 ppm as calcium carbonate.

Corrosion Data

Spectrum is non-corrosive to most metals commonly encountered in beverage and food processing applications.

How to Use

Surfaces to be sanitized with **Spectrum** must be thoroughly cleaned and rinsed before use. Soap and related anionic compounds may neutralize the bactericidal properties of a quaternary compound such as **Spectrum**.

General Sanitation:

The recommended use level for sanitizing food contact is 2.2 mL/L (1 fl. oz./3 Imp. gal.) which may be applied via circulation, spray, soak or manual methods. This provides 200 ppm of active sanitizer and no final rinse is required if this level is not exceeded.

For non food contact surfaces such as floors, walls and drains, a use solution of 6.25 mL/L (1 fl. oz./Imp. gal) is recommended.

Continuous Treatment:

For brewery pasteurizers and beverage can warmers, the use of **Spectrum** at 12-60 mL/100L (2-10 fl. oz./100 Imp. gal.) in water (10-50 ppm active agent) added every 8 hours of operation will ensure protection against slime and algae.

Spectrum dosing recommendations based on specific operating parameters, type of equipment and water conditions will be provided on request.

Properties

Form	Slight, yellow-green liquid
Odour	Pleasant, clean
Average Specific Gravity	0.99
Phosphates	None
Active Ingredients:	n-Alkyl (60% C14, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chloride 4.5% n-Alkyl (60% C12, 32% C14) dimethyl ethyl benzyl ammonium chloride 4.5%

Testing Procedure

Use Quaternary test papers or Quat Titration method for determination of **Spectrum** solution concentrations.

Precautionary Statement

Refer to current Material Safety Data Sheet.

JohnsonDiversey US
3630 East Kemper Road
Sharonville OH 45241
Tel: 1-800-626-5015
www.johnsondiversey.com

JohnsonDiversey Canada
2401 Bristol Circle
Oakville, Ontario L6H 6P1
Tel: 1-800-668-7171
www.johnsondiversey.com

JohnsonDiversey Puerto Rico
16-B Street
Sabana Abajo Industrial Park
Carolina
Puerto Rico 00983

3000081

03/07

JohnsonDiversey
Clean is just the beginning

SPECTRUM

HMIS		NFPA	Personal protective equipment
Health	3	3	
Fire Hazard	0	0	
Reactivity	0	0	

Version Number: 1 *Preparation date: 2008-05-02*

1. PRODUCT AND COMPANY IDENTIFICATION

Product name: SPECTRUM

MSDS #: MS0100630
Product Code: 57616010, 57616100, 57616330, 57616280

Recommended use: Food Processing. Sanitizer. This product is intended to be diluted prior to use.

Manufacturer, Importer, supplier:
US Headquarters
JohnsonDiversey, Inc.
8310 16th St.
Sturtevant, Wisconsin 53177-1964
Phone: 1-888-352-2249
MSDS Internet Address:
www.johnsondiversey.com

Canadian Headquarters
JohnsonDiversey - Canada, Inc.
2401 Bristol Circle
Oakville, Ontario L6H 6P1
Phone: 1-800-668-3131

Emergency telephone number: 1-800-851-7145 (Prosar); 1-651-917-6133 (Int'l Prosar); 01-800-710-3400 (México)

2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
DANGER. CORROSIVE. CAUSES SKIN AND EYE BURNS. HARMFUL OR FATAL IF SWALLOWED.

Principle routes of exposure: Eye contact. Skin contact. Inhalation.
Eye contact: Corrosive. Causes permanent eye damage, including blindness.
Skin contact: Corrosive. Causes permanent damage.
Inhalation: May cause irritation and corrosive effects to nose, throat and respiratory tract.
Ingestion: Corrosive. Causes burns to mouth, throat and stomach.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients

Ingredient(s)	CAS #	Weight %	LD50 Oral - Rat (mg/kg)	LD50 Dermal - Rabbit	LC50 Inhalation - Rat
n-Alkyl (60% C14, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chloride	68391-01-5	1 - 5%	500	Not available	Not available
n-Alkyl (68% C14, 32% C16) dimethyl ethylbenzyl ammonium chloride	68956-79-6	1 - 5%	500	Not available	Not available
Ethyl alcohol	64-17-5	1 - 5%	7060	Not available	Not available

4. FIRST AID MEASURES

Eye contact: Immediately flush eyes with running water for 15-20 minutes, keeping eyelids open. Get medical attention immediately.
Skin contact: Immediately flush with plenty of water for 15-20 minutes . Get medical attention immediately.
Inhalation: If breathing is affected, remove to fresh air. Get medical attention immediately.
Ingestion: If swallowed, rinse mouth. Give a cupful of water or milk . THEN IMMEDIATELY CONTACT A PHYSICIAN OR POISON CENTER. DO NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.
Aggravated Medical Conditions: Individuals with chronic respiratory disorders such as asthma, chronic bronchitis, emphysema, etc., may be more susceptible to irritating effects.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media: The product is not flammable. Extinguish fire using agent suitable for surrounding fire.

5. FIRE-FIGHTING MEASURES

Specific hazards: Not applicable
Unusual hazards: Corrosive material (See sections 8 and 10).
Specific methods: No special methods required

Special protective equipment for firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
Extinguishing media which must not be used for safety reasons: No information available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Use personal protective equipment
Environmental precautions and clean-up methods: Clean-up methods - large spillage. Soak up with inert absorbent material. Sweep up and shovel into suitable containers for disposal. Use a water rinse for final clean-up.

7. HANDLING AND STORAGE

Handling:
Avoid contact with skin, eyes and clothing. Do not taste or swallow. Avoid breathing vapors or mists. Use only with adequate ventilation. Remove and wash contaminated clothing and footwear before re-use. Wash thoroughly after handling. Product residue may remain on/in empty containers. All precautions for handling the product must be used in handling the empty container and residue. FOR COMMERCIAL AND INDUSTRIAL USE ONLY.
Storage:
Protect from freezing. Keep tightly closed in a dry, cool and well-ventilated place. KEEP OUT OF REACH OF CHILDREN.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure:
Good general ventilation should be sufficient to control airborne levels. Respiratory protection is not required if good ventilation is maintained.

Personal Protective Equipment

Eye protection: Chemical-splash goggles.
Hand protection: Chemical-resistant gloves
Skin and body protection: Protective footwear. If major exposure is possible, wear suitable protective clothing and footwear.
Respiratory protection: In case of insufficient ventilation wear suitable respiratory equipment. A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.
Hygiene measures: Handle in accordance with good industrial hygiene and safety practice

Ingredient(s)	CAS #	ACGIH	OSHA	Mexico
Ethyl alcohol	64-17-5	1000 ppm (TWA)	1900 mg/m³ (TWA) 1000 ppm (TWA)	1000 ppm (TWA) 1900 mg/m³ (TWA)

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid
pH: 7
Appearance: Liquid
Color: Clear Light Green Yellow
Odor: Fresh
Specific gravity: 0.995
Density: 8.26 lbs/gal
VOC: 1.0% *
Flash point: >200°F >93.3°C
Solubility: Completely Soluble
Viscosity: No information available

Bulk density: No information available
Dilution pH: 8 (1:100)
Vapor density: No information available
Evaporation Rate No information available
Boiling point/range: Not determined
Melting point/range: Not determined
Decomposition temperature: Not determined
Autoignition temperature: No information available
Partition coefficient (n-octanol/water): No information available
Solubility in other solvents: No information available
Elemental Phosphorus: 0 %P

* - Title 17, California Code of Regulations, Division 3, Chapter 1, Subchapter 8.5, Article 2, Consumer Products, Sections 94508

10. STABILITY AND REACTIVITY

Stability: The product is stable
Polymerization: Hazardous polymerization does not occur
Hazardous decomposition products: None reasonably foreseeable.

11. TOXICOLOGICAL INFORMATION

Acute toxicity: Corrosive Oral LD50 estimated to be > 2000 mg/kg Dermal LD50 estimated to be greater than 5000 mg/kg
Component information: See Section 3

11. TOXICOLOGICAL INFORMATION

Chronic toxicity: None known

Specific effects

Carcinogenic effects: None known
Mutagenic effects: None known
Reproductive toxicity: None known
Target organ effects: None known

Hazardous ingredients

Ingredient(s)	CAS #	NTP	IARC	OSHA
Ethyl alcohol	64-17-5	X		X

12. ECOLOGICAL INFORMATION

Environmental information: No data available

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products:
PESTICIDAL WASTE - Observe all applicable Federal/Provincial/State regulations and Local/Municipal ordinances regarding disposal of pesticide wastes. Handle as a Pesticide waste. Do not bury. Do not dispose of with Commercial or Household waste .

14. TRANSPORT INFORMATION

DOT/TDG: Please refer to the Bill of Lading/receiving documents for up to date shipping information

15. REGULATORY INFORMATION

International Inventories
All components of this product are listed on the following inventories: U.S.A. (TSCA), Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Australia (AICS), Philippines (PICCS), New Zealand (NZIoC), China (IECSC).

U.S. Regulations
California Proposition 65: This product is not subject to the reporting requirements under California's Proposition 65

STATE RIGHT TO KNOW

Ingredient(s)	CAS #	MARTK:	NJRTK:	PARTK:	RIRTK:
Ethyl alcohol	64-17-5	X	X	X	X
Water	7732-18-5	-	-	-	-
n-Alkyl (60% C14, 30% C16, 5% C12, 5% C18) dimethyl benzyl ammonium chloride	68391-01-5	-	-	-	-
n-Alkyl (68% C14, 32% C16) dimethyl ethylbenzyl ammonium chloride	68956-79-6	-	-	-	-

CERCLA/ SARA
SARA 311/312 Hazard Categories

Immediate: X
Delayed: -
Fire: -
Reactivity: -
Sudden Release of Pressure: -

Canada
WHMIS hazard class: Non-controlled.

PCP No. : 15248

16. OTHER INFORMATION

Reason for revision: Not applicable
Prepared by: NAPRAC
Additional advice: None

Notice to Reader: This document has been prepared using data from sources considered technically reliable. It does not constitute a warranty, express or implied, as to the accuracy of the information contained within. Actual conditions of use and handling are beyond seller's control. User is responsible to evaluate all available information when using product for any particular use and to comply with all Federal, State, Provincial and Local laws and regulations.

Windsor Salt

Dried FC Feed Mixing Rock Salt
Ojibway, Ontario Production

PDS VII-5
8/92

Description

Rock Salt from Ojibway, Ontario is direct-mined production of mineral Sodium Chloride. It is produced from an underground deposit by blasting with explosives followed by crushing, screening and drying operations.

Crushed rock salt particles are multifaceted and somewhat rectangular in shape. The appearance is translucent to white with a variable incidence of small red to black specks or streaks which are attributed to metallic oxide and sulfide impurities and to traces of hydrocarbons.

Feed mixing salt is manufactured by drying and removing dust from FC Rock salt. It is carefully screened to ensure optimum size for animal and poultry feed.

Chemical Analysis

Chemical Analysis, moisture-free basis is:

	Typical	Range
[1]Sodium Chloride (%)	98.0	97.9 - 98.2
Calcium Sulfate (%)	1.5	1.4 - 1.7
Calcium Chloride (%)	0.1	< 0.2
Magnesium Chloride (%)	0.1	< 0.2
Water Insolubles (mg/kg)	0.1	< 0.2
Moisture (%)	0.1	< 0.2
Iron (mg/kg)	7.0	< 10
Copper (mg/kg)	0.2	< 2
Heavy Metals as lead (mg/kg)	3	< 6
Sodium Ferrocyanide (mg/kg)	10	6 - 13

[1] *By difference of impurities, moisture-free basis (ASTM). Includes traces of potassium chloride (0.02%).*

Producing Mines

Ojibway, ON

Commodity Codes

	Ojibway	Anjou
40 kg bags	-	5015
1 tonne tote bags	-	5811
Bulk	5011	5011
Bulk (Industrial)	5019	5019

Packaging

40 kg net weight, multiwall kraft paper bags:

Gross Wt (kg)	Unit Dimensions L x W x H (cm)	Cube (m^3)
40.3	58.5 x 40.5 x 15	0.04

Units	Palletized* Gross Wt (kg)	Cube (m^3)
30	1260	1.32

** Includes 122 cm x 102 cm standard wood pallet.*

Physical Properties

Screen analysis and bulk density will vary with production shipped through distribution centers as a result of particle attrition and segregation in bulk handling.

Pour (loose) bulk density is 1200 - 1280 kg/m3 (75-80 lb/ft3).

Screen analysis at the mine within 90% confidence is:

U.S.S. Mesh	Opening Microns	% Retained** Typical	Limits	Cumulative % Passing Typical	Limits
12	1700	0		100	
16	1180	2	4 max	98	96 min
20	841	23		75	
30	600	28		47	
50	300	30		17	
100	150	15		2	7 max
Pan	-	2	7 max	-	

***On individual screens.*

The Canadian Salt Company Limited
755 boul. St-Jean, Suite 700, Pointe-Claire, Quebec H9R 5M9 514/630-0900 Fax 514/694-2451

windsor

Sel Windsor

Sel gemme sec FC à moulange
Production Ojibway, Ontario

PDS VII-5

Description

Le sel gemme d'Ojibway en Ontario est le produit de l'exploitation de mines de chlorure de sodium. Le sel est extrait de sédiments stratifiés sous-terrains qui sont soumis à des charges explosives, puis à des opérations de broyage et de tamisage.

Les particules broyées de sel gemme sont quelque peu rectangulaires et ont de nombreuses facettes. Elles peuvent être translucides ou blanches, et ont un nombre variable de petites taches ou de sillons rouges ou noirs, attribuables à des impuretés d'oxyde et de sulfure métallifères et à des traces d'hydrocarbures.

Le sel à moulange s'obtient en asséchant et en dépoussiérant le sel gemme FC. Le sel est soigneusement tamisé pour obtenir la grosseur adaptée à l'alimentation des animaux et de la volaille.

Analyse chimique

La composition chimique à l'état non humide, est :

	Typique	Échelle
[1] Chlorure de sodium (%)	98,0	97,9 à 98,2
Sulfate de calcium (%)	1,5	1,4 à 1,7
Chlorure de calcium (%)	0,1	0,2
Chlorure de magnésium (%)	0,1	0,2
Insolubles dans l'eau (%)	0,1	0,2
Humidité (%)	0,1	0,2
Fer (mg/kg)	7,0	10
Cuivre (mg/kg)	0,2	2
Métaux lourds comme le plomb (mg/kg)	3	6

[1] *Selon les différences d'impuretés et d'additifs à l'état non humide (procédures ASTM).*
Inclut des traces de chlorure de potassium (0,02 %).

Mine d'exploitation

Ojibway, Ont.

Codes de produits

	Ojibway	Anjou
Sacs 40 kg	-	5015
Poches 1 tonne métrique	-	5811
Vrac	5011	5011
Vrac (industriel)	5019	5019

Emballage

Sacs en papier kraft multicouches de 40 kg nets.

Dimensions unitaires

Poids net (kg)	L x l x h (cm)	Cube (m3)
40,3	58,5 x 40,5 x 15	0,04

Palettisation*

Unités	Poids brut (kg)	Cube (m^3)
30	1260	1,32

** Palette standard en bois de 122 cm x 102 cm.*

Propriétés physiques

La granulométrie et la densité apparente varieront selon la quantité livrée par les centres de distribution en raison de l'usure des particules et de la méthode de manipulation du produit en vrac.

La densité apparente d'écoulement (libre) est de 1 200 à 1 280 kg/m^3 (75 à 80 lb/pi^3).

La granulométrie effectuée à la mine est, à 90 % de précision :

Maille U.S.S.	Ouverture microns	Pourcentage retenu ** Typique	Limites	% Tamisage cumul. Typique	Limites
12	1700	0		100	
16	1180	2	4 max.	98	96 min.
20	841	23		75	
30	600	28		47	
50	300	30		17	
100	150	15		2	7 max.
Bac	-	2	7 max.	-	

*** Sur tamis individuels.*

La Société canadienne de Sel, Limitée
755 boul. St-Jean, Suite 700, Pointe-Claire, Québec H9R 5M9 514/630-0900 Fax 514/694-2451

windsor

windsor **THE CANADIAN SALT CO. LTD.** **Material Safety Data Sheet**

755 Boulevard St-Jean, Suite 700
Pointe Claire, Quebec, Canada H9R 5M9
514-630-0900

Eff. Date March 24, 2009
Exp. Date March 24, 2012
Emergency Phone Number: 312-807-2000
(Morton Salt Co.)

(1) PRODUCT INFORMATION

Chemical Name: Sodium Chloride
Product Name: F.C. Feed
Supplier: see above
Common Name: Salt, Rock Salt, Halite
Product Use: General use
CAS Number: 7647-14-5
Chemical Formula: NaCl

(2) HAZARDOUS INGREDIENTS

Chemical Name	Common Name	CAS Number	%	OSHA PEL	ACGIH TLV-TWA
None					

This is not a hazardous or controlled product as defined under Canada's WHMIS regulations.
This is not a hazardous or controlled product as defined under Canada's Hazardous Products Act and Controlled Products Regulations.
All ingredients are found in Canada's Domestic Substances List.
This product is not hazardous as defined by Canada's Transportation of Dangerous Goods Act.
This product is regarded as GRAS (generally recognized as safe) by the U.S. Food & Drug Administration.
No occupational exposure limits have been established by OSHA, ACGIH or NIOSH for this product.

NFPA RATINGS (Scale 0-4): Health=1 Fire=0 Reactivity=0

(3) PHYSICAL DATA

Boiling Point (760mm Hg): 1,413° C (2,575° F)
Vapour Pressure (mm Hg): 1 mm @ 865°C (1,589°F)
Vapour Density (Air =1): N/A
Solubility in Water: 36 g/100 cc water at 20°C(68°F) pH: 5.5 - 9.5 (depending on additives)
Appearance: Colorless or white crystals
Rock salt may have dark impurities
Melting Point: 801°C (1,474°F)

Specific Gravity (Water=1): 2.165
% non-volatile: 100
Evaporation rate (ether=1): N/A
Odour: none

(4) FIRE AND EXPLOSION HAZARD DATA

Flash Point: N/A
Flammable Limits LEL: N/A UEL: N/A
This product is non-combustible

Extinguishing Media: None required

Special Fire Fighting Procedures: None

Unusual Fire & Explosion Hazards: None

Hazardous Decomposition Products: None

(5) REACTIVITY DATA

Stability: Stable under normal temperatures and pressures

Incompatibility (Materials to Avoid): Stable and inert under normal conditions.
Will react with strong acids (to generate HCl) and strong oxidizing agents (to generate Cl_2).

Can Hazardous Polymerization occur: No
Hazardous Decomposition Products and Conditions: None

(6) TOXICOLOGICAL PROPERTIES

Oral Toxicity: Oral rat LD50: 3,000 mg/kg (RTECS, 1986)
Dermal Toxicity: Skin irritation rabbit: 500 mg/24 hr. Mild (RTECS, 1986)
Eye: Eye irritation rabbit: 100 mg/24 hr. Moderate (RTECS, 1986)
Inhalation: No information found

Chronic Toxicity: No information found

Mutagenesis: Mutation references cited (RTECS, 1986)

Effects of Overexposure:
- Ingestion: Very large doses can cause vomiting, diarrhea, and prostration.
- Skin Contact: Not expected to be a health hazard.
- Eye Contact: May cause irritation.
- Inhalation: Inhalation of dust may cause mild irritation to mucous membranes, nose and throat. Symptoms may include coughing, dryness and sore throat.

Acute Systemic Effects: Dehydration and congestion may occur in internal organs. Hypertonic salt solutions can produce inflammatory reactions in the gastrointestinal tract.

Chronic Systemic Effects: No information found

(7) PREVENTIVE MEASURES

SPILL OR LEAK PROCEDURES:

Response to Small Spills: Sweep up and containerize for reclamation or disposal. Vacuuming or wet sweeping may be used to avoid dust dispersal.

Response to Large Spills: Shovel and sweep up; containerize for reclamation or disposal.

Hazards to be Avoided: None known.
Reportable Quantity: Check your local requirements.
Waste Classification: Some jurisdictions have set maximum limits on Chlorides in waste effluent.

Disposal Methods: Whatever cannot be saved for reclamation may be delivered to an approved waste disposal facility, or if local ordinances allow, can be dissolved in sufficient amounts of water to meet water quality standards, and flushed down a sewer drain. Ensure compliance with local, provincial/state and federal regulations.

SPECIAL PROTECTION INFORMATION:

Respiratory Protection: For conditions of use where exposure to the dust is apparent, a NIOSH approved dust/mist respirator may be worn. For emergencies, a self-contained breathing apparatus may be necessary.

For Hands, Body: If deemed necessary, wear protective gloves and clean body-covering clothing.

For Eyes: Use chemical safety goggles. Contact lenses should not be worn when working with this material. Maintain eye wash fountain and quick-drench facilities in work area.

Ventilation: In general, dilution ventilation is a satisfactory health hazard control for this substance. However, if conditions of use create discomfort to the worker, a local exhaust system should be considered.

SPECIAL PRECAUTIONS:
Other Precautions: Transport in dry equipment; store in dry location.

LABELLING INFORMATION:

DOT Shipping Name:	Salt (common), sodium chloride
DOT Label:	Not applicable
UN Number:	Not applicable
Other contents of product label:	Not applicable
Warning:	None

(8) EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Immediately flush eyes with plenty of water for at least 15 minutes. Call a physician.
Skin Contact:	Wash exposed area with soap and water. Get medical advice if irritation develops.
Inhalation:	Remove to fresh air. Get medical attention for any breathing difficulty.
Ingestion:	If large amounts were swallowed, get medical advice.

(9) PREPARED BY:

The Canadian Salt Company Ltd.
755 Boulevard St-Jean, Suite 700
Pointe Claire, Quebec, Canada H9R 5M9
514-630-0900

USERS RESPONSIBILITY

The responsibility to provide a safe workplace remains with the user.
The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.

DISCLAIMER OF LIABILITY

The information contained herein is, to the best of our knowledge and belief, accurate.
However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material.
It is the responsibility of the user to comply with all applicable federal, provincial/state, and local laws and regulations. Nothing contained herein is to be construed as a recommendation for use in violation of any patents or of applicable laws or regulations.

Appendix C

SANI MARC

Material Safety Data Sheet

WHMIS	TDG Road/Rail
	

Health Hazard	*	3
Fire Hazard		0
Reactivity		1
Personal Protection		E

Approved for use in Food & Beverage plants

1. Product and company identification

Product name : AGRO-CHLORE

Code : 89-10200

Date of issue (dd/mm/yyyy) : 2013-10-11.

Material uses : Industrial applications: Sanitizer.

Supplier :
SANI-MARC
42, rue de l'Artisan
Victoriaville, Québec
G6P 7E3
819-758-1541

Manufacturer :
SANI-MARC
42, Rue de l'Artisan
Victoriaville, Québec
G6P 7E3
819-758-1541

In case of emergency : **Emergency phone: CANUTEC (613) 996-6666 (Collect calls accepted)**

2. Hazards identification

Potential hazards described in this section are not expected when manufacturer's direction for use and proper security measures are observed.

Physical state : Solid. [Granular solid.]

Odor : Pungent. [Strong]

Emergency overview : **WARNING!**

May be harmful if absorbed through skin or if swallowed. Severely irritating to the eyes, skin and respiratory system. Do not ingest. Do not get in eyes. Avoid contact with skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Severely irritating to the respiratory system.

Ingestion : Harmful if swallowed.

Skin : Harmful in contact with skin. Severely irritating to the skin.

Eyes : Severely irritating to eyes. Risk of serious damage to eyes.

See toxicological information (Section 11) for more details.

3. Composition/information on ingredients

Name	CAS number	% (w/w)
calcium hypochlorite	7778-54-3	60 - 100
calcium carbonate	471-34-1	1 - 5
calcium dihydroxide	1305-62-0	1 - 5
Calcium chloride, dihydrate	10035-04-8	1 - 5

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 20 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

5. Fire-fighting measures

Flammability of the product : Strong oxidizing agent.

Extinguishing media

Suitable : Use flooding quantities of water. USE WATER ONLY

Not suitable : Do not use water jet Do not use dry chemical extinguishers containing ammonium compounds.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
metal oxide/oxides

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

:

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

Large spill : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Do not store above the following temperature: 52°C (125,6°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	**List name**	**ppm**	**mg/m³**	**Other**	**ppm**	**mg/m³**	**Other**	**ppm**	**mg/m³**	**Other**	**Notations**
calcium dihydroxide	US ACGIH 2/2010	-	5	-	-	-	-	-	-	-	
	AB 4/2009	-	5	-	-	-	-	-	-	-	[3]
	BC 9/2010	-	5	-	-	-	-	-	-	-	
	ON 7/2010	-	5	-	-	-	-	-	-	-	
	QC 6/2008	-	5	-	-	-	-	-	-	-	
calcium carbonate	AB 4/2009	-	10	-	-	-	-	-	-	-	[3]
	QC 6/2008	-	10	-	-	-	-	-	-	-	[a]
calcium hypochlorite	US ACGIH	-	-	-	-	-	-	-	3	-	[A]
		-	5	-	-	-	-	-	-	-	[B]

[3]Skin sensitization
Form: [a]Total dust.
Notes: [A]Calcium hypochlorite [B]Calcium hydroxide

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Recommended: disposable particulate mask

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. >8 hours (breakthrough time): Chemical-resistant, impervious gloves
4-8 hours (breakthrough time): Chemical-resistant, impervious gloves
1-4 hours (breakthrough time): Chemical-resistant, impervious gloves
<1 hours (breakthrough time): Chemical-resistant, impervious gloves

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. Recommended: safety glasses with side-shields

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Personal protective equipment (Pictograms) :

9. Physical and chemical properties

Physical state	: Solid. [Granular solid.]	**Molecular formula**	: Not applicable.	**Flammable limits**	: Not available.
Color	: White.	**Molecular weight**	: Not applicable.	**Burning rate**	: Not available.
Odor	: Pungent. [Strong]	**Vapor pressure**	: Not available.	**Burning time**	: Not available.
Relative density	: 2,35	**Vapor density**	: Not available.	**Critical temperature**	: Not available.
pH	: 10,4 [Conc. (% w/w): 1%]	**Volatility**	: Not available.	**Auto-ignition temperature**	: Not available.
Viscosity	: Not available.	**Evaporation rate**	: Not available.	**Flash point**	: [Product does not sustain combustion.]
Odor threshold	: 1,4 ppm	**Ionicity (in water)**	: Not available.	**Dispersibility properties**	: Not dispersible in the following materials: cold water and hot water.

Solubility : Partially soluble in the following materials: cold water and hot water.

Melting/freezing point : 100°C (212°F)

Boiling/condensation point : Not available.

10. Stability and reactivity

Chemical stability : The product is stable.

Conditions to avoid : No specific data.

Materials to avoid : No specific data.
Reactive or incompatible with the following materials: oxidizing materials, reducing materials, combustible materials, organic materials and acids.
This product is chemically reactive with many substances, including, other pool treatment products, acids, organics, nitrogen-containing compounds, dry powder fire extinguishers (containing mono-ammonium phosphate), oxidizers, corrosive, flammable or combustible materials.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

The symptoms, hazards and situations described in this section are not expected when manufacturer's direction for use, proper security measures and given professionnal exposure limits are correctly followed.

Potential chronic health effects

Chronic effects :

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

11. Toxicological information

Target organs : May cause damage to the following organs: lungs, mucous membranes, gastrointestinal tract, upper respiratory tract, eye, lens or cornea, stomach.
Contains material which may cause damage to the following organs: skin.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : Adverse symptoms may include the following:
pain or irritation
watering
redness

Medical conditions aggravated by over-exposure :
Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
calcium hypochlorite	LD50 Oral	Rat	850 mg/kg	-
calcium dihydroxide	LD50 Oral	Rat	7340 mg/kg	-
	LD50 Oral	Rat	7340 mg/kg	-
Calcium chloride, dihydrate	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	1000 mg/kg	-
	LD50 Oral	Rat - Male	3798 mg/kg	-
calcium carbonate	LD50 Oral	Rat	6450 mg/kg	-
calcium hypochlorite	LD50 Oral	Rat	850 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
calcium dihydroxide	Eyes - Severe irritant	Rabbit	-	10 milligrams	-
calcium carbonate	Eyes - Severe irritant	Rabbit	-	24 hours 750 Micrograms	-
	Skin - Moderate irritant	Rabbit	-	24 hours 500 milligrams	-

Carcinogenicity Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
calcium hypochlorite	-	3	-	-	-	-

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Exposure	Species
calcium hypochlorite	-	Acute EC50 0,073 ppm Fresh water	48 hours	Daphnia - Water flea - Daphnia magna - Larvae
	-	Acute LC50 <50 ug/L Marine water	48 hours	Crustaceans - Calanoid copepod - Acartia tonsa
	-	Acute LC50 23 ug/L Fresh water	96 hours	Fish - Rainbow smelt - Osmerus mordax - Fry
calcium dihydroxide	-	Acute LC50 33884,4 ug/L Fresh water	96 hours	Fish - Zambezi barbel - Clarias gariepinus - Fingerling
	-	Chronic NOEC 56 mg/L Marine water	96 hours	Fish - Guppy - Poecilia reticulata - Young - 3 weeks
Calcium chloride, dihydrate	OECD 201 Alga, Growth Inhibition Test	Acute EC50 2700 mg/L Growth rate	72 hours	Aquatic plants - Selenastrum capricornutum
	OECD 202 *Daphnia* sp. Acute Immobilization Test and Reproduction Test	Acute EC50 2400 mg/L	48 hours	Daphnia - Daphnia magna
	EPA	Acute LC50 19400 mg/L	48 hours	Crustaceans - Cyclops abyssorum prealiinus
	EPA	Acute LC50 2770 mg/L	48 hours	Daphnia - Daphnia magna
	EPA	Acute LC50 13400 mg/L	96 hours	Fish - Gambusia affinis
	EPA	Acute LC50 10650 mg/L	96 hours	Fish - Lepomis macrochirus
	EPA	Acute LC50 4630 mg/L	96 hours	Fish - Pimephales promelas
calcium carbonate	-	Acute LC50 >56000000 ug/L Fresh water	96 hours	Fish - Western mosquitofish - Gambusia affinis - Adult
calcium hypochlorite	-	Acute EC50 0,073 ppm Fresh water	48 hours	Daphnia - Water flea - Daphnia magna - Larvae
	-	Acute LC50 <50 ug/L Marine water	48 hours	Crustaceans - Calanoid copepod - Acartia tonsa
	-	Acute LC50 0,11 mg/L	48 hours	Daphnia - Daphnia magna
	-	Acute LC50 23 ug/L Fresh water	96 hours	Fish - Rainbow smelt - Osmerus mordax - Fry
	-	Acute LC50 0,16 mg/L	96 hours	Fish - Trout

Toxicity of the products of biodegradation : The products of degradation are more toxic than the product itself.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Waste stream : Not available.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	1748	UN1748 CALCIUM HYPOCHLORITE DRY MIXTURE	5.1	II		**Reportable quantity** 10 lbs. (4.54 kg)
TDG Classification	1748	UN1748 CALCIUM HYPOCHLORITE DRY MIXTURE	5.1	II		-

PG* : Packing group

15. Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.

WHMIS (Canada) : Class C: Oxidizing material.
Class E: Corrosive material

Canadian lists : **CEPA Toxic substances**: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: None of the components are listed.
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Canada inventory :All components are listed or exempted.

Other certification :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. Other information on the product

Label requirements : CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED.

References : - Manufacturer's Material Safety Data Sheet.

Date of printing (YYYY-MM-DD) : 2013-10-11.

Date of issue (YYYY-MM-DD) : **2013-10-11.**

Note: MSDS are valid for a 3 years period after the date of issue

Indicates information that has changed from previously issued version.

MSDS prepared by:
QA and Documentation Department

SANI-MARC
42, Rue de l'Artisan
Victoriaville, Québec
G6P 7E3
819-758-1541

Notice to reader

There are potential hazards to people and goods associated with the use of this product which are detailed in the present Material Safety Data Sheet (MSDS). To minimize potential hazards associated with this product it is of users responsibility to conform the directions for use and all other instructions provided in the Material Safety Data Sheet (MSDS) of this product. The manufacturer, distributors and suppliers of this product are exonerating themselves and consequently shall not be liable for any prejudice or damage of any kind, resulting from the use of this product which may not be in accordance with the directions for use or all the instructions provided in the present Material Safety Data Sheet (MSDS) or resulting from an unadvised use of the present product..

Emergency phone: CANUTEC (613) 996-6666 (Collect calls accepted)

MATERIAL SAFETY DATA SHEET
BIOMAX ANTIMICROBIAL HAND SOAP

SECTION 1 – CHEMICAL PRODUCT & COMPANY IDENTIFICATION

PRODUCT NAME:	Biomax Antimicrobial hand soap
GENERAL/GENERIC NAME:	
PRODUCT USE:	Antimicrobial Hand Soap
EFFECTIVE DATE:	August 21, 2014
VENDOR NAME AND ADDRESS:	Alpine Specialty Chemicals Ltd.
	9 City View Drive, Etobicoke, Ontario M9W 5A5
24 HOUR EMERGENCY NO.	613-996-6666

SECTION 2 – COMPOSITION / INFORMATION INGREDIENTS

INGREDIENT	CAS.NO	%W/W	TLV	LD50 / LC50
Sodium C14-C16 Olefin Sulphonate	64-17-5	5 -10	NA	NA

SECTION 3 – HAZARDS IDENTIFICATION

Route of Entry:
Skin Contact: Won't cause irritation.
Eye Contact: May cause transient irritation.
Inhalation: Mist may cause irritation of the respiratory tract.
Ingestion: May cause irritation to digestive tract.
Effects of Acute Exposure: (see section 11 for Toxicological information).

SECTION 4 – FIRST AID

Eyes: Flush with running water for at least 15 minutes while holding eyelids open. Get medical attention.
Skin Contact: Flush contaminated skin with plenty of water. Remove contaminated clothing. Launder contaminated clothing thoroughly before re-use.
Inhalation: Remove victim to fresh air. Aid in breathing if necessary. If breathing stops, administer artificial respiration. Seek medical attention. Effects may be delayed for a few hours and aggravated by physical exertion.
Ingestion: Give plenty of water to drink to dilute stomach contents. ***Do not induce vomiting***. Seek immediate medical attention.

SECTION 5 – FIRE FIGHTING MEASURES

PRODUCT IS:	Non-Flammable
AUTO IGNITION TEMPERATURE:	NA
FLASH POINTS:	NA
DEGRATION PRODUCTS:	NA
EXTINGUISHING MEDIA:	NA

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Leak/Spill: Contain spills; absorb onto inert material.

SECTION 7 – HANDLING AND STORAGE

Handling Procedures: Avoid contact with eyes or clothing. . Keep container closed when not in use.
Storage Procedures: Keep from freezing. Keep containers closed when not in use.

SECTION 8 – EXPOSURE CONTROLS

PROTECTIVE EQUIPMENT TO BE USED:

RESPIRATORY PROTECTION:	Not required.
VENTILATION:	General ventilation adequate.
PROTECTIVE GLOVES:	Not required
EYE PROTECTION:	Not required
OTHER PROTECTIVE MEASURES:	Avoid eye contact. Store at room temperature. Keep out of reach of children and pets.

SECTION 9 – PHYSICAL PROPERTIES

PHYSICAL STATE:	Liquid
APPEARANCE AND ODOUR:	Light blue.
ODOUR THRESHOLD:	ND
SPECIFIC GRAVITY:	1.01 – 1.03 (water=1)
VAPOUR PRESSURE:	NA
VAPOUR DENSITY:	NA
PH Concentrate	NA
EVAPORATION RATE:	ND
INITIAL BOILING POINT:	100°C (212°F)
WATER SOLUBILITY:	Easily soluble in cold water, hot water.
FREEZING POINT:	0°C

SECTION 10 – STABILITY AND REACTIVITY

STABILITY:	Stable
INCOMPATIBILITY:	NA
HAZARDOUS DECOMPOSITION PRODUCTS:	See fire degradation products.
REACTIVITY:	No specific information is available in our database regarding the reactivity of this material in presence of various other materials.

SECTION 11 – TOXICOLOGICAL INFORMATION

ROUTE OF ENTRY:	Ingestion. Skin contact. Eye contact. Inhalation.
TOXICITY FOR ANIMALS:	Not Available
ACUTE EFFECTS:	May cause eye irritation.
CHRONIC EFFECTS:	Prolonged exposure may cause skin and eye irritation.
CARCINOGENIC EFFECTS:	Not Available
MUTAGENIC EFFECTS:	Not Available
TERATOGENIC EFECTS:	Not Available
DEVELOPMENTAL TOXICITY:	Not Available

SECTION 12 – ECOLOGICAL CONSIDERATION

No permanent effects on ecosystems.

SECTION 13 – DISPOSAL CONSIDERATIONS

Waste Disposal: In accordance with federal, provincial or local government requirements.

SECTION 14 – TRANSPORT INFORMATION

TDG Classification: Not Regulated

SECTION 15 – REGULATORY INFORMATION

WHMIS Classification: D2B

SECTION 16 – OTHER INFORMATION

Prepared by: Lab Personnel

Phone: (416) 744-2120
Website: www.alpinechem.com

Disclaimer:

The information contained in this form is based on data from sources considered technically reliable and has been provided in good faith in accordance with the available material. It is provided as a service to the persons using the product but conditions of use and handling may involve other and additional consideration beyond our control. No warranty, expressed or implied, is made and we will not be liable for any damages, losses, injuries or consequential damages which may result from the use or reliance on any information in this form.

Material Safety Data Sheet

WHMIS	TDG Road/Rail
	

Health Hazard	*	3
Fire Hazard		0
Reactivity		1
Personal Protection		C

Approved for use in Food & Beverage plants

1. Product and company identification

Product name : CAUSTEK V

Code : 05-10028

Date of issue (yyyy/mm/dd) : 2014-01-27.

Material uses : Industrial applications: Indiustrial alkaline degreaser

Supplier : Sani-Marc Inc.
42 rue de l'Artisan
Victoriaville, Qc
G6P 7E3
1-819-758-1541

Manufacturer : Sani-Marc Inc.
42 rue de l'Artisan
Victoriaville, Qc
G6P 7E3
1-819-758-1541

In case of emergency : **Emergency phone: CANUTEC (613) 996-6666 (Collect calls accepted)**

2. Hazards identification

Potential hazards described in this section are not expected when manufacturer's direction for use and proper security measures are observed.

Physical state : Liquid. [Transparent liquid.] **Odor** : Odorless.

Emergency overview : **DANGER!**

Harmful if swallowed. Severely corrosive to the eyes, skin, respiratory system and digestive tract. Causes severe burns. May be harmful if absorbed through skin. Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Inhalation. Ingestion.

Potential acute health effects

Inhalation : Severely corrosive to the respiratory system. Not a usual way of absorbtion Do not breathe dust/fume/gas/mist/vapors/spray.

Ingestion : Toxic if swallowed. Corrosive to the digestive tract. Causes severe burns.

Skin : Severely corrosive to the skin. Causes severe burns. Harmful in contact with skin.

Eyes : Severely corrosive to the eyes. Causes severe burns.

See toxicological information (Section 11) for more details.

3. Composition/information on ingredients

Name	CAS number	% (w/w)
sodium hydroxide	1310-73-2	30 - 60

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 20 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

5. Fire-fighting measures

Flammability of the product : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products Decomposition products may include the following materials: metal oxide/oxides

Special protective equipment for fire-fighters Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

:

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Keep away from acids. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Separate from acids. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	**List name**	**ppm**	**mg/m³**	**Other**	**ppm**	**mg/m³**	**Other**	**ppm**	**mg/m³**	**Other**	**Notations**
sodium hydroxide	US ACGIH 3/2012	-	-	-	-	-	-	-	2	-	
	AB 4/2009	-	-	-	-	-	-	-	2	-	[3]
	BC 9/2011	-	-	-	-	-	-	-	2	-	
	ON 7/2010	-	-	-	-	-	-	-	2	-	
	QC 9/2011	-	-	-	-	2	-	-	-	-	
[3]Skin sensitization											

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required. No monitoring equipment are required if no occupationnal exposure limit values are suggested.

Engineering measures : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing.

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. < 1 hour (breakthrough time): Chemical-resistant, impervious gloves

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead. Recommended: Safety Glasses

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Recommended: safety apron

8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation.

Personal protective equipment (Pictograms) :

9. Physical and chemical properties

Physical state	: Liquid. [Transparent liquid.]	**Molecular formula**	: Not applicable.	**Flammable limits**	: Not available.
Color	: Colorless.	**Molecular weight**	: Not applicable.	**Burning rate**	: Not applicable.
Odor	: Odorless.	**Vapor pressure**	: Not available.	**Burning time**	: Not applicable.
Relative density	: 1.49	**Vapor density**	: Not available.	**Critical temperature**	: Not available.
pH	: 14	**Volatility**	: Not available.	**Auto-ignition temperature**	: Not available.
Viscosity	: Not available.	**Evaporation rate**	: Not available.	**Flash point**	: [Product does not sustain combustion.]
Odor threshold	: Not available.	**Ionicity (in water)**	: Not available.	**Dispersibility properties**	: Not available.

Solubility : Easily soluble in the following materials: cold water and hot water.

Melting/freezing point Not available.

Boiling/condensation point : Not available.

:

10. Stability and reactivity

Chemical stability : The product is stable.

Conditions to avoid : No specific data.

Materials to avoid : Reactive or incompatible with the following materials:
acids
Highly reactive or incompatible with the following materials: metals, acids and moisture.
Absorbs moisture from the air. Incompatible with halogens and aluminum.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

The symptoms, hazards and situations described in this section are not expected when manufacturer's direction for use, proper security measures and given professionnal exposure limits are correctly followed.

Potential chronic health effects

Chronic effects :

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Target organs : Contains material which may cause damage to the following organs: upper respiratory tract, skin, eye, lens or cornea.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : Adverse symptoms may include the following:
stomach pains

Skin : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Eyes : Adverse symptoms may include the following:
pain
watering
redness

Medical conditions aggravated by over-exposure :

Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation

11. Toxicological information

sodium hydroxide	Eyes - Severe irritant	Monkey	-	24 hours 1 Percent	-
	Eyes - Mild irritant	Rabbit	-	400 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	24 hours 50 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	1 Percent	-
	Eyes - Severe irritant	Rabbit	-	0.5 minutes 1 milligrams	-
	Skin - Mild irritant	Human	-	24 hours 2 Percent	-
	Skin - Severe irritant	Rabbit	-	24 hours 500 milligrams	-

12. Ecological information

Ecotoxicity : Readily biodegradable

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Exposure	Species
sodium hydroxide	-	Acute EC50 40.38 mg/l Fresh water	48 hours	Crustaceans - Water flea - Ceriodaphnia dubia - Neonate
	-	Acute LC50 125000 µg/l Fresh water	96 hours	Fish - Western mosquitofish - Gambusia affinis - Adult

Toxicity of the products of biodegradation : The products of biodegradation are as toxic as the original product.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Waste stream : Not available.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
DOT Classification	1824	SODIUM HYDROXIDE SOLUTION RQ (sodium hydroxide)	8	II		**Reportable quantity** 2164 lbs / 982.47 kg [174.19 gal / 659.38 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.
TDG Classification	UN 1824	SODIUM HYDROXIDE, SOLUTION	8	II		**Remarks** Limited Qt Index 1L

PG* : Packing group

15. Regulatory information

United States inventory (TSCA 8b) : All components are listed or exempted.

WHMIS (Canada) : Class E: Corrosive material

Canadian lists : **CEPA Toxic substances**: None of the components are listed.
Canadian ARET: None of the components are listed.
Canadian NPRI: None of the components are listed.
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Canada inventory : All components are listed or exempted.

Other certification :

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. Other information on the product

Label requirements : CAUSES SEVERE RESPIRATORY TRACT, DIGESTIVE TRACT, EYE AND SKIN BURNS. HARMFUL IF SWALLOWED. MAY BE HARMFUL IF ABSORBED THROUGH SKIN.

Date of printing (YYYY-MM-DD) : 2014-04-29.
Date of issue (YYYY-MM-DD) : **2014-01-27.**

Note: MSDS are valid for a 3 years period after the date of issue

Indicates information that has changed from previously issued version.

MSDS prepared by:
QA and Documentation Department
Sani-Marc Inc.
42 rue de l'Artisan
Victoriaville, Qc
G6P 7E3
1-819-758-1541

Notice to reader

There are potential hazards to people and goods associated with the use of this product which are detailed in the present Material Safety Data Sheet (MSDS). To minimize potential hazards associated with this product it is of users responsibility to conform the directions for use and all other instructions provided in the Material Safety Data Sheet (MSDS) of this product. The manufacturer, distributors and suppliers of this product are exonerating themselves and consequently shall not be liable for any prejudice or damage of any kind, resulting from the use of this product which may not be in accordance with the directions for use or all the instructions provided in the present Material Safety Data Sheet (MSDS) or resulting from an unadvised use of the present product..

Emergency phone: CANUTEC (613) 996-6666 (Collect calls accepted)

MATERIAL SAFETY DATA SHEET

SERVCO

SERVCO LIQUID-CHLOR MAX

Effective Date: January 2, 2001

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name……..: SERVCO LIQUID-CHLOR MAX
Product Code……..: 10130
Product Family……..: Oxidizing Agent (Hypochlorite)
Chemical Name……..: Sodium Hypochlorite, Aqueous Solution
Formula……..: NaOCL

Distributor:
Taylor Chemical Ltd. Dba.
SERVCO
PO Box 1675
Hereford, Texas 79045
(806) 364-3731

EMERGENCY TELEPHONE NUMBER:

CHEMTREC
1-800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

COMPONENTS	***PERCENT***	***CAS NO.***
Sodium Hypochlorite	12.5%	7681-52-9
Sodium Chloride	9%-10%	7647-14-5
Sodium Hydroxide	0.5%-2%	1310-73-2
Water	Remainder	7732-18-5

3. HAZARDS IDENTIFICATION

Potential Health Effects

ACGIH - TLV: NOT ESTABLISHED; 1 ppm AS CHLORINE

Skin Contact: MAY CAUSE MODERATE SKIN IRRITATION. CONTACT WITH CONCENTRATED SOLUTIONS MAY BLEACH THE SKIN AND CAUSE REDNESS, PAIN, BLISTERING, ITCHY ECZEMA AND POSSIBLE CHEMICAL BURNS.

Eye Contact: MAY CAUSE SEVERE PAIN, BLURRED VISION, TEARING AND SWELLING. CONCENTRATED SOLUTIONS MAY CAUSE BURNING.

Ingestion: MAY CAUSE PAIN AND INFLAMMATION OF THE MOUTH, THROAT, ESOPHAGUS, AND STOMACH.CAN CAUSE EROSION OF MUCOUS MEMBRANES, ESPECIALLY IN THE STOMACH.

Inhalation: VAPORS MAY CAUSE SLIGHT TO SEVERE IRRITATION OF THE RESPIRATORY TRACT. HIGH CONCENTRATIONS MAY CAUSE SORE THROAT, BLISTERING, DELAYED PULMONARY EDEMA (SWELLING OF LUNG TISSUE) AND SHORTNESS OF BREATH.

Carcinogenicity: NTP: NO IARC: NO OSHA: NO

4. FIRST AID PROCEDURES

Eye Contact: IMMEDIATELY FLUSH EYES WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE HOLDING EYELIDS OPEN. GET MEDICAL ATTENTION.

Skin Contact: IMMEDIATELY REMOVE CONTAMINATED CLOTHING OR SHOES, WIPE EXCESS FROM SKIN AND FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. USE SOAP IF AVAILABLE OR FOLLOW BY WASHING WITH SOAP AND WATER. DO NOT REUSE CLOTHING UNTIL THOROUGHLY CLEANED. GET MEDICAL ATTENTION.

Inhalation: REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GIVE ARTIFICIAL RESPIRATION IF NOT BREATHING. GET MEDICAL ATTENTION.

Ingestion: DO NOT INDUCE VOMITING. RINSE MOUTH WITH WATER. IF CONSCIOUS, GIVE LARGE QUANTITIES OF WATER OR MILK AND GET IMMEDIATE MEDICAL ATTENTION. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON!

5. FIRE FIGHTING MEASURES

Flash Point (ºF): NONFLAMMABLE.
Extinguishing Media: USE MEDIA APPROPRIATE FOR SURROUNDING AREA.
Special Firefighting Procedures/Precautions: WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE GEAR. STAY UPWIND AND KEEP OUT OF LOW AREAS.

6. ACCIDENTAL RELEASE MEASURES

For Spill: CLEAN-UP PERSONNEL SHOULD USE PROTECTIVE EQUIPMENT TO PREVENT CONTACT. CONTAIN MATERIAL. PLACE COLLECTED MATERIAL IN A DISPOSAL CONTAINER. PREVENT LIQUID FROM ENTERING SEWERS OR WATERWAYS. DO NOT USE COMBUSTIBLE ABSORBENTS.

7. HANDLING AND STORAGE

Keep container tightly closed when not in use. Store in a cool, dry, well-ventilated area, away from heat and incompatible materials. Protect containers from physical damage.

AVOID CONTACT WITH EYES AND SKIN AND INHALATION OF VAPORS, MISTS, AND FUMES. AVOID DIRECT SUNLIGHT, HEAT, FLAMES AND OTHER IGNITION SOURCES.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: NOT NECESSARY UNDER NORMAL USE AND CONDITIONS. FOR AREAS WITH HIGH VAPOR CONCENTRATIONS, USE NIOSH APPROVED RESPIRATOR PROTECTION. FOR CANISTER TYPE RESPIRATORS, USE CHLORINE FILTERS. IN CASE OF FIRE, WEAR SELF-CONTAINED BREATHING APPARATUS.
Ventilation: LOCAL AND MECHANICAL RECOMMENDED.
Protective Gloves: CHEMICAL IMPERVIOUS GLOVES.
Eye/Face Protection: CHEMICAL SAFETY GOGGLES AND/OR FULL-FACE SHIELD.
Other Protection : CHEMICAL RESISTANT CLOTHING SUCH AS COVERALLS/APRON, BOOTS, ETC.

Work Practices: USE GOOD PERSONAL HYGIENE PRACTICES. WASH HANDS BEFORE EATING, DRINKING, SMOKING, OR USING TOILET FACILITIES. PROMPTLY REMOVE SOILED CLOTHING AND WASH THOROUGHLY BEFORE REUSE. SHOWER AFTER WORK USING PLENTY OF SOAP AND WATER.

9. PHYSICAL AND CHEMICAL PROPERTIES

Boiling Point (ºF): DECOMPOSES
Freezing Point (ºF): 7 - 10
Vapor Pressure (mmHg): 17.5 (@ 20 C)
Vapor Density (Air=1): NOT ESTABLISHED.
Specific Gravity (H2O=1): 1.20 - 1.40
pH 12 - 13 ***Evaporation Rate:*** NOT ESTABLISHED.
Solubility (H2O): COMPLETE
Appearance/Odor: CLEAR, PALE YELLOW OR GREENISH LIQUID WITH A CHLORINE ODOR.

10. STABILITY AND REACTIVITY

Chemical Stability: YES
Incompatible Material: ANY ACIDIC MATERIAL, AMMONIA, UREA, OXIDIZABLE MATERIALS AND METALS, SUCH AS NICKEL, COPPER, TIN, ALUMINUM AND IRON.
Hazardous Polymerization: WILL NOT OCCUR.
Decomposition Products: HYDROGEN CHLORIDE AND CHLORINE. CHLORINE GAS RATE OF DECOMPOSITION INCREASES WITH THE CONCENTRATION WITH TEMPERATURES ABOVE 85 DEGREES F.

11. TOXICITY INFORMATION

Oral = > 8000 mg/kg (Rat)_Dermal LD50 = N.E._Inhalation LC50= > 10.5 mg/l (Rat)

12. ECOLOGICAL INFORMATION

DAPHNIA MAGNA 24 HR. LC50 = > 500 MG/L_ZEBRA FISH STATIC 24 HR. LC50 = > 500 MG/L

13. DISPOSAL CONSIDERATIONS

DO NOT DISCHARGE INTO WATERWAYS OR SEWER SYSTEMS WITHOUT PRIOR APPROVAL. EMPTY DRUMS, AS DEFINED BY RCRA, MAY BE SENT TO LICENSED DRUM RECONDITIONED FOR REUSE.

DISPOSE OF WASTE MATERIALS ACCORDING TO ALL FEDERAL, STATE AND LOCAL REGULATIONS.

14. TRANSPORT INFORMATION

U.S.A. DOT Shipping Name: HYPOCHLORITE SOLUTION
Hazard Class: 8
UN/NA Number: UN1791
Packing Group: III
Subsidiary Hazard:
Marine Pollutant: NO

15. REGULATORY INFORMATION

CERCLA RQ (lbs): 100

SARA Title III Section 312:
Acute: YES
Chronic: NO
Flammable: NO
Sudden Release of Pressure: NO
Reactive: NO

HMIS HAZARD RATING

Health: 2 ***Fire:*** 0 ***Reactivity:*** 1

0 - Least **1 – Slight** **2 – Moderate** **3 - High** **4 - Extreme**

16. OTHER INFORMATION

EPA Pesticide Registration Number: 813-15

NSF Maximum Use Level for Potable Water (Standard 60): CHECK BOL FOR FACILITY DATA (37 mg/l TO 84 mg/l)

TSCA (Toxic Substance Control Act), 40 CFR 710: Sources of the raw materials used in this mixture assure that all chemical ingredients present are in compliance with Section 8(b) Chemical Substance Inventory, or are otherwise in compliance with TSCA.

DISCLAIMER

THE DATA PRESENTED IS TRUE AND CORRECT TO THE BEST OF OUR KNOWLEDGE AND BELIEF; HOWEVER, NEITHER SELLER NOR PREPARER MAKES ANY WARRANTIES, EXPRESSED OR IMPLIED, CONCERNING THE INFORMATION PRESENTED. THE USER IS CAUTIONED TO PERFOM HIS OWN HAZARD EVALUATION AND TO RELY UPON HIS OWN DETERMINATIONS.

APPENDIX D

Newfoundland Labrador

Government of Newfoundland and Labrador
Department of Fisheries and Aquaculture

2015/16
FISH PROCESSING LICENCE
FOR PRIMARY PROCESSING
Licence No 2015P86014P

Phocalux International Inc.
P.O. Box 167, St. John's, NL, A1C 1B1

Fish Processing Establishment Fleur de Lys

Is Duly Authorized to Purchase the Species of Fish Stated Herein, and No Others, and to Operate the Stated Fish Processing Establishment for the Purpose of Processing the said Species.

Seal **No Entries Below This Item**

This Licence is issued in accordance with the Fish Inspection Act, RSNL 1990 c.F-12 and the regulations made thereunder. It is subject to any other Licensing Condition and Directive and/or terms and conditions attached to same by the Minister of Fisheries and Aquaculture during the period that this licence is in force.

THIS LICENCE IS NOT VALID UNLESS SIGNED

This licence expires March 31, 2016

April 30/15
Date of Issue

Minister of Fisheries and Aquaculture

THE FOLLOWING CONDITIONS SHALL APPLY TO THIS LICENCE:

It is a condition of this licence that all species of fish duly authorized must be processed prior to being exported ("exported" in this context shall mean to ship or attempt to ship fish from the geographical confines of the Province of Newfoundland and Labrador to any other province, state or country). For this purpose the minimum processing requirements applicable for the species seal, as identified in the Schedule to the Fish Inspection Operations Regulations, are pelts must be tanned to meet specifications for final end use. The sale or proposed sale of pelts in any other form other than as identified in the Schedule, may only be carried out with the Minister's prior written approval.

It is a condition of this licence that the licence holder shall comply with all further Licensing Conditions and Directives issued by the Minister that are in force during the term of this licence.

It is a condition of this licence that the licence holder shall comply with the provincial statutes and regulations governing business operations in the Province of Newfoundland and Labrador that are in force during the term of this licence.

It is a condition of this licence that the licence holder shall comply with the reporting requirements as required by Section 15 of the Fish Inspection Operations Regulations.

Newfoundland Labrador

GOVERNMENT OF NEWFOUNDLAND AND LABRADOR
Service NL

THE CORPORATIONS ACT
FORM 2

CERTIFICATE OF INCORPORATION

(Section 15)

Corporation Name: **Phocalux International Inc.**
Corporation Number: **74364**
Date of Incorporation: **February 20, 2015**

I certify, as per the attached Articles of Incorporation, that this Corporation has been incorporated under the Corporations Act of Newfoundland and Labrador.

REGISTRAR OF COMPANIES
For Province of Newfoundland and Labrador
February 23, 2015

74364
February 20, 2015
8000 BVRV

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

THE CORPORATIONS ACT

REGISTERED

FORM 1

ARTICLES OF INCORPORATION

(Sections 12, 421, 463, 490,)

1 - Name of Corporation

Phocalux International Inc.

2 - The place in Newfoundland where the registered office is to be situated

167 Water Street, St. Johns, NL A1C 1B1

3 - The classes and maximum number of shares that the corporation is authorized to issue

Unlimited - Class A

4 - Restrictions if any on share transfers

See Schedule B attached hereto

5 - Number (or minimum and maximum number) of directors

1 - 10

6 - Restrictions if any on business the corporation may carry on

None

7 - Other provisions if any

See Schedule A attached hereto

8 - Incorporators

Names	Address (Include Postal Code)	Signature
Bernie Halloran	30 Parsonage Drive St. Johns NL A1A 0J5	

RECEIVED
FEB 20 2015

For Department use only

Corporation No. -

74364
February 20, 2015
80080BVRV

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

THE CORPORATIONS ACT

FORM 6

REGISTERED

NOTICE OF DIRECTORS

(Sections 175, 183)

1 - Name of Corporation	2 - Corporation No.
Phocalux International Inc.	74364

3 - The following persons became directors of this corporation:
Effective Date:

Name	Residential Address	Occupation
Bernie Halloran	30 Parsonage Drive St. JOhns, NL A1A 0J5	Businessman
Shannon Lewis	Box 7, Site Coachmans Cove, NL A0K 1X0	Businessman

4 - The following persons ceased to be directors of this corporation:
Effective Date: N/A

Name	Residential Address

5 - The directors of this corporation now are:

Name	Residential Address	Occupation	Citizenship
Bernie Halloran	30 Parsonage Drive, St. Johns	Businessman	Canadian
Shannon Lewis	Box 7 Coachmans Cove, NL	Businessman	Canadian

Date	Signature	Description of Office

743 64
February 20, 2015
8000BVRV

GOVERNMENT OF
NEWFOUNDLAND AND LABRADOR

THE CORPORATIONS ACT

REGISTERED

FORM 3

NOTICE OF REGISTERED OFFICE OR NOTICE OF CHANGE OF REGISTERED OFFICE

(Section 34)

1 - Name of corporation	2 - Corporation No.
Phocalux International Inc.	743 64

3 - Address of the registered office

167 Water Street, St. Johns, NL A1C 1B1

4 - Effective date of change

N/A

5 - Previous address of the registered office

N/A

Date	Signature	Description of Office
Feb. 20, 2015		President

APPENDIX E

Town Of Fleur De Lys

General Delivery
Fleur De Lys, NL
A0K 2M0
fleurdelys@xplornet.ca

Tel: 709 253 3131 Fax: 709 253 2146

February 23, 2015

PhocaLux International Inc.
Mr. Bernie Halloran, CEO
167 Water Street
St. John's, NL
A1C 1B1

RE: Support letter

To Whom it may Concern:

Council held a discussion and are pleased to say they will support Implementation of a Fully Integrated Seal Processing Facility 100% in Fleur de Lys.

Council is looking forward to meeting with the Company on February 25, 2015 @ 4:30 in The Town Hall.

Regards,

Susan Philpott
Town Clerk
Town of Fleur De Lys

The Baie Verte And Area Chamber Of Commerce
P.O. Box 578, Baie Verte, NL A0K 1B0
Phone 709-532-4204 Fax 709-532-4252
Email: bvachamber@nf.aibn.com

Monday, February-23-15

Northeast Coast Sealers Co-op
C/O Shannon Lewis
Fleur de Lys, NL
A0K 2MO

RE: Letter of Support – Implementation of Fully Integrated Seal Processing Facility in Fleur de Lys, NL

Dear Mr. Lewis;

It is my pleasure on behalf of the Baie Verte & Area Chamber of Commerce to extend our support and encouragement with your endeavours involving PhocaLux International Inc.

On behalf of our organization I recognize the operation of Northeast Coast Sealers Co-op having been an important employer as a seal processing facility to our region and its stakeholders since 1986. I for see this merge to engage and develop a fully integrated seal processing facility having a positive impact to our local economy.

In conclusion, I fully support the efforts of Northeast Coast Sealers Co-op with PhocaLux International Inc. As they engage to expand the existing infrastructure in Fleur de Lys to maximize the facilities and implement additional processing of meat, oil and skin tanning capabilities.

Sincerely,
Lloyd Hayden

President,
Baie Verte & Area Chamber of Commerce

CBDC Emerald

An ACOA Partner, Serving Rural Atlantic Canada

February 23, 2015

Northeast Coast Sealers Co-op
General Delivery
Fleur de Lys, NL A0K 2M0

Dear Mr. Lewis:

The Emerald Business Development Corporation **(CBDC Emerald)** has been in operation since 1988. The mandate of CBDC's is to assist in the creation of small businesses and in the expansion and modernization of existing businesses by providing financial and technical services to entrepreneurs in the Emerald Zone.

Our objective is to help build stronger communities in Atlantic Canada by stimulating private sector employment in our rural areas. We also partner with funding agencies, community economic development organizations and other similar groups that aid in the growth and viability of our communities.

As an agency totally devoted to business and economic growth in our region, we fully support the Northeast Coast Sealers Co-op in their efforts to develop and promote the Sealing industry.

We believe that your partnership with PhocaLux International Inc. will encourage economic growth not only in Fleur de Lys but for other areas throughout the peninsula and beyond. In addition to this, the partnership will also generate spin-off opportunities for local suppliers. As an organization, we welcome the prospects to increase the processing and manufacturing potential in our region and this proposed partnership would definitely ensure this objective!

CBDC Emerald supports and encourages stakeholders to work with Northeast Coast Sealers Co-op to help make this project a reality.

Sincerely,

Jennifer Whelan
Executive Director

P.O. Box 508, Baie Verte, NL A0K 1B0
Tel: (709) 532-4690/8312 Fax: (709) 532-4669

Canadian Sealers Association

P.O. Box 8005
St. John's, NL
A1B 3M7
Tel: (709) 722-8195
Fax: (709) 722-2061

February 23, 2015

Mr. Bernie Halloran, CEO
PhocaLux International Inc.
167 Water Street
St. John's NL A1C 1B1

Dear Mr. Halloran:
This acknowledges your recent letter outlining plans for PhocaLux International Inc. to establish a fully integrated seal processing center at Fleur de Lys in partnership with the Northeast Coast Sealers Co-operative. The proposal draws on the expertise of both companies and their long standing commitment to develop the sealing industry to its full potential.

On behalf of all sealers in our province, we are very encouraged by this new initiative and can assure you of our full support, to work with you to bring this business proposal to fruition. Despite the unfair treatment of the sealing industry over the years, by misinformed individuals, and the inherent restrictions it places on market access, recent new initiative have demonstrated that the seal industry is poised for development. The work by our association in particular, to educate, train and certify sealers has improved its image and public perception of the industry and it has been complemented by several new business ventures in the retail trade and food service industries.

Sealing has always played a major part in sustaining our rural people throughout the years and it's just as important today as ever before in our history. All our sealers fully support this proposal and business plan and we encourage others to give it every consideration.

We wish you all the best and look forward to working with you, to bring it to success.

Sincerely
Frank Pinhorn
Executive Director
Canadian Sealers Association.

DESCRIPTION OF A PROCESS THAT WILL ALLOW TO REDUCE THE CONSUMPTION OF CHEMICAL NEEDED TO TREAT SEAL SKINS AND THEIR POLLUTION CHARGE IN WASTEWATER

From Daniel Houde
engineer from l'Ordre de Ingénieurs du Québec

Laval, 16 August, 2015

From analysis performed on seal skin treatment solutions, the following table presents analytical results of the expected contaminants to be found in Phocalux wastewater.

Table 1 Analytical result of wastewater from seal skin tanning

Parameters in mg/litre	Soaking	Pickling	Washing	Tanning
BOD_5	<2	2 820	1 800	33
Solids (suspended)	3 110	1 540	250	97
Solids (dissolved)	102 000	43 100	39 600	66 300
Total oil & grease	2 340	2 220	549	94,4

To verify if a physico-chemical process applied on skin treatment waste water, can help to meet Schedule A standards, analysis of samples of the waste solutions have given the following results.

Table 2 Analytical result of wastewater from seal skins tanning, after a physico-chemical treatment

Parameters in mg/litre after a physico-chemical treatment	Soaking	Pickling	Washing	Tanning
BOD_5	1 140	1 496	498	156
Solids (suspended)	19	86	68	40
Solids (dissolved)	72 400	38 200	35 000	43 400
Total oil & grease	47	70,8	188	< 5

From these results, one can foresee that the wastewater composition will exceed Schedule A standards, for all parameters (BOD, oil & grease, suspended solids and dissolved solids). Referring to dissolved solids, it is supposed that their concentration should be considered if "body of water" as specified by Schedule A regulation, includes the sea.

A physico-chemical system can remove all suspended solids very efficiently. But it can remove only part of the BOD and oil & grease. And it has almost no effect on dissolved solids.

BOD and oil & grease dispersed in water, can easily be oxidized by a bioreactor and achieve final level in accordance with Schedule A standards. But also it has no effect on dissolved solids. Worst, its performance can be affected if salt concentration his too high.

To reduce salt concentration economically, one must reduce its consumption. Industrially, one of the best way to maximize the efficiency of mass transfer between a solid (seal skins) and a liquid (soaking, pickling, washing and tanning solutions), is to use a counter-flowing contact process. This kind of process is largely used in mining industries and in washing facilities. The following picture, obtained from a text book on mass transfer, explains the principle better than what I can do.

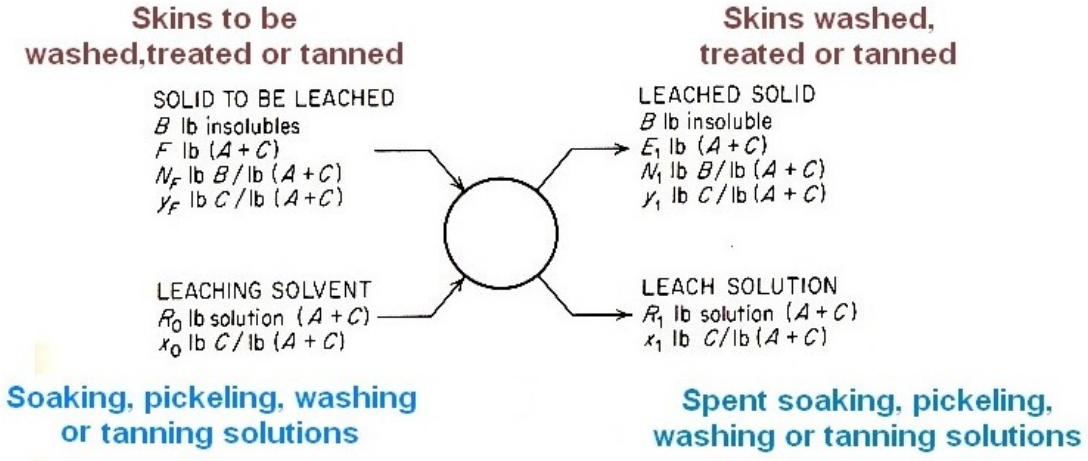
In summary, such a system can reduce considerably, the amount of reactants needed to achieve the quality of a finished product. It does so, by putting many batch processes in a sequence that improves step by step, the quality of the finish product.

Batch process

Single-stage leaching

Consider the single real leaching or washing stage of Fig. 13.25. The circle represents the entire operation, including mixing of solid and leaching solvent and mechanical separation of the resulting insoluble phases by whatever means may be used. Weights of the various streams are expressed as pounds for a batch operation or as lb/hr [or lb/(hr)(sq ft)] for continuous flow. Since for most purposes the solid B is insoluble in the solvent and a clear liquid leach solution is obtained, the B discharged in the leached solids will be taken as the same as that in the solids to be leached.
tion of N,

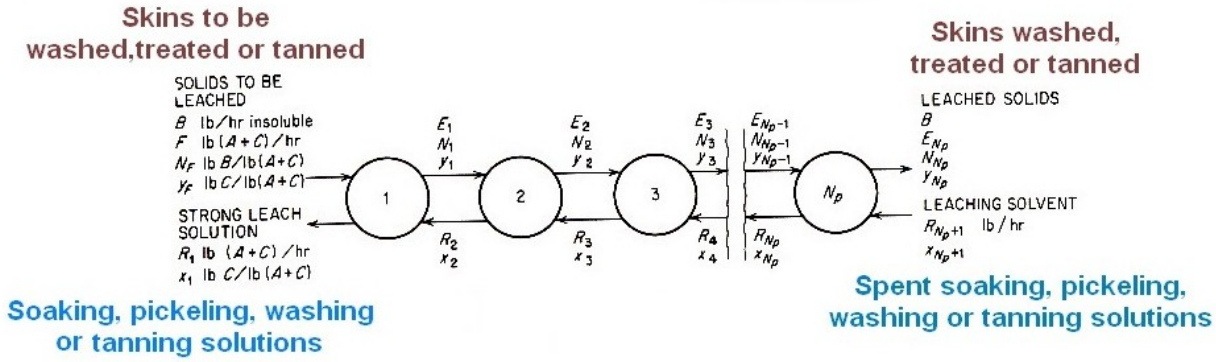
Fig. 13.25 *Single-stage leaching or washing.*



Counter-flow contacting process

Multistage countercurrent leaching

A general flow sheet for either leaching or washing is shown in Fig. 13.28. Operation must necessarily be continuous for steady-state conditions to prevail, although leaching according to the Shanks system will approach the steady state after a large number of cycles have been worked through.



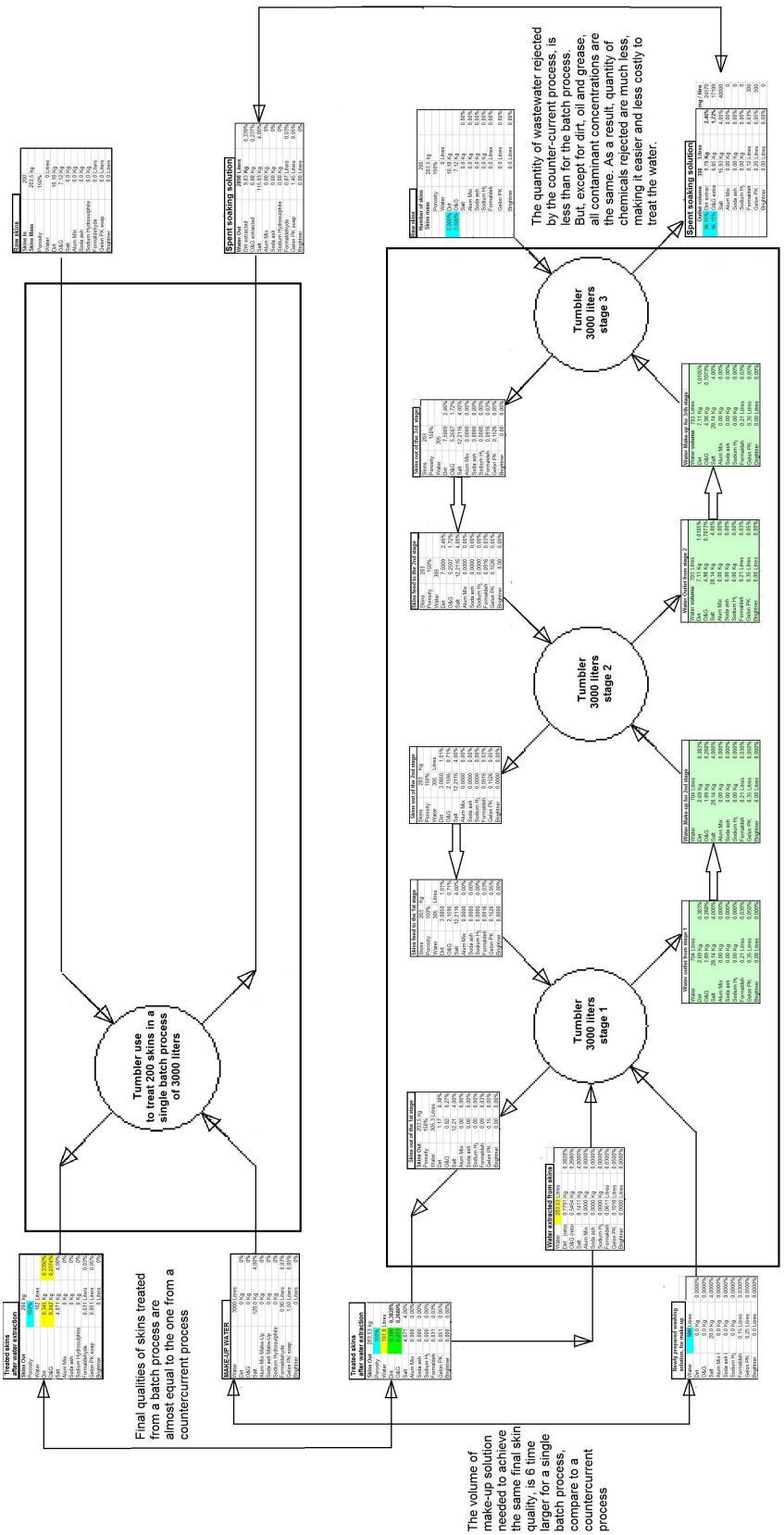
Description of a 3 stages counter-flow process for skins treatment :

The next page presents a performance comparison between a single stage batch process and a 3 stages counter-flow process, as applied to skins treatment. One can see that the quantity of water and chemicals needed, are 6 time less than the quantities a traditional batch process need to achieve the same skins quality.

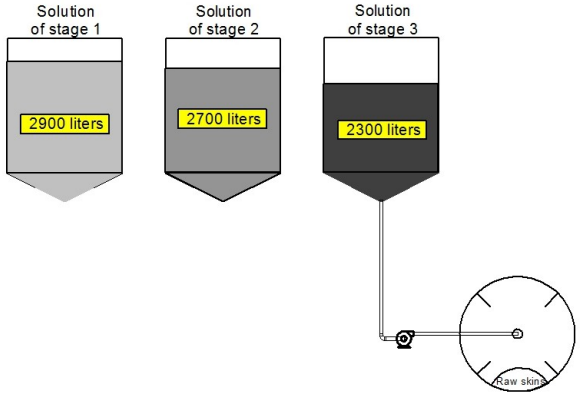
Assuming that it cost at least $ 1.20 in chemicals per skin, a reduction of their consumption by 6 time, would represent a cost saving of at least $ 1 000, for a production rate of 1000 skins per week. And that doesn't take account the saving on the operating cost of a wastewater treatment, since, there also, the quantity of chemicals required and the amount of sludge to disposed, will also be 6 time less.

Pages 5 to 9 present an operating method, that use each tumbler as a three stage counter-flow process. But, the method is complex and many valves will have to be manipulated. Human errors are likely to occur.

The use of programmable microcontrollers can reduce the probability of human error. Such a control system could assist operators, by indicating which valves or pumps to activate and/or by controlling the entire operation. Provided that all instruments and controls are there and well maintained, the process should not be more complicated to control than a modern household washing machine.


Tumbler use
to treat 200 skins in a
single batch process
of 3000 liters
Tumbler
3000 liters
stage 1
Tumbler
3000 liters
stage 2
Tumbler
3000 liters
stage 3
The quantity of wastewater rejected by the counter-current process, is less than for the batch process. But, except for dirt, oil and grease, all contaminant concentrations are the same. As a result, quantity of chemicals rejected are much less, making it easier and less costly to treat the water.
Final qualities of skins treated from a batch process are almost equal to the one from a countercurrent process
The volume of make-up solution needed to achieve the same final skin quality, is 6 time larger for a single batch process, compare to a countercurrent process

Step #01



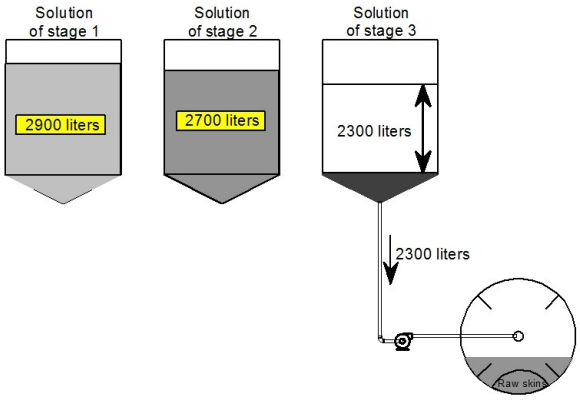
DESCRIPTION OF THE PROCEDURE FOLLOWED BY THE COUNTERFLOW PROCESS TO TREAT SEAL SKINS

For design purposes the procedure is based on the treatment of 200 seal skins, in a tumbler containing 3000 liters of solutions.

Step # 01

Raw skins are loaded in the tumbler.

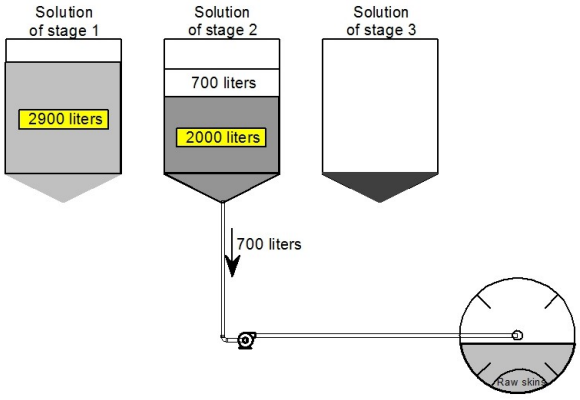
Step #02



Step # 02

The tumbler is filled with 2300 liters of the stage 3 solution.

Step #03



Step # 03

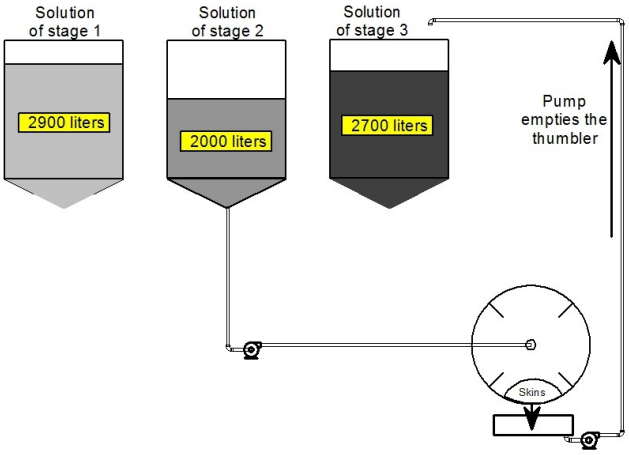
700 liters of the stage 2 solution is added to the tumbler as a make-up, to prevent uncontrolled accumulation of dirt in the solution 3 to be recycled.

The total volume of solution in the tumbler is :
700 + 2300 = 3000 liters.

Once filled, the tumbler is put at work for 2 to 4 hours.

DESCRIPTION OF THE PROCEDURE FOLLOWED BY THE COUNTERFLOW PROCESS TO TREAT SEAL SKINS

Step #04

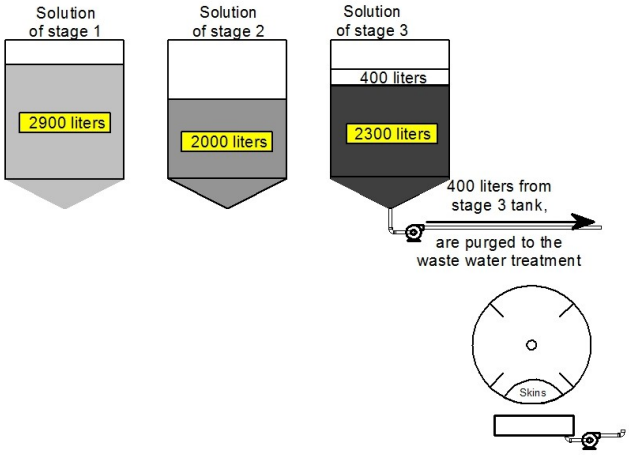


Step # 04

After 2 to 4 hours of tumbling,
the content of the tumbler is pumped back
to the tank for the stage 3 solution.

Of the 3000 liters, approximately 300 liters
are retained by soaked skins and
2700 liters are returned to stage 3 tank.

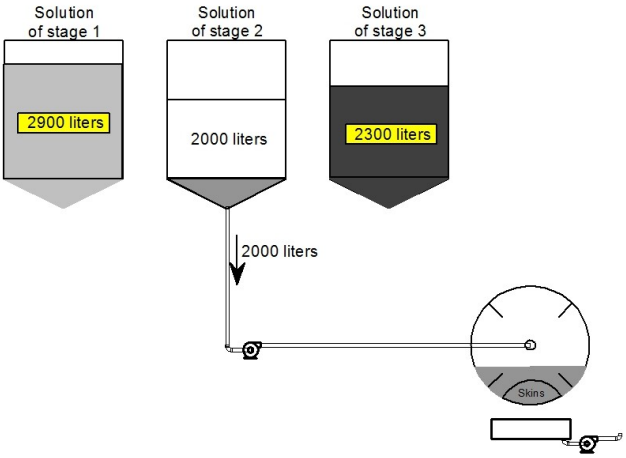
Step #05



Step # 05

400 liters of the stage 3 solution are purged to
the physico-chemical wastewater treatment plan,
leaving 2300 liters of recycled stage 3 solution.

Step #06

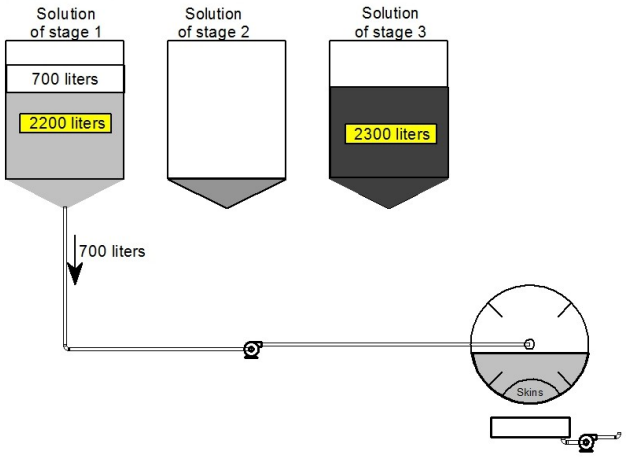


Step # 06

The tumbler is filled with 2000 liters
of the stage 2 solution.

DESCRIPTION OF THE PROCEDURE FOLLOWED BY THE COUNTERFLOW PROCESS TO TREAT SEAL SKINS

Step #07



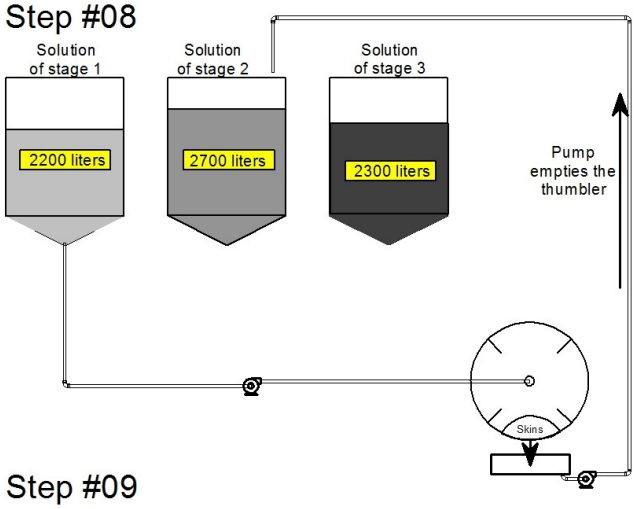
Step # 07

700 liters of the stage 1 solution is added to the tumbleras a make-up. Like for step #3, it as to prevent uncontrolled accumulation of dirt in the solution 2 to be recycled.

The total volume of solution in the tumbler is : 300 liters from soaked skins + 700 + 2300 = 3000 liters.

Once filled, the tumbler is put at work for 2 to 4 hours.

Step #08

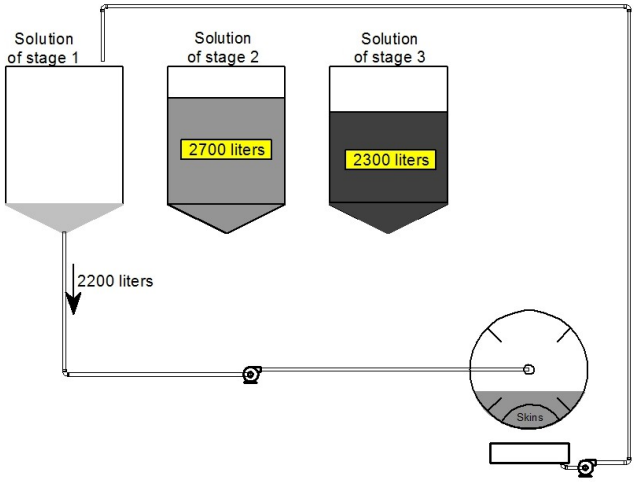


Step # 08

After 2 to 4 hours of tumbling, the content of the tumbler is pumped back to the tank for the stage 2 solution.

Of the 3000 liters, approximately 300 liters are retained by soaked skins and 2700 liters are returned to stage 2 tank.

Step #09

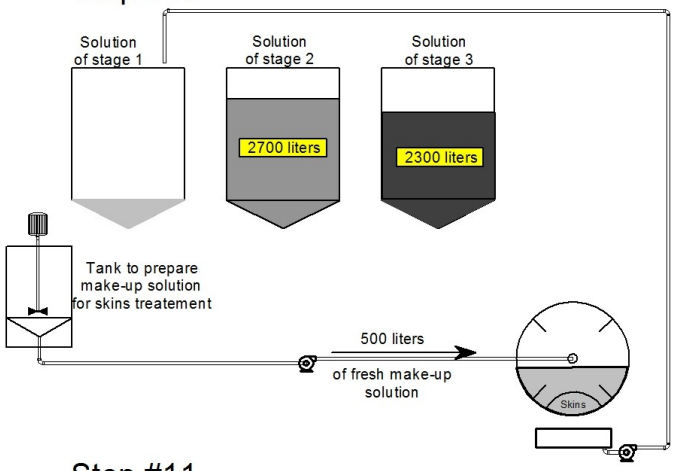


Step # 09

The tumbler is filled with 2200 liters of the stage 1 solution.

DESCRIPTION OF THE PROCEDURE FOLLOWED BY THE COUNTERFLOW PROCESS TO TREAT SEAL SKINS

Step #10



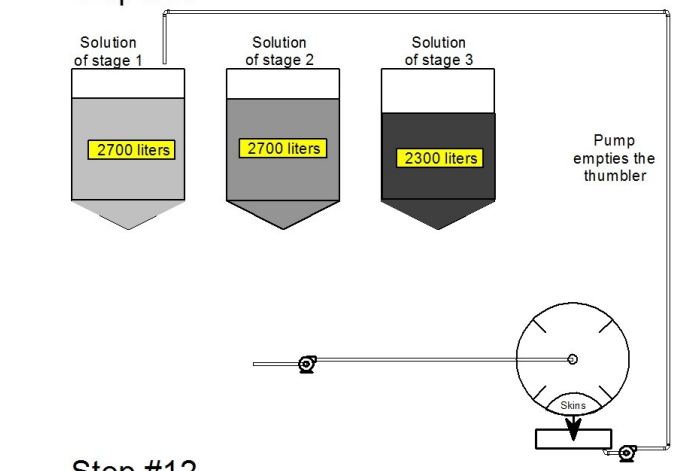
Step # 10

500 liters of a newly prepared chemicals solution is fed to the tumbler. Like for steps #2 and #3, it as to prevent uncontrolled accumulation of dirt in the solution 1 to be recycled.

The total volume of solution in the tumbler is :
300 from soaked skins + 500 + 2200 = 3000 liters.

Once filled, the tumbler is put at work for 4 to 8 hours.

Step #11

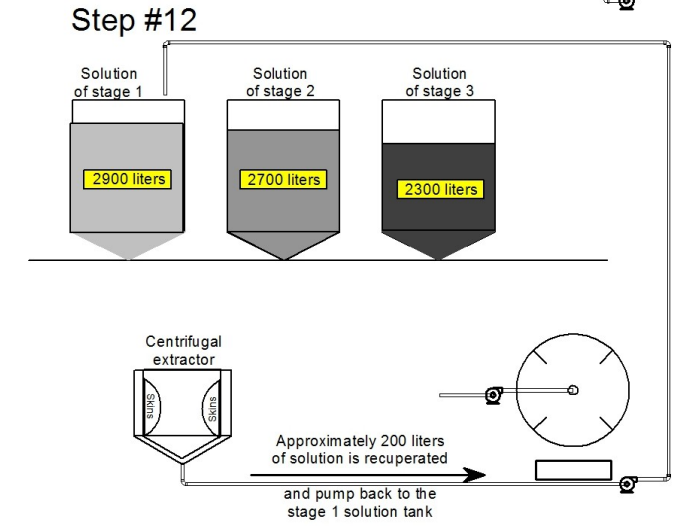


Step # 11

After 2 to 4 hours of tumbling, the content of the tumbler is pumped back to the tank for the stage 2 solution.

Of the 3000 liters, approximately 300 liters are retained by soaked skins and 2700 liters are returned to stage 2 tank.

Step #12



Step # 12

Soaked wet skins are remove from the tumbler and put in a centrifugal extractor. Approximatly 200 liters of water extracted will be pumped to the stage 1 solution tank,

Once this step completed, the system is ready to begin a new cycle of treatment of raw skins

DESING OF THE WASTEWATER TREATMENT SYSTEM

Both a physico-chemical system and a bio-digester will have to be installed to remove pollutants from wastewater.

Use of the physico-chemical system:

The principal function of the physico-chemical system will be to neutralise the water pH. Three (3) of the five (5) skins treatment steps (pickling, washing and tanning), are strongly acidic and contain a large amount of aluminum salt. If one sends these solutions directly in a bio-digester, they may affects microbial activity and even kill the biomass. Therefore, it is important to neutralise the pH of the water sent to the bio-digester.

But because of the high content of aluminum salt, and its low solubility at pH above 6.5, it is expected that the wastewater neutralisation will produce large quantity of sludge; large enough to prevent any settling of particle in the treated water. In any case, all treated water, including the filtrate, will have to be sent to the bio-digester.

This water treatment reactor can be used for the physico-chemical treatment.

Use of an aerobic biological digester:

The principal function of the biological digester will be to digest organic compounds like proteins extracted from skins, oil & grease, formaldehyde, detergent and the brightener.

For design purpose, the volume of wastewater that will be sent to the bio-digester is estimated at 7500 litres / day with a total BOD concentration estimated at 3500 mg/L.

The quantity of air to be injected by aerators is estimated to 80 SCFM (2.3 M^3) at a pressure of 7.5 psig, (0.5 bar). The required total power of aerators is estimated to be at 5 HP.

In operation, a bio-digester behaves as a living organism. Good environmental condition is a must, to maintain its efficiency. Some chemicals composing skins treatment wastewater, can be a nuisance to microbial activities. Namely, formaldehyde which is a powerful antiseptic and salt at high concentration that can provoke an osmotic choc, which can put micro-organism in dormancy. There is also the detergent Gelon PK, that may provoke a lot of foaming.

Expected performance of the counter-flow process on wastewater quality before treatment:

From simulation based on a production of 100 skins, we obtain the following table:

3 STAGES COUNTER-FLOW PROCESS

		Soaking	Pickling	Washing	Rincing	Tanning	Average composition mg/litre
Water consummed	Litres	1991	2500	1482	16018	2500,00	24 491
Dirt (protein and all)	Kg	49	8	0,21	0,04	0	2 326
Oil & Grease	Kg	34	11	0,30	0,06	0	1 869
Sodium salt	Kg	80	100	69	72	100	17 171
Alum Mix	Kg	0	23	4,51	0,85	101	5 276
Soda ash	Kg	0	0	2,11	2,80	0,09	204
Sodium Hydrosulphite	Kg	0	0	1,06	1,40	0,04	102
Formaldehyde	Litres	0,60	0	0	0	0	31
Gelon PK soap	Litres	1,00	0,66	2,73	3,51	0,11	327
Brightener	Litres	0	0	0	0	1,03	42
					Total salt concentration		22 753

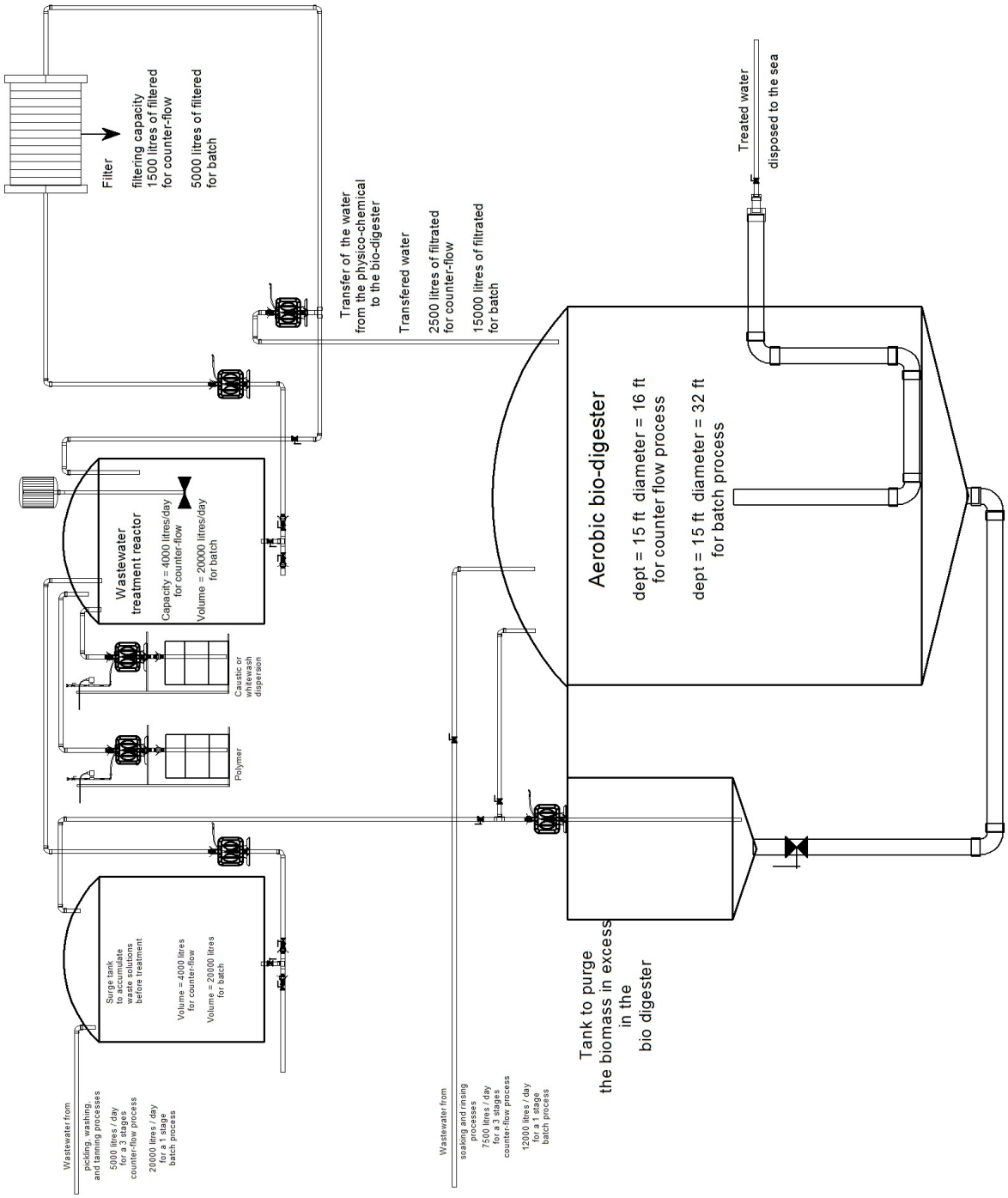
1 STAGE BATCH PROCESS

		Soaking	Pickling	Washing	Rincing	Tanning	Average composition mg/litre
Water consummed	Litres	15000	15000	15000	15000	15000	75 000
Dirt (protein and all)	Kg	50,9	8,1	0,2	0	0	789
Oil & Grease	Kg	35,6	11,5	0	0	0	634
Sodium salt	Kg	600	620	758	0	620	34 648
Alum Mix	Kg	0	141	5,39	0	621	10 228
Soda ash	Kg	0	0	30	0	0,09	401
Sodium Hydrosulphite	Kg	0	0	15	0	0,05	201
Formaldehyde	Litres	4,50	1,04	0	0	0	74
Gelon PK soap	Litres	7,50	4,24	37,6	0	0,12	660
Brightener	Litres	0	0	0	0	7,5	100
					Total salt concentration		45 477

From these two tables, it can be seen that the treatment of seal skins by a 3 stages counter-flow process, can reduce by 50%, the concentration of salt in wastewater, when it's compared to a batch process. It reduces the salt concentration below salt concentration in the sea, therefore allowing to meet Schedule A standards.

Estimated chemical and wastewater treatment cost for a 3 stages conter-flow process							
1000 seal skins	**Price**	**Soaking**	**Pickling**	**Washing**	**Rincing**	**Tanning**	**Cost**
Sodium salt	$0,35	107	107	131		107	$120,56
Alum Mix	$1,00		29			107	$28,89
Soda ash	$0,50			5,33			$2,67
Sodium Hydrosulphite	$2,00			2,67			$5,33
Formaldehyde	$2,00	0,80					$1,60
Gelon PK soap	$5,00	1,33	0,56	6,67			$42,78
Brightener	$5,00					1,33	$0,00
Sludge disposal	$90,00	2,12	M3				$190,65
						Total	**$392,48**

Estimated chemical and wastewater treatment cost for a 1 stage batch process							
1000 seal skins	**Price**	**Soaking**	**Pickling**	**Washing**	**Rincing**	**Tanning**	**Cost**
Sodium salt	$0,35	640	640	787		640	$723,33
Alum Mix	$1,00		173			640	$173,33
Soda ash	$0,50			32,0			$16,00
Sodium Hydrosulphite	$2,00			16,0			$32,00
Formaldehyde	$2,00	4,8					$9,60
Gelon PK soap	$5,00	8,0	3,33	40,0			$256,67
Brightener	$5,00					8,0	$0,00
Sludge disposal	$90,00	15,0	M3				$1 350,00
						Total	**$2 560,93**


Filter
filtering capacity
1500 litres of filtered
for counter-flow
5000 litres of filtered
for batch
Transfer of the water
from the physico-chemical
to the bio-digester
Transfered water
2500 litres of filtrated
for counter-flow
15000 litres of filtrated
for batch
Treated water
disposed to the sea
Wastewater
treatment reactor
Capacity = 4000 litres/day
for counter-flow
Volume = 20000 litres/day
for batch
Caustic or
whitewash
dispersion
Polymer
Surge tank
to accumulate
waste solutions
before treatment
Volume = 4000 litres
for counter-flow
Volume = 20000 litres
for batch
Aerobic bio-digester
dept = 15 ft diameter = 16 ft
for counter flow process
dept = 15 ft diameter = 32 ft
for batch process
Tank to purge
the biomass in excess
in the
bio digester
Wastewater from
pickling, washing,
and tanning processes
5000 litres / day
for a 3 stages
counter-flow process
20000 litres / day
for a 1 stage
batch process
Wastewater from
soaking and rinsing
processes
7500 litres / day
for a 3 stages
counter-flow process
12000 litres / day
for a 1 stage
batch process

September 10, 2015

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Attention: Mr. Bernie Halloran, Chief Executive Officer
Mr. Shannon Lewis, Executive Director
Mr. Brad Rideout, Partner

Wastewater Treatment Review for Seal Hide Tannery Operation
Engineering Services – Feasibility Review of Tannery Wastewater Treatment

Introduction

PhocaLux International Inc. (PhocaLux) retained Dillon Consulting Limited (Dillon) to aid in obtaining environmental approval from the Newfoundland and Labrador Department of Environment and Conservation (DOEC) for their Seal Hide Tannery processing Operation in Fleur de Lys, NL. Included in Dillon's scope of work was to complete the following tasks:

- Task 1 – Meeting with DOEC
- Task 2 – Review available information on treatment performance
- Task 3 – Review available treatment technologies
- Task 4 – Prepare a letter-style report

This letter represents the completion of Task 4 of this scope.

Task 1 - Meeting with DOEC, August 19, 2015

On August 19, 2015 Dillon and PhocaLux met with the DOEC to discuss the PhocaLux process in Fleur de Lys, NL and the requirements for environmental approval. This meeting confirmed that the operation must meet requirements of Schedule A of the Environmental Control Water and Sewage Regulations, 2003 (Attachment 1) for approval. DOEC clarified that the total dissolved solids (TDS) as stated in Schedule A must not exceed an additional 1000 mg/L above that of the source water and the biochemical oxygen demand (BOD) must not exceed 20 mg/L. The existing GC Rieber Carino Ltd. (Carino) Seal Hide Tannery Operation located in South Dildo, NL was also discussed and DOEC stated that Carino does have an environmental permit; however they are out of compliance in relation to Schedule A. Therefore Carino has an Environmental Compliance Agreement. Preliminary review of this agreement suggests that additional treatment to meet criteria is not planned; it appears the focus is on Environmental Effects Monitoring.

Task 2 - Review of Available Information on Treatment Performance

Given that PhocaLux is not yet an operating facility, it does not have access to wastewater quality information for its operation at this time. PhocaLux has stated that it has purchased equipment including a waste treatment system from a former Seal Hide Tannery Operation, Phoca G, located in Carbonear, NL. For these reasons, PhocaLux plans on utilizing a tanning process very similar to the former Phoca G operation. Unfortunately, Dillon and PhocaLux were unsuccessful in obtaining the wastewater information for the former Phoca G operation for this report.

PhocaLux did however provide Dillon a report prepared by Mr. Daniel Houde dated August 18, 2015 (Attachment 2). Dillon was informed that the source of results presented in this report is from an actual Seal Tannery in the Montreal area with a physical-chemical pretreatment using similar hide processing operation as that proposed by PhocaLux. In addition to this source of information, Dillon reviewed the processing plant effluent from DOEC's annual report on Carino's effluent discharges for 2013 (Attachment 3). Dillon does understand that the wastewater generated by the future PhocaLux operation may differ from the reference data presently available.

The following reference contaminant concentrations (Table 1) were considered in raw wastewater and pre-treated flows using physical-chemical pretreatment as per Mr. Houde's report.

Table 1 - Effluent Quality Estimate Following Physical-Chemical Pretreatment

Parameter	Raw combined wastewater	After physical-chemical pretreatment	Schedule A Effluent Quality Target
BOD (mg/L)	1,160	820 to 3,000	20
TSS (mg/L)	1250	50	30
TDS (mg/L)	62,000	47,000	1,000
Total Oil & Grease	1,300	80	15
Formaldehyde (mg/L)		74	not listed

The above information is based on average values shown in Tables 1 and 2 of Mr. Houde's report, and assumes equal volumes of water used for all four stages of tanning. The estimated wastewater generation rate is between 7.5 and 10 m^3/day based on the hide processing recipe provided by PhocaLux. A wastewater production of 10 m^3/day has been assumed at this time. Actual production volumes must be confirmed.

This report by Mr. Houde highlights that effluent quality will not meet Schedule A and that the biological polishing step included in the existing treatment system purchased by PhocaLux may be vulnerable to high salinity and the presence of formaldehyde. These two factors could render the biological treatment ineffective.

Based on published data for 2013, Carino reportedly discharged elevated chromium (III) indicating a process that is based on chromium salt skin stabilization. The Carino results did not report formaldehyde concentration and formaldehyde is not listed on Schedule A. The reported effluent quality had elevated concentrations of the following parameters: TDS between 1,710 and 12,000 mg/L; BOD between 190 and 3,200 mg/L; TSS between 5 and 230 mg/L; ammonium between 1 and 66 mg/L; and phenol between 0.1 and 17 mg/L. Data shows that this operation did not meet effluent quality requirements for TDS and BOD, in addition to a number of other parameters listed in Schedule A.

To evaluate polishing treatment options Dillon used the effluent quality provided by Mr. Houde as this set of information seems to correspond with the proposed hide processing operation and represents the worst case scenario for TDS.

Task 3 - Review Available Treatment Technologies (Wastewater Management Alternatives)

Dillon has reviewed appropriate technologies for the removal of BOD and TDS, as identified in Schedule A as well as the removal of total suspended solids (TSS) which may contain a portion of BOD and additional contaminants. The results are as follows:

TDS Removal

Total Dissolved Solids (TDS) may be removed by ion exchange, evaporation, or reversed osmosis. Among these options, only evaporation or evaporation and drying of evaporated brine are practical applications for tannery wastewater. Ion exchange filtration would only function on a waste stream with very little contaminants other than salt. Reverse osmosis filtration processes is likely not suitable for this application due to low waste flow rates and elevated contaminant concentrations in the wastewater feed. Additionally, capital, operating, and utility consumption requirements for the reverse osmosis process are significant, limiting economic feasibility for this application.

BOD Removal

Soluble organic matter expressed as Biochemical Oxygen Demand (BOD) could be removed through biological treatment or through catalytic oxidation.

The most cost effective process for BOD removal is biological treatment. However, for the proposed effluent generated following physical-chemical pretreatment, high salinity and the potential presence of additional waste constituents such as formaldehyde would render the biological system unstable and ineffective.

Catalytic oxidation is efficient in small batches and on a waste stream that has low turbidity. It is suspected that the effluent from physical-chemical pretreatment and following filtration will continue to have elevated turbidity/colour; consequently, the efficiency of such a system would be limited. Operating cost of catalytic oxidation process is significant. Additionally, this process will not remove salinity contributing to TDS.

Particulate Solids Removal

Removal of Total Suspended Solids (TSS) with more limited BOD reduction (consisting of the removal of the particulate fraction of BOD only) may be achieved by a supplementary solids separation and filtration process. It is envisioned that this process would follow the existing physical-chemical process purchased by PhocaLux. Solids removal may be achieved through two stages: Dissolved Air Floatation (DAF) and fine-pore bag filtration. The DAF process functions by adding a polymer to the wastewater to bind residual solids into larger floc particles. Air is injected into the liquid causing particles to float to the top of the DAF vessel, where they are then removed as a waste sludge. The DAF process is a widely used technique to reduce the concentration of suspended solids, including particulate BOD and metals, from wastewater. Bag filtration provides a secondary barrier to further remove fine solids particles.

Table 2 below summarizes wastewater management options which were reviewed by Dillon for PhocaLux. It is worth noting that these options all assume the use of the physical-chemical Pretreatment batch system which was purchased from the former Phoca G operation. The costs associated with the operation, maintenance and captured waste removal in the physical chemical pretreatment system were not included in this review.

Table 2 - Wastewater Management Alternatives

1. Physical-Chemical Pretreatment with Effluent Filtration Only - Ocean Discharge	
Description	• Effluent expected to meet or exceed other existing provincial sealing processing operations. • Will require working with Department of Environment and Conservation to obtain EA approval, and approval is not certain. • The treatment system will consist of physical-chemical pretreatment such as that purchased for this operation, followed by Dissolved Air Flotation (DAF) and polishing bag filters. • DAF filtration operates by introducing a chemical flocculant to the wastewater stream and separating solids by floating particles to the surface of the liquid using air. It is a widely used technique to reduce the concentration of suspended solids, including particulate BOD and metals, from wastewater. • DAF and bag filters are proposed to remove contaminant carry over as a result of suspended solids washout from physical-chemical pretreatment. • Sludge collected by DAF would be returned to the tanks that collect sludge from the physical-chemical pretreatment stages. Solids collected in the bag filter stage would be disposed of along with the disposable filter bags. Waste sludge from the physical-chemical and DAF processes will be dewatered by a frame and plate filter press. • An environmental impact assessment is expected to be required as a condition for implementation. The impact of chemical wastes (including heavy metals), discharged to the treatment system from the tanning process should be considered as part of this assessment exercise. • The effluent filtration process appears to be the only economically feasible alternative. • Discharge of treated effluent to ocean is assumed to occur through existing raw water intake pipe with no new outfall pipe construction or lengthening required.
Capital Cost (new processes only)	• $300,000 • Cost estimate includes: o Purchase cost for new DAF and filter system; o Installation markup; o Electrical and mechanical building modifications; o Indirect project costs including contractor mobilization, insurance, trial operation, and 20% estimating cost contingency; and

	○ Engineering costs (i.e., Environmental Impact Assessment) are excluded at this time.
Annual Operating Cost	• $60,000 • Cost estimate includes: ○ Electrical costs at $0.105/kWh for operation of physical-chemical pretreatment, DAF and filter systems; ○ Chemical consumption for DAF and pretreatment equipment; ○ Equipment maintenance allowance (1% of installed value); ○ Annualized upkeep replacement cost (assuming 15-year design life); ○ Operator cost, assuming 2hr/day part time operation at $50/hr; and ○ Environmental Monitoring is not included in these costs.
2. Physical-Chemical Pretreatment Followed by Evaporation	
Description	• Zero discharge, as condensate from evaporation could be reused in production process. • Evaporation would require less treatment steps ahead of evaporation process as there is no need for high quality pre-filtration. • Large quantity of brine reject, between 15 to 30% of treated flow (approximately 1.5 to 3 m3/day of brine solution) will be generated that would require specialized disposal. Investigation of whether if a waste stream with a TDS as high as 300,000 mg/L can be disposed in Newfoundland is still unknown. ○ Brine solution will contain: ▪ Total Dissolved Solids, mostly sodium chloride at 300,000 mg/L ▪ BOD: 5,200 mg/L ▪ TSS: 340 mg/L ▪ Oil/Grease: 490 mg/L ▪ Formaldehyde: 470 mg/L • In addition to brine waste, the physical-chemical pretreatment system will also produce waste sludge dewatered by the frame and plate filter press. • The feasibility of using raw wastewater as feed to evaporation without physical-chemical pretreatment should be evaluated once the system is implemented as a full scale trial process. This process configuration may reduce the complexity and the operating cost of treatment. • Evaporation will require significant amount of energy. The source of energy could be electricity, "Bunker C" fuel oil, or propane gas.

	• Project may be eligible for government funding as a research/demonstration project.
Capital Cost (new processes only)	• $650,000 • Cost estimate includes: o Purchase cost for new evaporator; o Equipment accessories including feed tanks, pumps and controls; o Boiler for evaporator processes; o Installation markup; o Electrical and mechanical building modifications; o Indirect project costs including contractor mobilization, insurance, trial operation, and 20% estimating cost contingency; and o Engineering costs are excluded at this time.
Annual Operating Cost	• $250,000 • Cost estimate includes: o Utility demand for evaporator process, currently utility costs are estimated based on electrical heating; o Chemical demand for pretreatment; o Waste transport and disposal assuming one 16-hour round trip pickup will be required to collect each 30m3 of produced waste. Trucking costs of $154/hr and waste disposal costs of $1000/m3 are assumed. We assume total disposal costs will be $210,000 with an annual trucking cost of $21,000; o Equipment maintenance allowance (1% of installed value); o Annualized upkeep replacement cost (assuming 15-year design life); and o Operator cost, assuming 2 hr/day part time operation at $50/hr.
3. Physical-Chemical Pretreatment, Evaporation and Drying of Brine Solution to Crystallized Solid Waste	
Description	• Zero discharge, as condensate from evaporation and drying could be reused in production process. • Evaporation and drying processes would require less treatment steps ahead of evaporation process as there is no need for high quality pre-filtration. • Estimated volume reduction as a result of evaporation is approximately 70-85%. Drying is expected to remove approximately 90% of water content from the remaining evaporated brine and approximately 0.2 m3/day of solid waste would be generated

	○ Estimated composition of solids waste: ▪ BOD (incl. in Total Solids): 16 g/kg ▪ Total Solids: 930 g/kg ▪ Oils/Grease (incl. in Total Solids): 1.5 g/kg ▪ Water content: 70 g/kg • Evaporation and drying will require significant amount of energy, approximately 900 MJ/day, primarily in the form of steam required to feed the evaporator and dryer processes. • Project may be eligible for government funding as a research/ demonstration project.
Capital Cost (new processes only)	• $1,500,000 • Cost estimate includes: ○ Purchase cost for new evaporator and dryer; ○ Equipment accessories including feed tanks, pumps and controls; ○ Boiler for evaporator and dryer processes; ○ Installation markup; ○ Electrical and mechanical building modifications; ○ Indirect project costs including contractor mobilization, insurance, trial operation, and 20% estimating cost contingency; and ○ Engineering costs are excluded at this time.
Annual Operating Cost	• $160,000 • Cost estimate includes: ○ Utility demand for evaporator and dryer processes, currently utility costs are estimated based on electrical heating; ○ Chemical demand for pretreatment; ○ Waste transport and disposal assuming one 16-hour round trip pickup will be required to collect each 30 m3 of produced waste. Trucking costs of $154/hr and waste disposal costs of $600/m3 are assumed. We assume total disposal costs will be $16,800 with an annual trucking cost of $2,800; ○ Equipment maintenance allowance (1% of installed value); and ○ Annualized upkeep replacement cost (assuming 15-year design life); • Operator cost, assuming 2 hr/day part time operation at $50/hr.
4. Physical-Chemical Pretreatment and Exfiltration From an Off-site Lagoon	
Description	• Same level of treatment as Option #1. • Treated waste would be transported to an in-land lagoon for further polishing and exfiltration.

	• Water would exfiltrate from lagoon base or tile bed. • A hydrogeological impact assessment will be required to evaluate impact of brine exfiltration on groundwater quality and on the environment. • May be difficult to obtain approval for this solution. • Bedrock formation may not allow for dissipation of liquid. • Capital cost could be significant because of the lagoon and tile field has to be constructed in bedrock and land acquisition. • This alternative will be challenging to implement successfully at the Fleur de Lys site. It has been removed from consideration and has not been evaluated further.

Anticipated Project Roll Out

Based on the cost assessment presented above, only Alternative 1, physical-chemical pretreatment with effluent filtration is considered for implementation as an economically feasible solution. It is expected that this alternative will provide a high level of treated wastewater quality, comparable or better than similar operations by competitor tannery operations.

Presently, the actual quality of treated effluent expected to be generated by the system is unknown. Factors influencing wastewater quality include:

- Chemical use requirements of the tanning process and raw waste discharge quality, particularly the concentrations of heavy metals.
- Sizing, performance, and pretreatment chemistry within the upstream physical-chemical treatment system purchased by PhocaLux

As a first step, further information on the actual performance of the pretreatment system may be developed through a batch testing exercise including operation of the tanning process using the proposed processing method and the physical-chemical waste pretreatment system.

Following the batch testing process, pretreated wastewater loading to the effluent filtration process will be better known, and will allow for a more accurate system sizing and estimation of effluent quality. This information may form part of the environmental impact assessment completed to satisfy local environmental regulators.

We understand that the preferred method of implementation may involve obtaining a provisional approval to operate from regulators based on existing information with the requirement to complete the batch trial run and environmental assessment as a follow-up item.

Expansion and enhancement of the treatment process to include the zero-discharge processes described in Table 2 (evaporation, or evaporation and brine drying) may be considered as a future item.

Disclaimer

Dillon Consulting Limited (Dillon) has used the degree of care and skill ordinarily exercised under similar circumstances at the time the work was performed by reputable members of the engineering consulting profession practicing in Canada.

This report was prepared by Dillon for the sole benefit of Phocalux. The material in the report reflects Dillon's best judgment in light of the information available to Dillon at the time of preparation. Any use which a third party (i.e., a party other than Phocalux) makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Dillon accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

Closing

We trust this report meets you current requirements. If you have any questions or comments, please contact the undersigned.

Yours sincerely,

DILLON CONSULTING LIMITED

Chris Boone, P.Eng.
Project Manager, Associate

CWB:rbc
Our file: 15-2553

Attachments
1. Newfoundland and Labrador Regulation 65/03 "Schedule A"
2. Report by Mr. Daniel Houde dated August 18, 2015
3. GC Rieber Carino Company 2013 Effluent Discharge Criteria Summary

Attachment 1

Newfoundland and Labrador Regulation 65/03, “Schedule A”

NEWFOUNDLAND AND LABRADOR
REGULATION 65/03

Environmental Control Water and Sewage Regulations, 2003
under the
Water Resources Act
(O.C. 2003-231)

Amended by:

23/09

NEWFOUNDLAND AND LABRADOR
REGULATION 65/03

Environmental Control Water and Sewage Regulations, 2003
under the
Water Resources Act
(O.C. 2003-231)

(Filed May 23, 2003)

Under the authority of section 64 of the *Water Resources Act* , the Lieutenant-Governor in Council makes the following regulations.

Dated at St. John's , May 21, 2003 .

Deborah E. Fry
Clerk of the Executive Council

REGULATIONS

Analysis

Short title

1. These regulations may be cited as the *Environmental Control Water and Sewage Regulations, 2003* .

65/03 s1

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Definitions

2. In these regulations

(a) "Act" means the *Water Resources Act* ;

(b) "composite sample" means a quantity of undiluted effluent collected continually at an equal rate or at a rate proportionate to flow over a designated sampling period;

(c) "grab sample" means a quantity of undiluted effluent collected at any given time; and

(d) "industry" means

(i) the Metal Mining Industry,

(ii) the Pulp and Paper Industry, and

(iii) the Petroleum Refining Industry.

65/03 s2; 23/09 s1

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Sewage discharge compliance

3. A person discharging sewage and other materials into a body of water, public sewer or sewer

leading to a public sewer shall comply with the standards, conditions and provisions prescribed in these regulations for the constituents, contents or description of the sewage or other discharged materials.

65/03 s3

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Discharge of materials

4. (1) A person shall not discharge sewage or other effluent into a public sewer or a sewer leading to a public sewer containing materials which would obstruct or impede the flow of sewage within the public sewer or impair or interfere with the public sewer or sewage works of that public sewer.

(2) The materials referred to in subsection (1) include oil or by-products of oil, flammable, explosive, toxic, poisonous or corrosive liquids, solids or gases, fats, congealing materials and other substances in quantity which interfere with the free flow within the public sewer.

65/03 s4

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Specified discharge prohibition

5. A person shall not discharge into a public sewer or sewer leading to a public sewer, sewage or effluent

(a) containing a constituent specified in Column 1 of Schedule B having a content in milligrams per litre, parts per million, in excess of the maximum specified in Column 2 of that Schedule;

(b) having a temperature in excess of 65° Celsius; or

(c) having a pH value less than 5.5 or greater than 9.0.

65/03 s5

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Specified discharge prohibition

6. A person shall not discharge into a body of water sewage or effluent

(a) containing a constituent specified in Column 1 of Schedule A having a content in milligrams per litre in excess of the maximum specified in Column 2 of that Schedule;

(b) having a temperature in excess of 32° Celsius;

(c) having a pH value less than 5.5 or greater than 9.0; or

(d) a radio-active substance having a gross beta activity before discharge of more than 37 Bq per litre with the exception of

(i) radium 226 which shall not exceed 0.37 Bq per litre, and

(ii) strontium 90 which shall not exceed 0.37 Bq per litre.

65/03 s6; 23/09 s2

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Discharge not construed by regulations

7. Nothing in these regulations shall be construed to permit the discharge of a pollutant into a body of water.

65/03 s7

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Analysis procedures

8. Notwithstanding sections 5, 6, 7 and 10.1, all analytical work in relation to effluent samples and receiving water samples is to be carried out using analytical procedures acceptable to the Assistant Deputy Minister of Environment of the Department of Environment of the Government of Newfoundland and Labrador .

65/03 s8; 23/09 s3

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Sampling

9. (1) A person taking effluent samples or receiving water samples shall take them as composite samples or as grab samples.

(2) In the case of composite sampling, all levels are required to be within the appropriate values as established in sections 5, 6 and 10.1 and Schedules A to E as appropriate.

(3) In the case of grab sampling, 90% of all levels taken in one month shall be within the appropriate values as established in sections 5, 6 and 10.1 and Schedules A to E as appropriate.

65/03 s9; 23/09 s4

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Monitoring

10. The minister may, for specific purposes and time periods as he or she may determine, require that a water user or discharger of sewage monitor its effluent for the constituents in sections 5 and 6 and Schedules A to E as appropriate and report the effluent quality.

23/09 s5

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Discharge standard varied by industry

10.1 (1) Notwithstanding paragraphs 5(a) and 6(a),

(a) a person primarily in the Metal Mining Industry shall not discharge sewage or effluent which does not comply with standards prescribed in Schedule C;

(b) a person primarily in the Pulp and Paper Industry shall not discharge sewage or effluent which does not comply with standards prescribed in Schedule D; and

(c) a person primarily in the Petroleum Refining Industry shall not discharge sewage or effluent which does not comply with standards prescribed in Schedule E.

(2) For the purpose of subsection (1), whether a person falls primarily within a particular industry shall be determined by the minister.

23/09 s6

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Repeal

11. The *Environmental Control Water and Sewage Regulations* , Consolidated Newfoundland and Labrador Regulation 1078/96, are repealed.

65/03 s11

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Schedule A

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Column 1 *Constituents*	*Column 2* *Maximum Content* *(in milligrams per litre unless noted)*
B.O.D.	20
Coliform - faecal	1000/100 ml
Coliform - total	5000/100 ml
Solids (dissolved)	1000 (see note)
Solids (suspended)	30 (see note)
Oils (Ether extract)	15
Floating debris, oils and grease	None to be visible
Arsenic	0.5
Barium	5.0
Boron	5.0
Cadmium	0.05
Chlorine	1.0
Chromium (hexavalent)	0.05
Chromium (trivalent)	1.0
Copper	0.3
Cyanide	0.025
Iron (total)	10
Lead	0.2
Mercury	.005
Nickel	0.5
Nitrates	10
Nitrogen (ammoniacal)	2.0
Phenol	0.1
Phosphates (total as $P_2 O_5$)	1.0

Phosphorus (elemental)	0.0005
Selenium	0.01
Sulfides	0.5
Silver	0.05
Zinc	0.5

156/80 Sch A; 65/03 Sch A

Schedule B

Column 1 *Constituents*	*Column 2* *Maximum Content* *(in milligrams per litre)*
5-day B.O.D.	300
Chlorine Demand	30
Fats, Oils and Grease (Ether extract)	100
Suspended Solids	350
Boron	5.0
Cadmium	0.05
Chromium (hexavalent)	0.05
Chromium (trivalent)	1.0
Copper	0.3
Cyanide	2.0
Iron	15.0
Lead	0.2
Mercury	0.005
Nickel	0.5
Phenols	0.5
Phosphates (total as $P_2 O_5$)	10.0
Phosphorus (elemental)	0.0005
Zinc	0.5

NOTES:

(1) If water is being abstracted from a water course, used, treated and subsequently returned to the same water course, these solids data mean that the effluent should not contain more than 1000 or 30 milligrams per litre more than was in the water originally abstracted.

(2) 1 bequerel (bq) - 27.03 pico-curies. Bequerel is the SI unit for the measure of radioactivity.

(3) All metal results should be the total of the particulate and the dissolved fractions of that metal and the maximum content is the amount in excess of the background level as determined upstream of the discharge.

65/03 Sch B

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Schedule C

A person primarily in the Metal Mining Industry shall comply with sections 3 and 19.1 and 20 and Schedule 4 of the *Metal Mining Effluent Regulations* (Canada) SOR/2002-222, including any changes or amendments to those sections of and that schedule to those regulations over time.

23/09 s7

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Schedule D

A person primarily in the Pulp and Paper Industry shall comply with sections 3 and 14 of the *Pulp and Paper Effluent Regulations* , (Canada) SOR/92-269, including any changes or amendments to those sections of those regulations over time.

23/09 s7

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Schedule E

A person primarily in the Petroleum Refinery Industry shall comply with sections 4, 7, 8 and 9 and Schedules 1 and 2 of the *Petroleum Refinery Liquid Effluent Regulations* , (Canada) CRC -c.828, including any changes or amendments to those sections and those schedules of those regulations over time.

23/09 s7

Attachment 2

Report by Mr. Daniel Houde dated August 18, 2015

DESCRIPTION OF A PROCESS THAT WILL ALLOW TO REDUCE THE CONSUMPTION OF CHEMICAL NEEDED TO TREAT SEAL SKINS AND THEIR POLLUTION CHARGE IN WASTEWATER

From Daniel Houde
engineer from l'Ordre de Ingénieurs du Québec

Laval, 18 August, 2015

From analysis performed on seal skin treatment solutions, the following table presents analytical results of the expected contaminants to be found in Phocalux wastewater.

Table 1 Analytical result of wastewater from seal skin tanning

Parameters in mg/litre	Soaking	Pickling	Washing	Tanning
BOD_5	<2	2 820	1 800	33
Solids (suspended)	3 110	1 540	250	97
Solids (dissolved)	102 000	43 100	39 600	66 300
Total oil & grease	2 340	2 220	549	94,4

To verify if a physico-chemical process applied on skin treatment waste water, can help to meet Schedule A standards, analysis of samples of the waste solutions have given the following results.

Table 2 Analytical result of wastewater from seal skins tanning, after a physico-chemical treatment

Parameters in mg/litre after a physico-chemical treatment	Soaking	Pickling	Washing	Tanning
BOD_5	1 140	1 496	498	156
Solids (suspended)	19	86	68	40
Solids (dissolved)	72 400	38 200	35 000	43 400
Total oil & grease	47	70,8	188	< 5

From these results, one can foresee that the wastewater composition will exceed Schedule A standards, for all parameters (BOD, oil & grease, suspended solids and dissolved solids). Referring to dissolved solids, the following description of a system will applied only, if derogation can be obtained from the Department of Environment & Conservation.

A physico-chemical system can remove all suspended solids very efficiently. But it can remove only part of the BOD and oil & grease. And BOD and oil & grease dispersed in water, can easily be oxidized by a bioreactor and achieve final level in accordance with Schedule A standards.

DESING OF THE WASTEWATER TREATMENT SYSTEM

Both a physico-chemical system and a bio-digester will have to be installed to remove pollutants from wastewater.

Use of the physico-chemical system:

The first step of the physico-chemical system will be a surge reservoir that will also serve as a oil separator. Raw skins washing and pickling produce a lot of floating grease and, to ease work, it has to be removed before further treatment.

The principal function of the physico-chemical system will be to neutralise the water pH. Three (3) of the five (5) skins treatment steps (pickling, washing and tanning), are strongly acidic and contain a large amount of aluminum salt. If one sends these solutions directly in a bio-digester, they may affects microbial activity and even kill the biomass. Therefore, it is important to neutralise the pH of the water sent to the bio-digester.

After the water is neutralised, it will be send to a second reservoir (or 2 reservoirs) with a coned bottom and having a total capacity large enough to contain the maximum production of a full day (15000 liters).

But because of the high content of aluminum salt, and its low solubility at pH above 6.5, it is expected that the wastewater neutralisation will produce large quantity of sludge; large enough that it may prevents any settling of particle in the treated water. In any case, all settled and filtrated water will have to be sent to the bio-digester.

The filtration can be done in numerous ways. The most practical, will be a drum filter that can filter continuously without clogging; but it's require large amount diatomaceous earth and maintenance time.

Other practical filters are: a press filter with a chamber capacity of 3 cubic meters, or a filtration basket. The press filter is very efficient, but requires the presence of an operator. The basket filter is easy to operate and don't require a permanent presence of an operator. But both systems require that the sludge be conditioned to ease water movement through grains. Neutralisation of waste water with lime whitewash is a must.

This water treatment reactor can be used for the physico-chemical treatment.

Use of an aerobic biological digester:

The principal function of the biological digester will be to digest organic compounds like proteins extracted from skins, oil & grease, formaldehyde, detergent and the brightener.

For design purpose, the volume of wastewater that will be sent to the bio-digester is estimated at 7500 litres / day with a total BOD concentration estimated at 3000 mg/L.

The quantity of air to be injected by aerators is estimated to 80 SCFM (2.3 M^3) at a pressure of 7.5 psig, (0.5 bar). The required total adiabatic power of aerators is estimated to be at a minimum of 5 HP. The volume of the biological reactor will be at least 100 cubic meters, with a depth of 4.6 meters (15 ft) and a diameter of 5.5 meters (18 ft).

In operation, a bio-digester behaves as a living organism. Good environmental condition is a must, to maintain its efficiency. Some chemicals composing skins treatment wastewaters, can be a nuisance to microbial activities. Namely, formaldehyde which is a powerful antiseptic and salt at high concentration that can provoke an osmotic choc, which can put micro-organism in dormancy. There is also the detergent Gelon PK, that may provoke a lot of foaming.

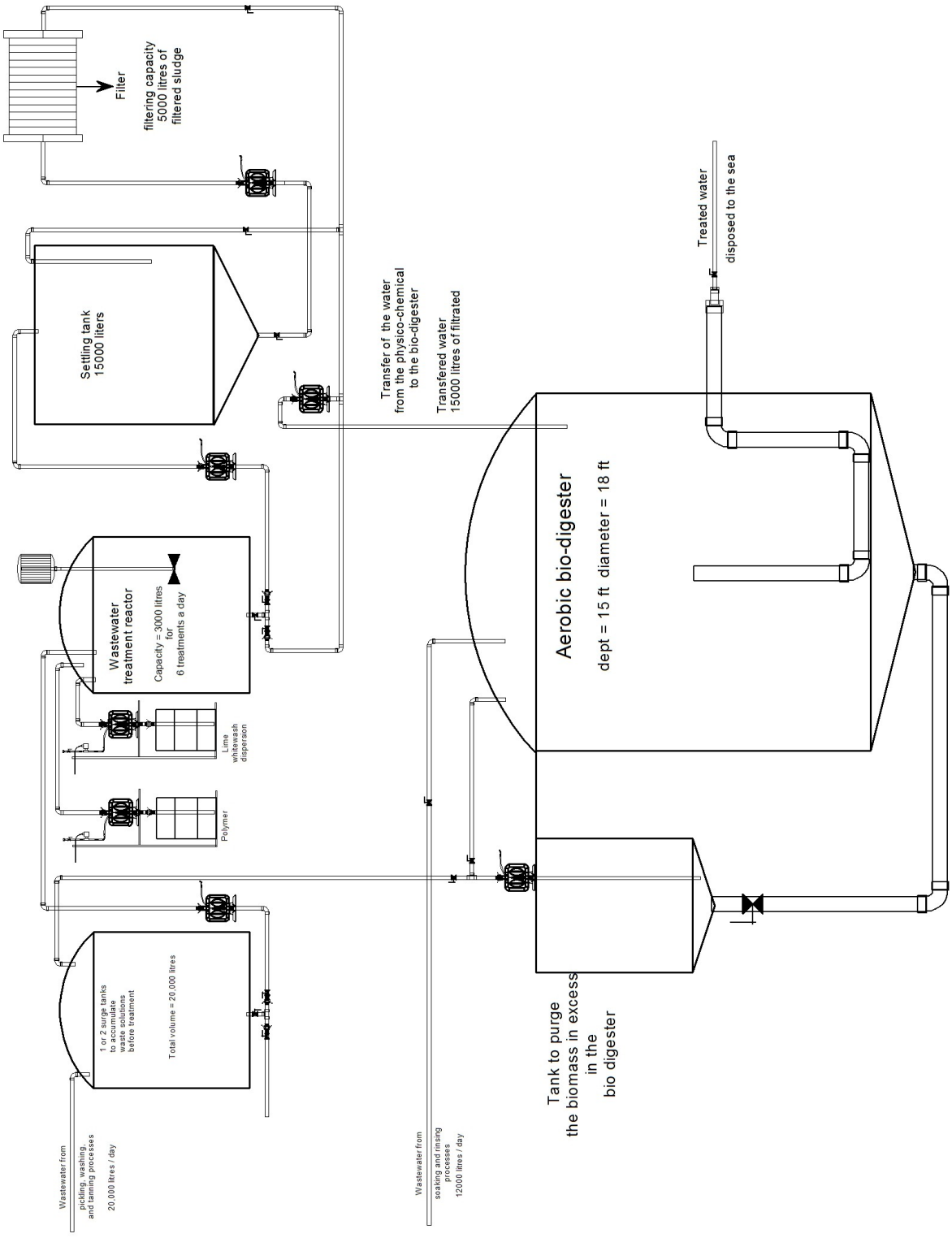
Water containing formaldehyde will have to be fed in small volume at a time, especially at the start up. Once the system will be in operation for few months, the biomass will be adapted to its presence. With refer to foaming, a cyclone equipped with water jets will capture and destroy foam.

Expected performance of the skin treatment process on wastewater composition:

From simulation based on a production of 1000 skins, we obtain the following table:

		Soaking	Pickling	Washing	Rincing	Tanning	Average composition mg/litre
Water consummed	Litres	15000	15000	15000	15000	15000	75 000
Dirt (protein and all)	Kg	50,9	8,1	0,2	0	0	789
Oil & Grease	Kg	35,6	11,5	0	0	0	634
Sodium salt	Kg	600	620	758	0	620	34 648
Alum Mix	Kg	0	141	5,39	0,00	621	10 228
Soda ash	Kg	0	0	30	0,00	0,09	401
Sodium Hydrosulphite	Kg	0	0	15	0,00	0,05	201
Formaldehyde	Litres	4,50	1,04	0	0	0	74
Gelon PK soap	Litres	7,50	4,24	37,6	0,00	0,12	660
Brightener	Litres	0	0	0	0	7,5	100
					Total Sodium salt concentration		45 477

Estimated chemical and wastewater treatment cost for a 1 stage batch process							
1000 seal skins	**Price**	**Soaking**	**Pickling**	**Washing**	**Rincing**	**Tanning**	**Cost**
Sodium salt	$0,35	640	640	787		640	$723,33
Alum Mix	$1,00		173			640	$173,33
Soda ash	$0,50			32,0			$16,00
Sodium Hydrosulphite	$2,00			16,0			$32,00
Formaldehyde	$2,00	4,8					$9,60
Gelon PK soap	$5,00	8,0	3,33	40,0			$256,67
Brightener	$5,00					8,0	$0,00
Sludge disposal	$90,00	15,0	M3				$1 350,00
						Total	**$2 560,93**


Filter
filtering capacity
5000 litres of
filtered sludge
Settling tank
15000 liters
Transfer of the water
from the physico-chemical
to the bio-digester
Transfered water
15000 litres of filtrated
Treated water
disposed to the sea
Wastewater
treatment reactor
Capacity = 3000 litres
for
6 treatments a day
Lime
whitewash
dispersion
Polymer
Aerobic bio-digester
dept = 15 ft diameter = 18 ft
1 or 2 surge tanks
to accumulate
waste solutions
before treatment
Total volume = 20,000 litres
Wastewater from
pickling, washing
and tanning processes
20,000 litres / day
Wastewater from
soaking and rinsing
processes
12000 litres / day
Tank to purge
the biomass in excess
in the
bio digester

Attachment 3

GC Rieber Carino Company 2013 Effluent Discharge Criteria Summary

Department of Environment and Conservation

Industrial Effluent Compliance
2013 Annual Report

Pollution Prevention Division

July 2014

Table 19: GC Rieber Carino Company 2013 Effluent Discharge Criteria Summary (mg/L, unless noted)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Samples	5	5	5	6	5	5	3	5	6	5	5	4	59
pH, Maximum (units)	9.69	11.4	8.76	10.7	8.55	11.30	12.2	12.2	9.76	9.50	9.15	8.75	12.2
pH, Minimum (units)	8.41	6.86	7.07	6.75	5.63	6.66	6.18	6.94	5.24	5.58	7.35	7.08	5.24
pH, Exceedance (<5.5, >9.0)	3	3	0	2	0	3	2	1	5	1	1	0	21
As, Maximum	<0.001	<0.001	<0.001	0.0032	<0.01	<0.1	0.0023	<0.001	<0.001	<0.001	<0.001	<0.001	<0.1
Exceedance (0.5)	0	0	0	0	0	0	0	0	0	0	0	0	0
Ba, Maximum	0.0033	0.0046	0.0039	0.0063	0.025	<0.1	0.0161	0.0231	0.018	0.011	0.019	0.0015	<0.1
Exceedance (0.5)	0	0	0	0	0	0	0	0	0	0	0	0	0
B, Maximum	<0.05	<0.05	<0.05	<0.5	<0.5	<5	0.066	<0.5	0.058	<0.5	<0.5	<0.05	<5.0
Exceedance (5.0)	0	0	0	0	0	0	0	0	0	0	0	0	0
Cd, Maximum (ug/L)	0.128	0.032	0.032	0.26	0.76	<1.7	0.329	0.23	0.75	0.011	0.22	0.096	<1.7
Exceedance(0.05)	0	0	0	0	0	0	0	0	0	0	0	0	0
Cr (III), Maximum	1.4	0.17	0.36	0.03	0.3	<0.1	0.14	0.05	0.53	0.75	0.26	0.45	1.4
Exceedance (1)	1	0	0	0	0	0	0	0	0	0	0	0	1
Cr (VI), Maximum	0.0118	0.0054	0.01	0.00086	0.0068	0.0042	0.0042	0.0015	0.0074	0.019	0.0036	0.0051	0.019
Exceedance (0.05)	0	0	0	0	0	0	0	0	0	0	0	0	0
Cu, Maximum	0.102	0.0502	0.027	0.0233	0.0413	<0.2	0.0325	0.0536	0.72	0.068	0.06	0.083	0.72
Exceedance (0.3)	0	0	0	0	0	0	0	0	1	0	0	0	1
Fe, Maximum	3.42	4.32	1.81	7.75	50.2	<5.0	12	2.77	34	39	2.2	2.3	50.2
Exceedance (10)	0	0	0	0	1	0	1	0	1	1	0	0	4
Pb, Maximum	0.00053	<0.0005	0.00075	<0.005	<0.005	<0.05	0.00121	0.008	0.0021	<0.005	<0.005	<0.0005	<0.05
Exceedance(0.2)	0	0	0	0	0	0	0	0	0	0	0	0	0
Hg, Maximum (ug/L)	0.018	<0.013	<0.013	0.027	<0.013	0.022	0.05	<0.013	<0.013	<0.013	<0.013	<0.013	0.05
Exceedance (0.005)	0	0	0	0	0	0	0	0	0	0	0	0	0
Ni, Maximum	0.0241	0.0168	0.0134	0.043	0.121	<0.2	0.0728	0.072	0.12	0.085	0.064	0.069	<0.2
Exceedance (0.5)	0	0	0	0	0	0	0	0	0	0	0	0	0

Note: Monthly water chemistry analysis for July was collected August 5 and the October analysis was collected November 12.

Table 19 Continued: GC Rieber Carino Company 2013 Effluent Discharge Criteria Summary (mg/L, unless noted)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
Zn, Maximum	0.0254	0.0142	<0.005	0.0116	0.213	<0.5	0.0306	<0.05	0.38	0.13	<0.05	0.0097	<0.5
Exceedance (0.5)	0	0	0	0	0	0	0	0	0	0	0	0	0
Se, Maximum	<0.001	<0.001	<0.001	0.0074	<0.01	<0.1	0.0021	0.0027	0.0034	0.0036	0.0049	0.0021	<0.1
Exceedance (0.5)	0	0	0	0	0	0	0	0	0	0	0	0	0
Ag, Maximum	<0.0001	<0.0001	<0.0001	<0.0001	<0.001	<0.01	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.01
Exceedance (0.05)	0	0	0	0	0	0	0	0	0	0	0	0	0
TDS, Maximum	2030	2640	1710	3780	9610	9490	2700	9010	12000	8800	12000	2100	12000
Exceedance (1000)	1	1	1	1	1	1	1	1	1	1	1	1	12
TSS, Maximum	26	33	5.2	36	37	22	34	18	230	48	24	31	230
Exceedance (30)	0	1	0	1	1	0	1	0	2	1	0	1	8
BOD, Maximum	270	190	170	1500	3200	680	990	820	970	1000	1100	740	3200
Exceedance (20)	4	4	4	5	4	4	2	4	5	4	4	3	47
Ammonia, Maximum	2.3	4.1	1	49	20	13	7.9	5.3	66	30	8.1	0.98	66
Exceedance (2.0)	1	1	0	1	1	1	1	1	1	1	1	0	10
Sulfide, Maximum	<0.020	<0.020	<0.020	<0.020	<0.020	0.027	0.26	<0.020	0.024	0.022	<0.020	<0.020	0.26
Exceedance (0.5)	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Oil & Grease, Maximum	11	9.1	5.6	7.5	17	22	24	25	49	28	42	24	49
Exceedance (15)	0	0	0	0	2	1	2	2	3	3	4	1	18
Phenol	0.41	0.66	0.057	<0.10	1.6	6.8	0.093	11	14	17	17	0.19	17
Exceedance (0.1)	1	1	0	0	1	1	0	1	1	1	1	0	8
Cyanide	<0.0020	0.0025	<0.0020			0.0031	<0.010	0.007	0.0086	0.015	0.0066	<0.0010	0.015
Exceedance (0.025)	0	0	0			0	0	0	0	0	0	0	0