

# Caulmert Limited

Engineering, Environmental & Planning  
Consultancy Services

## Bryn Posteg Landfill Site

Sundorne Products (Llanidloes) Limited

## Environmental Permit Variation Application

## Surface Water Treatment Process Description & Operating Techniques

### Prepared by:

#### Caulmert Limited

14 Farrington Way, Eastwood Link Business Park, Eastwood, Notts, NG16 3BF

**Tel:** 01773 749 132

**Email:** [andystocks@caulmert.com](mailto:andystocks@caulmert.com)

**Web:** [www.caulmert.com](http://www.caulmert.com)

**Document Reference:** 4299-CAU-XX-XX-RP-V-0303.A0.C0

May 2021

## APPROVAL RECORD

**Document Title:** Surface Water Treatment Process Description & Operating Techniques

**Document Ref:** 4299-CAU-XX-XX-RP-V-0303.A0.CO

**Client:** Sundorne Products (Llanidloes) Limited

**Caulmert Project Manager:** Andy Stocks

**Issued by:** Caulmert Limited, 14 Farrington Way, Eastwood Link Business Park, Eastwood, Notts, NG16 3BF

<b>Author</b>	Samantha Bowler Environmental Consultant	<b>Date</b>	26/05/2021
<b>Reviewer</b>	Andy Stocks Associate Director	<b>Date</b>	26/05/2021
<b>Approved</b>	Andy Stocks Associate Director	<b>Date</b>	26/05/2021

## DISCLAIMER

This report has been prepared by Caulmert Limited with all reasonable skill, care and diligence in accordance with the instruction of the above-named client and within the terms and conditions of the Contract with the Client.

The report is for the sole use of the above-named Client and Caulmert Limited shall not be held responsible for any use of the report or its content for any purpose other than that for which it was prepared and provided to the Client.

Caulmert Limited accepts no responsibility of whatever nature to any third parties who may have been made aware of or have acted in the knowledge of the report or its contents.

No part of this document may be copied or reproduced without the prior written approval of Caulmert Limited.

## BRYN POSTEG LANDFILL SITE

### SURFACE WATER TREATMENT PROCESS DESCRIPTION & OPERATING TECHNIQUES

#### TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>1</b>
1.1	Report Overview .....	1
<b>2.0</b>	<b>PROCESS DESCRIPTION.....</b>	<b>2</b>
2.1	Site Background .....	2
2.2	Application Proposal .....	2
2.3	Proposed Surface Water Treatment Facility.....	4
<b>3.0</b>	<b>OPERATING TECHNIQUES .....</b>	<b>8</b>
3.1	Part C3 – Qu.1a Table 1a: Tell us about the activities you want to do .....	8
3.2	Part C3 – Qu.1b Table 1b: Types of Waste .....	8
3.3	Part C3 – Qu.2 Table 2: Emissions (releases) .....	8
3.4	Part C3 – Qu.3a: Technical Standards .....	8
3.5	Part C3 – Qu.3b: General Requirements – Risk Assessments.....	9
3.6	Part C3 – Qu.3c: Types and amounts of Raw Materials.....	9
3.7	Sludge Removal & Disposal.....	11
<b>4.0</b>	<b>MONITORING .....</b>	<b>12</b>
4.1	Part C3 – Qu.4a: Measures for monitoring point source emissions .....	12
4.2	Point Source Emissions to Air .....	12
4.3	Point Source Emissions to Sewers, Effluent Treatment Plants or Other Transfers Off-Site .....	12
4.4	Point Source Emissions to Water (other than sewers) .....	12
4.5	Point Source Emissions to Land .....	13
<b>5.0</b>	<b>MANAGEMENT .....</b>	<b>14</b>
5.1	Environmental Management System .....	14
5.2	Accidents, Incidents and Non-Compliances.....	14

#### APPENDICES

<b>Appendix 1</b>	Surface Water Treatment Information – Siltbuster Data Sheet
<b>Appendix 2</b>	Ferric Chloride Data Sheet
<b>Appendix 3</b>	Sodium Hydroxide Data Sheet
<b>Appendix 4</b>	Anionic Polymer Data Sheet - Aquatreat 156 Anionic Potable Water Grade (PWG)

## **1.0 INTRODUCTION**

### **1.1 Report Overview**

- 1.1.1 Caulmert Limited have been appointed by Sundorne Products (Llanidloes) Limited, trading as Potters Waste Management ('the Operator'), to prepare this report as part of a normal permit variation application for Bryn Posteg Landfill Site operated under Environmental Permit referenced EPR/BU7766IC.
- 1.1.2 This report is written in response to information requested in application form Part C3 and outlines the general process description and operating techniques of the proposed surface water treatment activity on Site at Bryn Posteg Landfill Site. The activity will involve treating surface water collected at the Site to remove suspended solids prior to being discharged from Site.

## 2.0 PROCESS DESCRIPTION

### 2.1 Site Background

2.1.1 Bryn Posteg Landfill Site is an operational landfill site which is operated by Sundorne Products (Llanidloes) Limited (trading as Potters Waste Management) and is permitted to accept non-hazardous and inert commercial, industrial and municipal wastes for treatment and disposal to landfill.

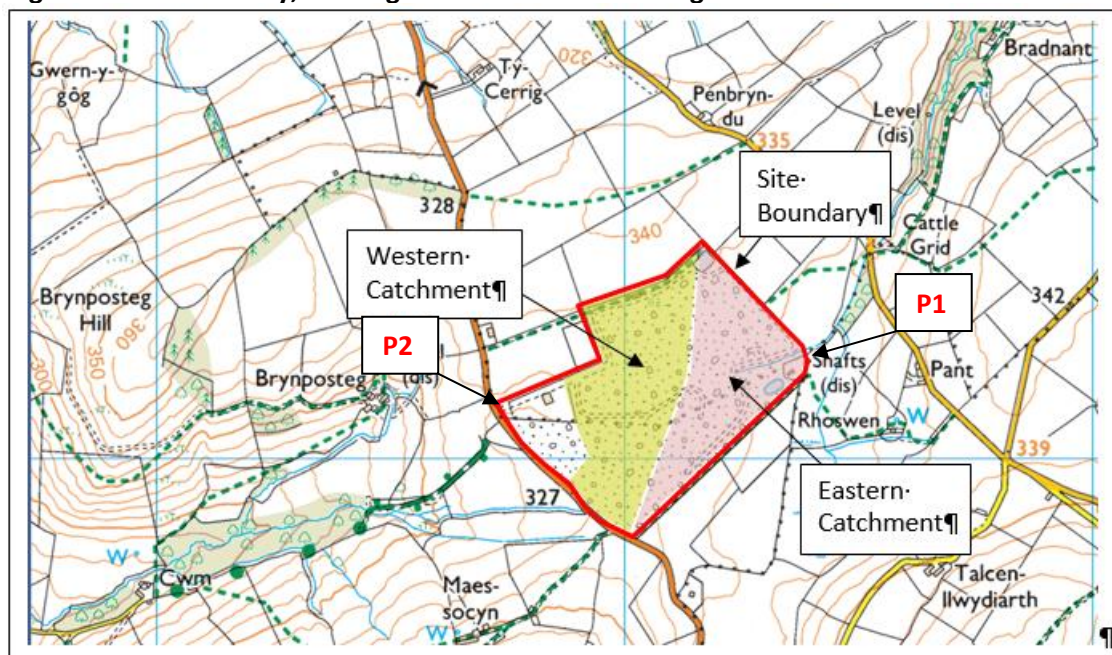
2.1.2 The Operator proposes to undertake surface water treatment at the Site and further information on this process is provided in this report, in response to Improvement Condition 11 of the Environmental Permit and as requested by Natural Resources Wales (NRW). Specifically, NRW have asked the Operator to submit a normal permit variation to cover the treatment aspects of the surface water at the Site and its ultimate discharge off-site, including details on infrastructure and specifics on the treatment process.

2.1.3 Only surface water from Bryn Posteg Landfill Site will be treated at the proposed new surface water treatment facility, in order to remove suspended solids concentrations to levels below permitted compliance limits for discharge to surface water off-site.

### 2.2 Application Proposal

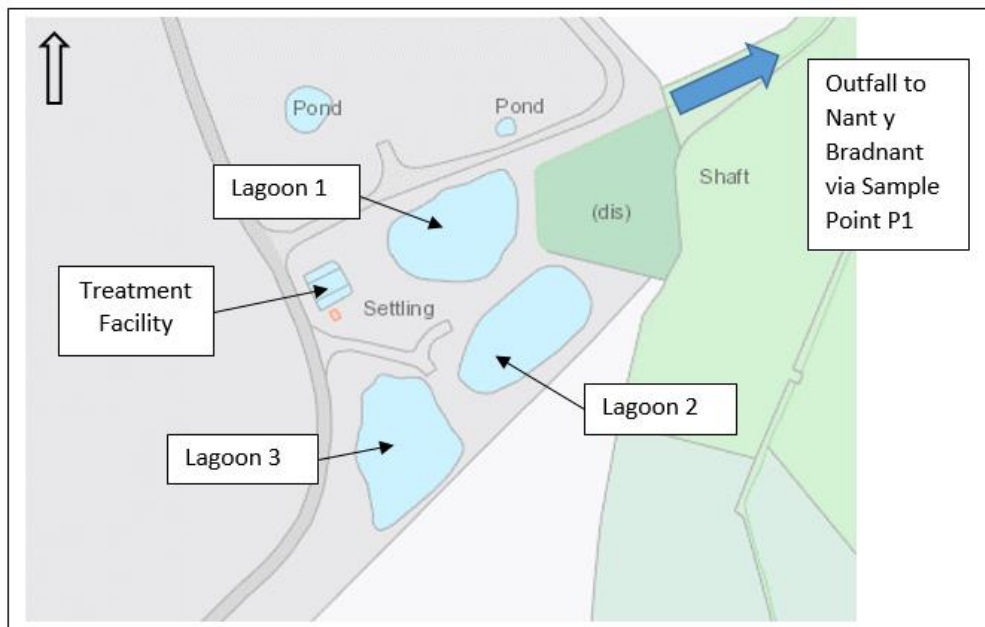
2.2.1 The current surface water management system at Bryn Posteg Landfill Site is divided in two different sub-catchment areas (see Figure 1.), the eastern and western catchments, as a consequence of its geography and engineered landform. Surface water in the eastern catchment is directed to and discharged at surface water point P1 (into the Nant y Bradnant stream) on the eastern boundary. Surface water from the western catchment is collected and discharged at surface water point P2 (into the Afon Dulas stream).

**Figure 1. Site Boundary, Drainage Catchments & Discharge Points**



- 2.2.2 Surface water samples collected from the Site have on occasions exceeded the permitted values for the Site. Suspended solids exceedances were experienced in 2013 and in 2015 at Sampling Point P1 (eastern outfall, to the Nant y Bradnant). It also noted that the suspended solids are more frequently elevated above the compliance limit at Sampling Point P2 (western outfall to the Afon Dulas) from 2015. The 2019 Annual Review reported that suspended solids concentration exceeded the compliance limit in July 2019 at P1 with a concentration of 69 mg/l, which was lower than the previous year (2018) when the maximum was 200 mg/l.
- 2.2.3 Historically, there were no active means of treating surface water runoff from either catchment. Any water treatment was undertaken passively, achieved by a combination of flow attenuation provided by slope angle and vegetation, and by accumulation that affords some solids settlement. There was also a degree of ground infiltration should there be a favourable hydraulic gradient between surface flow and subterranean groundwater pipework.
- 2.2.4 There are three surface water storage lagoons located on the eastern edge of the eastern catchment. The two primary lagoons, Lagoon 1 and Lagoon 2, were established as outfall points from an earlier (now decommissioned) surface water treatment facility. These lagoons allowed surface water to settle post-treatment, promoting the settlement of suspended solids by gravity. A surface water 'supernatant' with a lower suspended solids content was allowed to outfall to the Nant y Bradnant headwater. Lagoon 3 was created sometime after the first two lagoons, formed in an excavation created by a borrow pit. The general arrangement of the three lagoons is shown in Figure 2, below.

**Figure 2. General Arrangement of the existing lagoons (eastern drainage catchment)**



- 2.2.5 The surface water management system has been designed to enable the installation of a surface water treatment facility comprising a series of balancing ponds, dosing and flocculation plant and silt traps to reduce the suspended solids to within the current permitted discharge limits. The maximum capacity of the plant will be designed to treat 30 l/s, although balancing ponds are proposed to manage the peak runoff. In order to mitigate any

environmental impacts and comply with the Environmental Permit, the system infrastructure will be inspected and maintained regularly by trained site staff, which will include checking for evidence of contamination, excessive sedimentation and structural integrity. The surface water management system as a whole will comprise drains around the foot of landfill areas and haul roads, lagoons and a surface water treatment facility.

2.2.6 The new surface water treatment facility will be installed in the eastern drainage catchment area of the Site. This facility will receive untreated surface water captured in Lagoon 3 from the eastern and western drainage catchments. The facility will chemically treat the water using a Serpentine dosing structure to encourage solids settlement and then the treated surface water will flow into Lagoons 1 and 2 and be discharged to the Nant y Bradnant watercourse via discharge point P1 (see Figure 2.). The surface water treatment process will enable the Operator to better comply with permitted surface water compliance limits for suspended solids within the Permit.

2.2.7 In support of the surface water treatment process, it will be necessary to provide the following:

- A surface water treatment facility;
- Flow balancing;
- Inter-stage pumping;
- De-sludging;
- Quality monitoring;
- Operation and maintenance.

## **2.3 Proposed Surface Water Treatment Facility**

2.3.1 The following provides design rationale and detail of the surface water treatment facility:

2.3.2 In order for consent limits within the permit to be met for suspended solids in surface water discharged off-site, there is a requirement to treat the water using chemical additives to remove the suspended solid load. Without the use of chemical additives, there would be insufficient lagoon capacity on site for the settlement of suspended solids to meet consent limits.

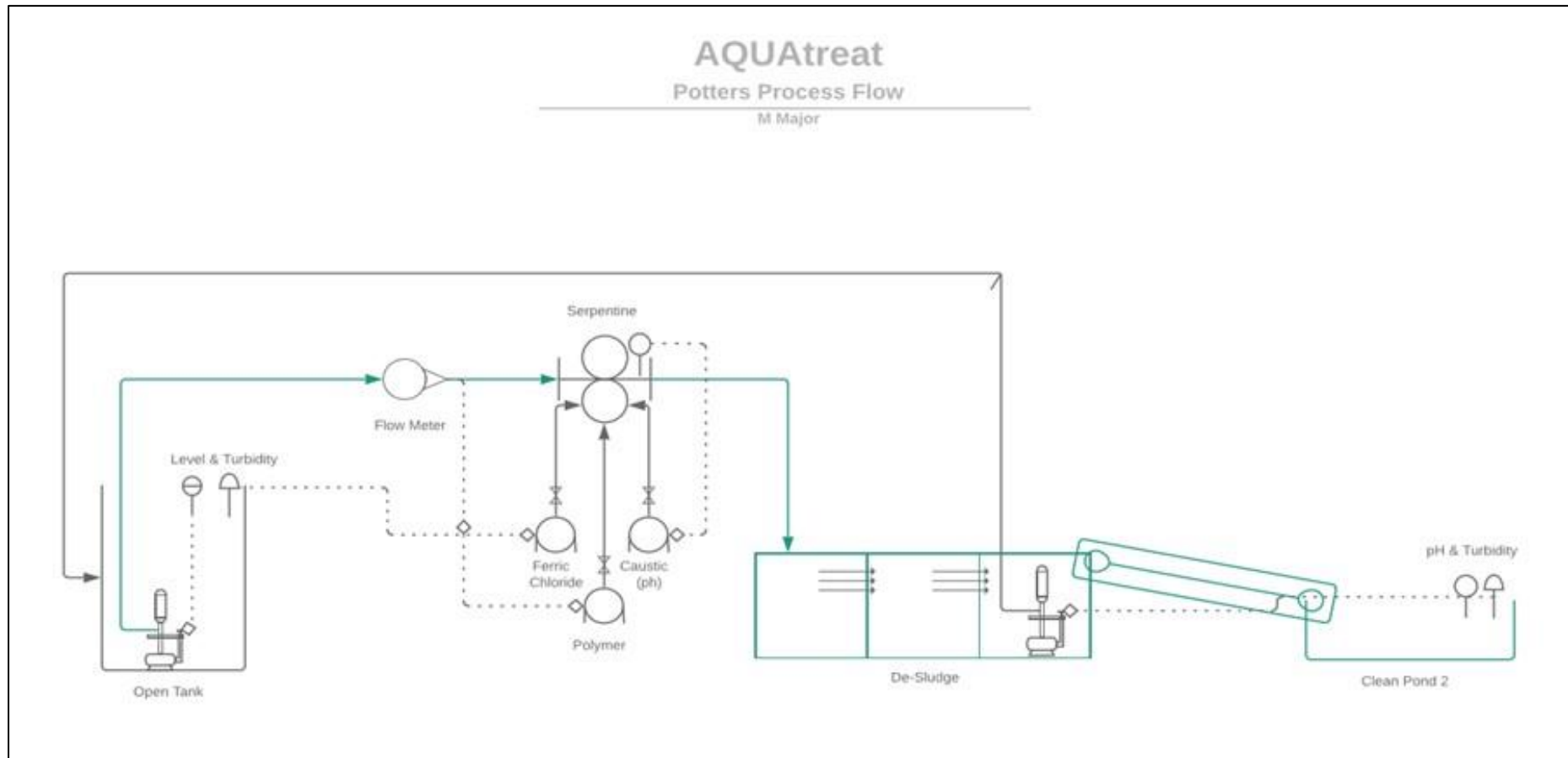
2.3.3 There is to be a single surface water treatment facility that will receive and treat flows from Lagoon 3, which captures surface water from both the eastern and western drainage catchments on the Site. Surface water will be taken from Lagoon 3 where it will be chemically treated to encourage the settlement of suspended solids within the facility, before the treated water is discharged into Lagoons 1 and 2 and allowed to outfall from the Site to the Nant y Bradnant watercourse on the eastern boundary.

2.3.4 The treatment process has been assessed and designed by Aquatreat Limited on behalf of the Operator. The treatment process has been designed specifically to enhance the flocculation and precipitation of suspended solids and will comprise the dosing of a primary coagulant and a polymer for flocculation and settlement of solids and an additive for pH adjustment.

- 2.3.5 Primary coagulant dosing will use Ferric Chloride (44%) (datasheet in Appendix 2) and be introduced via a dosing pump that will accept a 4-20mA signal from the influent flow meter and as a result, dosing of the coagulant will be dosed proportionally to the flows from Lagoon 3.
- 2.3.6 The pH adjustment will rely on the introduction of Sodium Hydroxide (32%) (Appendix 3). Water pH will be monitored by means of a pH probe and a controller, that will proportionately adjust a dosing pump up or down by means of a 4-20mA signal. The pH will be monitored immediately after discharge from the serpentine.
- 2.3.7 The coagulation stage will be complemented by flocculation with the subsequent addition of an Anionic Polymer called Aquatreat 156. The polymer will be diluted to produce a 0.1% working solution. The dosing of the polymer will also be proportional to the influent via a 4-20mA signal from the flow meter, same as dosing of the Ferric Chloride. Due to commercial sensitivity, the chemical make-up of Aquatreat 156 is unknown however the material data sheet (Appendix 4) states that this has no hazard ratings. It also states that the material decomposes to ammonia, carbon oxides and nitrogen oxides. It is therefore considered that any impact from this compound would be regulated by the existing ammonia compliance discharge limit within the Permit.
- 2.3.8 The surface water treatment system is designed such that iron (in Ferric Chloride) and the polymer will both precipitate out of solution and would not be expected to be present in the surface water discharge but will end up in the sludge deposits. The dosing systems will have pre-set maximum control parameters to prevent overdose situations and water monitoring equipment will also have set alarm functions to prevent overdosing. Treated surface water would be tested prior to discharge to ensure all discharge compliance limits are met.
- 2.3.9 The monitoring of the surface water discharge at P1 is regulated under the existing environmental permit. Ammoniacal nitrogen and BOD provide a general indication of the overall surface water quality. With the addition of Aquatreat 156 Polymer during the treatment process, the monitoring of ammoniacal nitrogen as part of the discharge limits within the Permit would remain appropriate to be protective of pollution from this additive, as Aquatreat 156 degrades to ammonia, carbon oxides and nitrogen oxides.
- 2.3.10 The chemical additives will be administered to the untreated surface water by a dosing Serpentine structure with settlement tank, as shown in Figure 3 below:



Figure 3 – Aquatreat Chemical Dosing Serpentine



- 2.3.11 The Ferric Chloride and Sodium Hydroxide will be contained in Bulk Bunded Storage Tanks. The Bunded Tanks will be located on concrete bunded bases within a covered area with a roof. All delivery pipework will be doubled walled. The powder Aquatreat 156 polymer will be stored in a secure dry container within the covered area. Similarly, the dosing infrastructure will be set on an impermeable concrete slab within a timber framed-building with roof covering.
- 2.3.12 Suspended solids in the treated surface water will settle out of the water into the de-sludge tank section of the treatment facility and then the water will discharge to Lagoons 1 and 2 before leaving the site. A two-stage lagoon system will be used: the first stage is used for normal flows, and the second stage used during 'high rainfall' conditions. In times of overflow or storm events, the lagoon system will have emergency overflow outlets and in normal conditions there will be bypass outlets to allow flow for water that does not require treatment.
- 2.3.13 A V-notch weir will help to establish a volumetric flow rate of treated flows. The flows will also be monitored by a multi-parameter monitoring station to ensure that the treated water meets the permitted quality values, particularly for pH and suspended solids. This will include telemetry that notifies should water quality fall outside a consented parameter, for example if pH is detected above 8.5 or below 6.0 then alarms will activate and the treatment plant will shut down, stopping flows of water into Lagoons 1 and 2 and the dosing of chemical additives will temporarily cease, until the situation can be rectified.
- 2.3.14 The treatment of surface water will be made by a proprietary system supplied by Siltbuster Process Solutions. This will take the form of chemical dosing and polymer dosing administered via a Siltbuster inline pipe flocculator PF150. The unit will receive pumped flow and as such has no individual power requirement and no moving parts, relying instead on induced water turbulence invoked by its arrangement of pipework. Details of Siltbuster's pipe flocculator PF150 is shown in Appendix 1.
- 2.3.15 The proposed surface water treatment facility will be located in an area close to the existing surface water lagoons in the eastern area of the site. Vehicular access will be afforded to the facility via the existing haul road network. Access will be necessary for routine operation and maintenance duties, and for carrying out de-sludging of settled solids in the tank.
- 2.3.16 The treatment facility will be sized to accommodate a throughput of up to 30l/s. The flow through the facility will be controlled via a variable-speed pump set within a sump fed by existing Lagoon 3. The rate of treatment will be measured by an electromagnetic flow meter within the feed pipework of the pipe flocculator.

### 3.0 OPERATING TECHNIQUES

#### About Your Activities

#### 3.1 Part C3 – Qu.1a Table 1a: Tell us about the activities you want to do

- 3.1.1 There are no proposed changes to the listed activities, directly associated activities, waste tonnages or waste types at the site listed in the Environmental Permit as part of this variation application.
- 3.1.2 This application is in response to Improvement Condition 11, as requested by NRW, which requires a normal variation application for the treatment of surface water at the site.

#### 3.2 Part C3 – Qu.1b Table 1b: Types of Waste

- 3.2.1 There are no proposed changes to the waste types to be accepted at the site, as listed in the Environmental Permit, as part of this variation application.

#### Emissions to Air, Water and Land

#### 3.3 Part C3 – Qu.2 Table 2: Emissions (releases)

- 3.3.1 *Point Source Emissions to Air:* There are no proposed changes to existing emissions to air as part of this variation application.
- 3.3.2 *Point Source Emissions to Land:* There are no proposed changes to existing emissions to land as part of this variation application
- 3.3.3 *Point Source Emissions to Water:* A Surface Water Pollution Risk Assessment (ref. 3400-CAU-XX-XX-RP-O-0302) has been undertaken as part of this variation application and there are no proposed changes to the current monitoring regime and compliance limits within the permit.

#### Operating Techniques

#### 3.4 Part C3 – Qu.3a: Technical Standards

- 3.4.1 As part of this variation application, the following guidance in Table 1 below was used:

**Table 1 - Relevant Technical Guidance**

Description of Schedule 1 activity or directly associated activity	Relevant technical guidance note or Best Available Technique as described in BAT conclusions under IED	Document Reference
<p><u>Directly associated activities:</u></p> <p>Surface water management e.g. physico / chemical treatment of surface water</p> <p>Water discharges to controlled waters</p>	<p>Sector Guidance Note S5.06: recovery and disposal of hazardous and non-hazardous waste</p> <p>‘How to comply with your environmental permit’ NRW - Version 8 October 2014</p>	<p>This report: Process Description &amp; Operating Techniques Report (ref. 4299-CAU-XX-XX-RP-V-0303)</p> <p>Amenity &amp; Accidents Risk Assessment (ref. 4299-CAU-XX-XX-RP-V-0302)</p> <p>Surface Water Pollution Risk Assessment (ref. 3400-CAU-XX-XX-RP-O-0302)</p>

### 3.5 Part C3 – Qu.3b: General Requirements – Risk Assessments

3.5.1 It is a general requirement for all applications to consider the risk of emissions in relation to possible accidents, fugitive emissions, odour, surface water pollution and noise and vibration. Risk assessments were carried out using the NRW’s templates and the following risk assessments are provided as part of this permit variation application:

- Amenity & Accidents Risk Assessment ref. 4299-CAU-XX-XX-RP-V-0302;
- Surface Water Pollution Risk Assessment ref. 3400-CAU-XX-XX-RP-O-0302.

### 3.6 Part C3 – Qu.3c: Types and amounts of Raw Materials

3.6.1 The raw materials used in the surface water treatment process will consist of additives which will chemically treat the water, causing suspended solids to flocculate and then settle out of the water. The additives will be Ferric Chloride, Sodium Hydroxide and Polymer.

3.6.2 The chemical usage figures of the additives are based on hourly rates relative to water flow rate, rather than calculated as annual tonnages. It is proposed by Aquatreat that based on surface water flow rates of 10, 20 and 30 litres per second, the hourly additive usage rates will be as presented in Table 2 below. The annual rate will depend on annual rainfall data/trends.

**Table 2 – Hourly chemical requirements based on various surface water flow rates**

Flow Rate (litres per second)	Ferric Chloride 44% (litres per hour)	Sodium Hydroxide 32% (litres per hour)	Polymer (grams per hour)
<b>10</b>	1.8	7.2	7.2
<b>20</b>	3.6	14.4	144
<b>30</b>	5.05	20.2	202

\*The chemical usage figures are based on hourly rates. The yearly rate will depend on annual rainfall data/trends.

3.6.3 The purpose of each raw material used in the surface water treatment process, with reference to the relevant data sheet, is as follows:

- Ferric Chloride – the primary coagulant agent (data sheet in Appendix 2);
- Sodium hydroxide – for pH adjustment (data sheet in Appendix 3);
- Anionic polymer – for flocculation and to aid settlement (data sheet in Appendix 4).

3.6.4 The Operator will select the least harmful products to use in the operation wherever possible. All the additives will be kept in an enclosed area within sealed containers and bunded storage tanks sat on an impermeable concrete surface. Bunds will hold 110% capacity of the stored material.

3.6.5 The Operator will keep Material Safety Data Sheets for all products used at the facility and any relevant recommendations in relation to the handling or storage of the materials will be followed and in accordance with the Site's management procedures. Records of the quantities of raw materials will be recorded with periodic reviews on usage with a view to identify opportunities for improved efficiency.

3.6.6 The Operator will have a regular review of new developments in raw materials and for the implementation of any suitable ones with an improved environmental profile. This will be based on a number of factors such as price, process suitability, environmental impact including impurities content. Quality-assurance procedures for controlling the impurity content of raw materials will be assessed when purchasing raw materials from suppliers and requesting information and the raw material content of that product. Where any potentially-less polluting options for process materials are identified, the operator can trial the alternative raw process materials to assess its suitability.

3.6.7 Any containers or drums for the storage and usage of additives will be returned to the supplier for reuse. In the event that the supplier cannot accept any empty containers for reuse, opportunities for reconditioning will be considered.

### **3.7 Sludge Removal & Disposal**

- 3.7.1 A sludge blanket will accumulate on the bottom of the settlement tank of the facility after a period of time and sludge removal will be necessary when the sludge reaches a nominated marker point. It is anticipated sludge will need to be removed weekly in winter, due to higher rainfall at the site, and only as required in summer because of lower rainfall and reduced surface water throughput.
- 3.7.2 The sludge will consist of inert fines from the Site's surface water and also remnants of the Ferric Chloride and Polymer additives. The sludge will therefore be classed as a non-hazardous waste. Upon sludge removal, the sludge will be kept on Site, excess liquid removed and then deposited within the landfill site as a sludge waste already covered by the waste codes within the existing landfill permit (EPR/BU7766IC) (provided the sludge is not a liquid and is dewatered appropriately).

## 4.0 MONITORING

### 4.1 Part C3 – Qu.4a: Measures for monitoring point source emissions

- 4.1.1 The Operator should consider the need for environmental monitoring to assess the effects of point source emissions to air, controlled waters, groundwater or land.
- 4.1.2 This section details the potential point source emissions associated with the surface water treatment activity and describes the environmental monitoring procedures, methods and frequencies for each emission source.

### 4.2 Point Source Emissions to Air

- 4.2.1 There are no point source emissions to air to consider as part of the surface water treatment activity.

### 4.3 Point Source Emissions to Sewers, Effluent Treatment Plants or Other Transfers Off-Site

- 4.3.1 There are no point source emissions to sewers, effluent treatment plants or other transfer off site to consider as part of the surface water treatment activity.

### 4.4 Point Source Emissions to Water (other than sewers)

#### Point source emissions to surface water

- 4.4.1 The treated surface water will outfall from Lagoons 1 and 2 to be discharged at surface water discharge point P1, on the eastern boundary of the site, directly into the Nant y Bradnant stream, adjacent to Site. The location of monitoring and discharge point P1 is shown in Figure 1 (Section 2.2).
- 4.4.2 To prevent any potential environmental impact from the release of treated surface water from the site, the treated surface water will be sampled monthly at discharge point P1, as per the Environmental Permit and sent for quality testing at an MCERTS accredited laboratory to identify the following parameters:
- Suspended solids
  - pH
  - Biological oxygen demand (BOD)
  - Ammoniacal nitrogen (NH<sub>4</sub>-N)
- 4.4.3 The environmental monitoring, including sampling and testing procedures will be conducted in accordance with the Environmental Permit.

#### Point source emissions to groundwater

- 4.4.4 There will be no direct discharges to groundwater from the surface water treatment activity.

#### **4.5 Point Source Emissions to Land**

- 4.5.1 There are no point source emissions to land to consider as part of the surface water treatment activity.



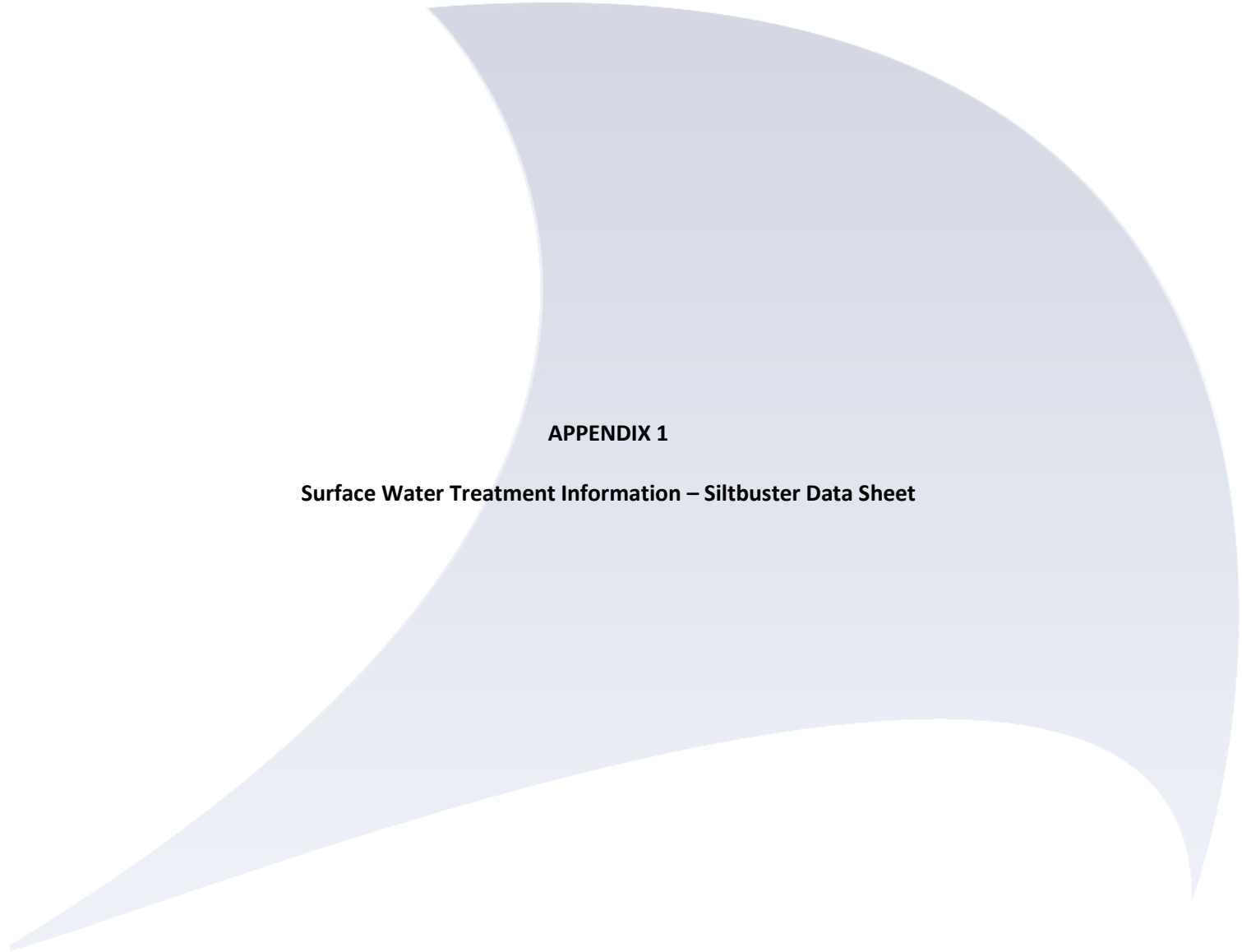
## **5.0 MANAGEMENT**

### **5.1 Environmental Management System**

- 5.1.1 The Site and all activities will be operated in accordance with the procedures outlined within the Site's Environmental Management System (EMS).
- 5.1.2 Effective operational and maintenance systems will be employed on all aspects of the treatment process and the system will have in place documented operational procedures for all elements of the Site operations that could have significant environmental impact. Following on from the introduction of the new surface water treatment facility, any additional procedures to be incorporated in the system will be included in the planned preventative maintenance programme for the plant and its associated infrastructure. All relevant staff will be trained and aware of any new procedures or documentation relating to the effective operational running of the surface water treatment facility. To monitor and record training the company's management system includes internal auditing and reporting of results to senior management and this will ensure that the appropriate skills and competencies necessary are carried by the relevant persons and identify any further training needs.
- 5.1.3 Any contractors attending Site will complete a site induction which includes measures that must be taken to protect the environment whilst working on Site. Contractors will be supervised at all times whilst on Site by trained site staff and will be required to sign in and out of Site when arriving and leaving.

### **5.2 Accidents, Incidents and Non-Compliances**

- 5.2.1 Written procedures for handling, investigating, communicating and reporting non-compliances with operating procedures or emissions limits will form part of the Site's EMS. Any non-compliances in the Environmental Permit will be reported to NRW.
- 5.2.2 Site management will conduct audits at least annually to check and monitor that all activities are being carried out in conformity with clear and logical systems for keeping records, including those of accidents, incidents and non-compliances.
- 5.2.3 An emergency action plan will form part of the plant operational procedures, ensuring that all foreseeable accidents are mitigated against and action plans prepared which should be followed by site staff in the event of an accident occurring. The emergency plan will identify the hazards and assess the risks of each and set out control measures to reduce the risk of a potential accident occurring on Site.



## **APPENDIX 1**

### **Surface Water Treatment Information – Siltbuster Data Sheet**

# PIPE FLOCCULATOR RANGE

(Pipe Flocculator range for effluent dosing / conditioning)

## Equipment Data Sheet



Siltbuster Ltd & Siltbuster Process Solutions Ltd  
Unipure House, Wonastow Road West,  
Monmouth NP25 5JA  
Tel: 01600 772256  
E-mail: [sps@siltbuster.com](mailto:sps@siltbuster.com)

### A. Overview of Pipe Flocculator Range:



Compact Pipework with integral dosing points, Instrument Mounts and Sample/Drain points to enable controlled dosing for conditioning / pre-treatment of effluent (usually ahead of Lamella clarifier or Dissolved Air Flootation solids removal stage).

Note how this PF160 unit (left) is located under an MT30 Mix Tank side walkway to keep site layout compact.

**Handling:** Skid Mounted: FLT slots and top level built in lifting eyes.

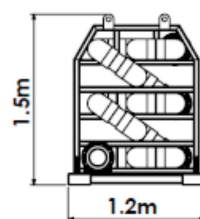
### C. Weights and Dimensions

Product Ref:	Nominal Bore (mm)	Weight Empty (kg)	Dimensions		
			Height (m)	Width (m)	Length (m)
PF63	50	250	0.9	0.65	1.8
PF90	80	500	1.4	0.8	3.3
PF100	100	800	1.5	1.2	4.9
PF150	150	1200	1.5	1.2	4.9

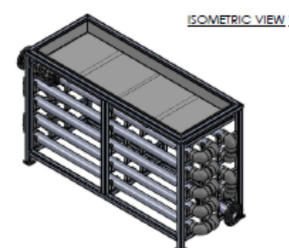
Larger sizes (DN200 etc) are fabricated to order in SS304 pipework, Glav Frame (or as required).



(PF150 Side View)



(PF100 End View)



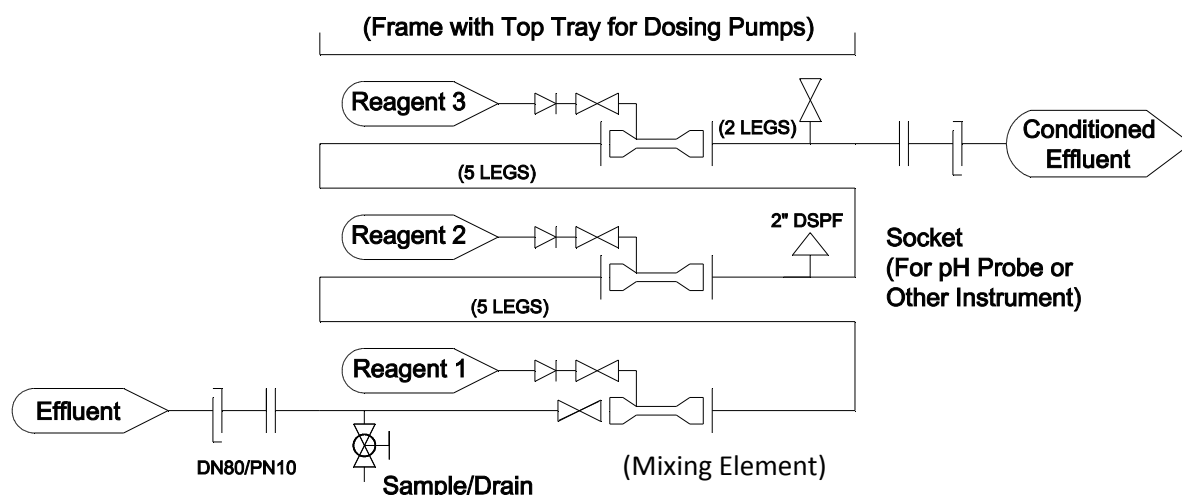
(PF63 Isometric)

# 2 Stage Dose Skid

## Equipment Data Sheet Continued



Typical P & I D drawing for Pipe Flocculator:



### Mixing Element:

Flocculators typically include 3 No Mixer stages:



Typically pipe diameter reduces to 75% of main diameter (to nearest equivalent pipe size) then enlarges back. 1" socket placed upstream of restriction, for reagent dosing.

### Example:



Example of DN200 Stainless Flocculator.

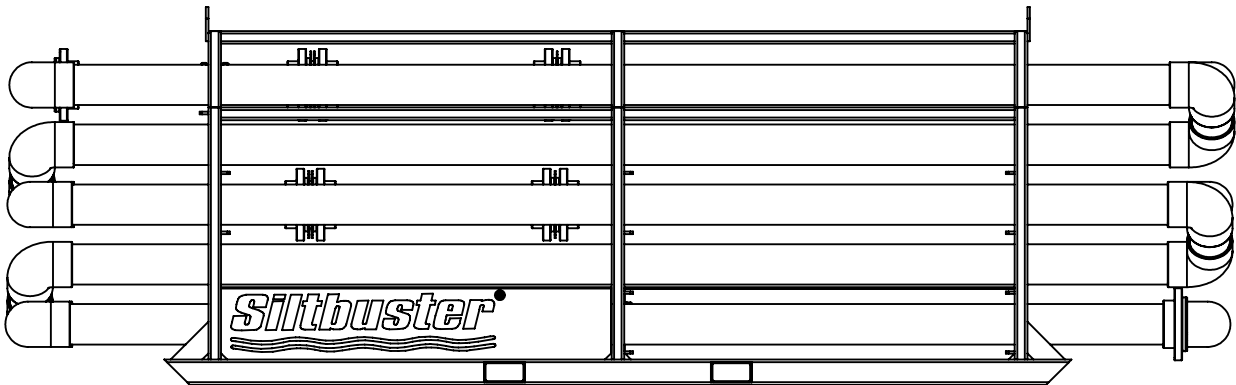
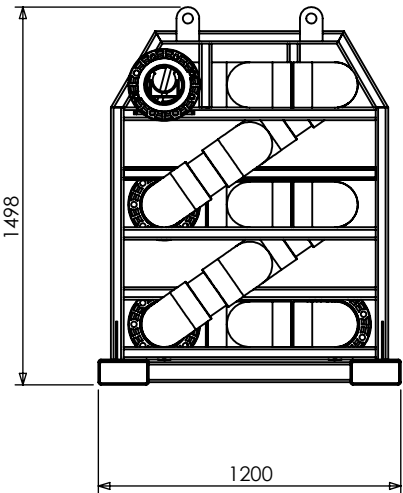
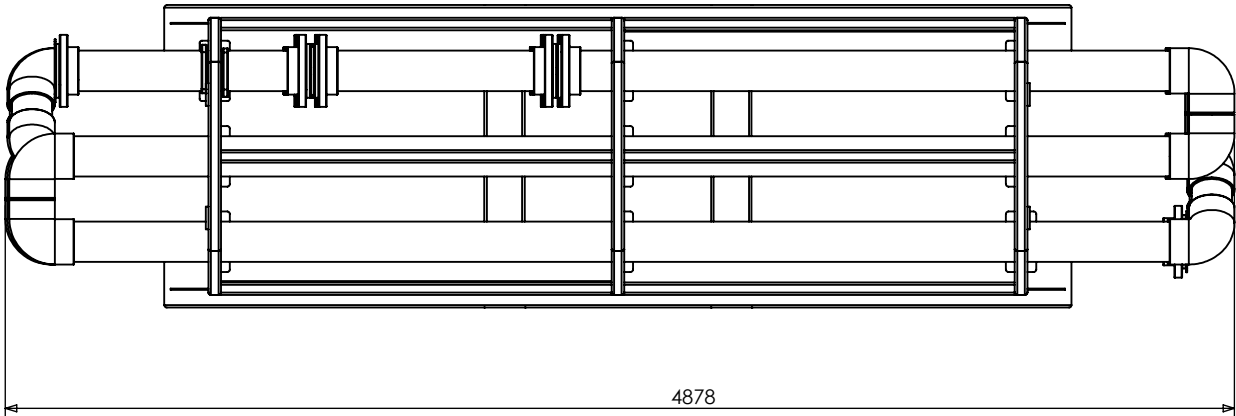
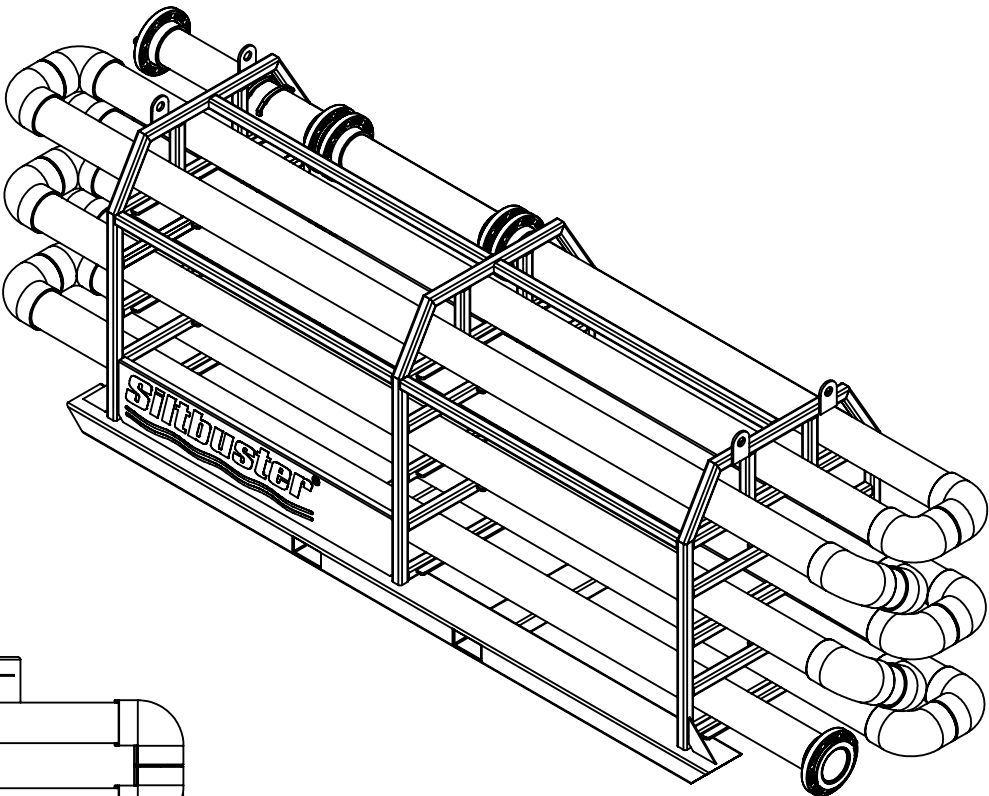
Please note:

- Compact Design
- Sample Point (Top Left)
- pH Probe Mount (Bottom Left)
- Self Standing Galv Frame
- Located under walkway of DAF unit

Note: In the interest of product development, the above specifications may change without warning. E&OE.



MODEL REF:  
PF150



Project	Title	
GA DRAWINGS	PF150	SILTBUSTER LTD. UNIPURE HOUSE, WONASTOW ROAD, WEST MONMOUTH MONMOUTHSHIRE NP25 5JA TEL: 01600 772256 FAX: 01600 775312



## **APPENDIX 2**

### **Ferric Chloride Data Sheet**



Customer Service 800-864-1742  
FAX 888-273-6226

## Material Safety Data Sheet (MSDS) Ferric Chloride Solution

### SECTION 1 – CHEMICAL PRODUCT AND COMPANY INFORMATION

**Product Name:** Ferric Chloride Solution      **Chemical Family:** Inorganic Iron Salts  
**Product Use:** Water Treatment Chemical      **CAS #:** 7705-08-0  
**Product Formula:**  $\text{FeCl}_3$

**Manufacturer's Name:** Pencco, Inc.  
**Manufacturer's Address:** P.O. Box 600, San Felipe, TX 77473  
**Emergency Phone Number:** PENCCO (979) 885-005  
CHEMTREC (800) 424-9300 – 24 hours a day

**Revision Date:** February 4 2014

### SECTION 2 – COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient	CAS #	Weight Percentage	ACGIH TLV	OSHA PEL	STEL
Water	7732-18-5	58 – 72%	N/A	N/A	N/A
Ferric Chloride	7705-08-0	28 – 42%	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	N/A
Ferrous Chloride	7758-94-3	<0.5%	1 mg/m <sup>3</sup>	1 mg/m <sup>3</sup>	N/A
Hydrochloric Acid	7647-01-0	<0.5%	5 ppm	5 ppm	N/A

**Section 313 Supplier Notification:** The hydrochloric acid mentioned above is subject to the reporting requirements of SARA TITLE III Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). This notification must be included in all MSDS's that are copied and distributed for this material.

### SECTION 3 – HAZARD IDENTIFICATION

**Appearance and Odor:** Reddish-brown liquid with a slightly acidic odor.

**Emergency Overview:** A corrosive chemical. Harmful or fatal if swallowed. Harmful if inhaled. Eye or skin contact may cause irritation. Contact with liquid or vapor form of this chemical may cause severe injury or death. Avoid overexposure.

**Fire and Explosion Hazards:** Substance itself does not burn, but may decompose upon heating to produce corrosive and/or toxic fumes, such as hydrogen chloride and phosgene gas. Ferric chloride can react with metals to form flammable and potentially explosive hydrogen gas.

**Carcinogenicity:** None of the components of this material are listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

#### Summary of Acute Health Hazards

**Ingestion** – Toxic by ingestion. May cause irritation to the mouth and stomach. Higher doses may lead to abnormal liver function with nausea or vomiting, stomach pain, diarrhea, fast and weak pulse, lethargy, pallor, shock, hypertension, dilated pupils, fever, coma and even death.



Customer Service 800-864-1742  
FAX 888-273-6226

Individuals with pre-existing liver diseases may have increased susceptibility to the toxicity of exposure.

**Inhalation** – May cause irritation of the upper respiratory tract, resulting in difficulty breathing.

**Skin Contact** – Irritation and possibly burns.

**Eye Contact** – Irritation and possibly burns.

## SECTION 4 – FIRST AID MEASURES

**Eye Contact First Aid:** Immediately flush eyes for 15 minutes with large amounts of water while holding eyelids apart. Washing within one minute is essential to achieve maximum effectiveness. Obtain medical attention IMMEDIATELY after flushing.

**Skin Contact First Aid:** Flush skin with water. Remove contaminated clothing; wash before reuse. If irritation is still present, seek medical attention IMMEDIATELY.

**Inhalation First Aid:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Obtain medical attention IMMEDIATELY.

**Ingestion First Aid:** DO NOT INDUCE VOMITING. Give 1 or 2 glasses of water or milk. Never give anything by mouth to an unconscious individual. Obtain medical attention IMMEDIATELY.

## SECTION 5 – FIRE FIGHTING MEASURES

**Flash Point:** Not applicable.

**Upper/Lower Explosion Limits in Air:** Not applicable.

**Auto Ignition Temperature:** Not applicable.

**Extinguishing Media:** Will not burn; use materials appropriate for surrounding fire.

**Fire and Explosion Hazards:** Substance itself does not burn, but may decompose upon heating to produce corrosive and/or toxic fumes, such as hydrogen chloride and phosgene gas. Ferric chloride can react with metals to form flammable and potentially explosive hydrogen gas.

**Fire Fighting Instructions:** Firefighters should wear proper protective equipment and self-contained breathing apparatus with full face-piece operated in a positive pressure mode. Move exposed containers from fire area if it can be done without risk. Use water to keep fire-exposed containers and tanks cool.

**Hazardous Product of Decomposition or Combustion:** Hydrogen chloride, hydrogen, phosgene.

	NFPA Rating	HMIS Rating	4 = Extreme / Severe
Health	2	2	3 = High / Serious
Reactivity	0	0	2 = Moderate
Flammability	0	0	1 = Slight





Customer Service 800-864-1742  
FAX 888-273-6226

## SECTION 6 – ACCIDENTAL RELEASE MEASURES

Review safety precautions before proceeding with cleanup. Use appropriate personal protection equipment. Do not touch spilled material. Neutralize spill with lime (calcium hydroxide), limestone (calcium carbonate), or soda ash (sodium carbonate). Restrict access to area until completion of clean up.

**Caution:** limestone and soda ash will evolve CO<sub>2</sub>; ventilation should be provided in enclosed areas. Dike area around spill to prevent spreading, and use absorbent material to pick up spill.

**CERCLA Reportable Discharge (RQ):** 1000 lbs. (454 kg), Based on anhydrous ferric chloride. Divide by solution concentration to obtain solution weight.

**Disposal:** Under the Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user to determine whether a substance should be classified as a hazardous waste at the time of disposal. This is due to the fact that product use, transformation, synthesis, mixtures, etc. may change the nature of the product. Dispose of waste in accordance with applicable federal, state, and local laws.

**RCRA:** Test waste material for corrosivity, DOO<sub>2</sub>, prior to disposal.

**Steps To Be Taken In Case Material Is Released Or Spilled:** Notify the appropriate environmental authorities. Note that spills may need to be reported to the National Response Center ((800) 424-8802)

## SECTION 7 – HANDLING AND STORAGE

**Handling:** Store and handle in corrosion-proof materials (and area). Use FRP or PVC pipes. Be cautious of substance residue in empty containers. Act according to precautions and warnings set forth.

**Storage:** Store in a tightly closed container. Do not store in metal containers. Fiberglass, plastic, or rubber-lined tanks may be used for storage. Protect from damage and keep separated from incompatible substances.

## SECTION 8 – EXPOSURE CONTROLS AND PERSONAL PROTECTION

**Respiratory Protection:** Adequate general ventilation should be provided to keep vapor and mists below exposure limits. The exposure limits for some components are listed in Section 2. Wear a NIOSH/OSHA approved respirator with a dust/mist cartridge if there is potential of exposure to mists in excess of applicable limits, in any situation where product vapor or mists may be present, such as in confined spaces.

**Eye Protection:** Wear splash resistant goggles and/or safety glasses with side shields. Wear a full face shield if possibility of material splashing or spraying exists. Maintain eye wash fountain. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather.



Customer Service 800-864-1742  
FAX 888-273-6226

**Skin Protection:** Where there is possibility of skin contact, use the following as appropriate, to avoid skin contact: gloves impervious to material, apron, boots, hood, pants, and jacket. Maintain a safety shower with quick opening valves. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather.

## SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

<b>Boiling Point:</b>	<b>106°C (223°F)</b>	<b>pH:</b>	<b>&lt; 2.0</b>
<b>Melting Point:</b>	<b>N/A</b>	<b>Solubility in Water:</b>	<b>Complete</b>
<b>Specific Gravity:</b>	<b>1.2 – 1.6</b>	<b>Vapor Pressure:</b>	<b>40 mm Hg @ 20°C</b>
<b>% Volatile:</b>	<b>60 – 75 (Water)</b>	<b>Evaporation Rate:</b>	<b>N/A</b>
<b>Vapor Density (Air = 1):</b>	<b>N/A</b>	<b>Molecular Weight:</b>	<b>162.2</b>
<b>Appearance:</b>	<b>Red/Brown Colored Liquid</b>	<b>Odor:</b>	<b>Slightly acrid</b>

## SECTION 10 – STABILITY AND REACTIVITY

**Stability:** Stable at normal conditions

**Polymerization:** Will not occur.

**Decomposition:** Decomposes upon heating to produce corrosive and/or toxic fumes, such as hydrogen chloride. Contact with metals may evolve flammable hydrogen gas.

**Incompatibility:** Rapidly corrodes most metals (titanium is one exception); may generate flammable, potentially explosive hydrogen gas. Avoid contact with nylon, aluminum/aluminum alloys, carbon steel, stainless steel, and copper / copper alloys. Metals, bases, halocarbons, acids, and combustible materials can be considered incompatible.

## SECTION 11 – TOXOLOGICAL INFORMATION

**Chronic Effects:** Repeated dosage may cause hemosiderosis, including possible damage to liver and pancreas.

**Toxicological Data:** Anhydrous Ferric Chloride Solid Oral LD<sub>50</sub> (rat) = 450 mg/kg

**Carcinogenicity:** None of the components of this material are listed as a carcinogen by IARC, NTP, OSHA, or ACGIH.

**Reproductive Effects:** TDLo Rat 1 day (intratesticular) 12976  $\mu\text{g/kg}$ ; TDLo Rat 1 day (intravaginal) 29 mg/kg pre pregnancy continuous.

**Target Organs:** No data available.

## SECTION 12 – ECOLOGICAL INFORMATION

**Ecotoxicological Information:** TLm Daphnia 15 ppm/96 hr fresh water/ conditions of bioassay not specified.

**Persistence and Degradation:** No data available



Customer Service 800-864-1742  
FAX 888-273-6226

## **SECTION 13 – DISPOSAL CONSIDERATIONS**

Under the Resource Conservation and Recovery Act (RCRA), it is the responsibility of the user to determine whether a substance should be classified as a hazardous waste at the time of disposal. This is due to the fact that product use, transformation, synthesis, mixtures, etc. may change the nature of the product. Product containers should be thoroughly emptied before disposal. Dispose of waste in accordance with applicable federal, state, and local laws.

## **SECTION 14 – TRANSPORTATION INFORMATION**

**DOT Shipping Name:** Ferric Chloride Solution

**Hazard Class:** 8 – Corrosive Material

**UN Number:** UN 2582

**Packing Group:** III

**Reportable Quantity:** 1000 lbs (454 kg)

**Shipping Containers:** Rubber-lined steel tank cars/trucks; polyethylene drums, bottles

**Storage Conditions:** Keep containers closed

## **SECTION 15 – REGULATORY INFORMATION**

**OSHA:** Hazardous Corrosive Liquid – 29 CFR 1920.1200

OSHA Process Safety (29 CFR 1910.119): No

**CERCLA:** Hazardous Substance – Reportable Quantity (RQ) = 1000 lbs (454 kg)

**SARA Regulations:** 313 and 40 CFR 372: No

**SARA Hazard Categories, SARA Sections 311/312 (40 CFR 370.21):**

Acute: Yes; Chronic: No; Fire: No; Reactive: No; Sudden Release: No

**Clean Water Act:** Designated as a hazardous substance under Section 311(b)(2)(A) of the Federal Water Pollution Control Act; ferric chloride is also regulated by the Clean Water Act Amendments of 1977 and 1978. This chemical is subject to regulations regarding its discharge.

**TSCA Inventory Status:** Yes

**California Proposition 65:** No

**Right-To-Know Lists:** Massachusetts, California, Pennsylvania, New Jersey. This substance does not contain nor is manufactured with ozone-depleting substances.



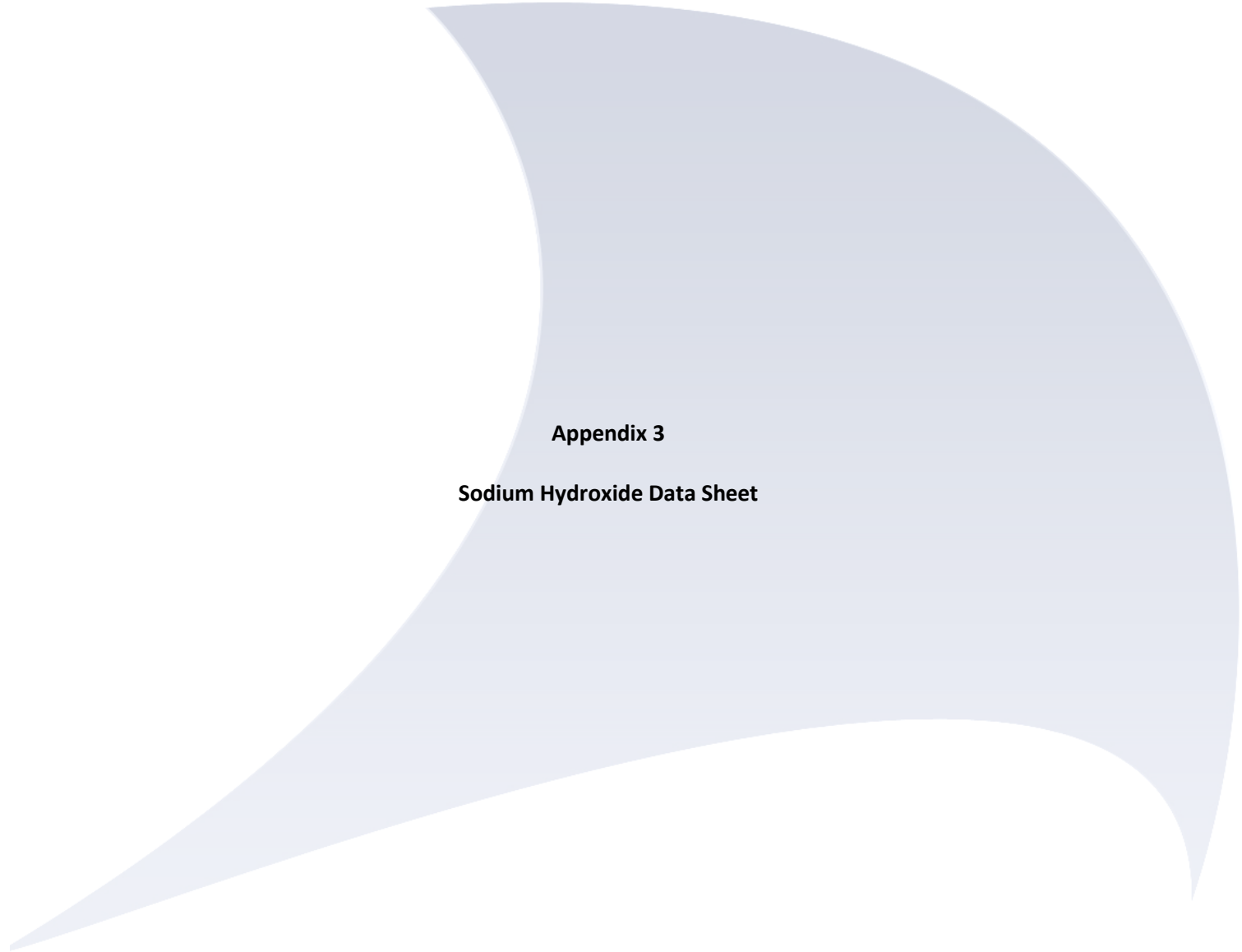
Customer Service 800-864-1742  
FAX 888-273-6226

## **SECTION 16 – OTHER INFORMATION**

**IMPORTANT! Read this MSDS before use or disposal of this product. Pass along the information to employees and any other persons who could be exposed to the product to be sure that they are aware of the information before use or other exposure.**

Pencco provides the information contained in each material safety data sheet ("MSDS"), technical data sheet ("TDS"), product information brochure and/or information contained herein (including data and statements) in good faith and makes no representations as to its comprehensiveness or accuracy as of the date of publication. The MSDSs, TDSs, and product information brochures are referred to collectively as the "Data Sheets". It is the responsibility of the user to obtain and use the most recent version of the Data Sheets. Each Data Sheet relates only to the specific product designated therein and may not be valid where such product is used in combination with any other materials or in any process. Further, since the conditions and methods of use of the product and information are beyond the control of Pencco, Pencco expressly disclaims any and all liability as to any consequential damages or results obtained or arising from any use of the products or the information contained in the Data Sheets. NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY PARTICULAR PURPOSE OR ANY OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE AS CONCERNS THE DATA SHEETS OR THE RELATED PRODUCTS.

No statement made in the Data Sheets or by any employee or agent of Pencco shall be construed as a permission or recommendation for the use of any product in a manner that might infringe existing patents. No employee, agent, distributor, or sales representative is authorized to vary the terms of the above paragraph, to make any statements, representations, or warranties inconsistent with the above paragraph, or to provide any information that is at variance with the above paragraph. All materials related to the product are subject in all respects to the above paragraph and to the extent that they are inconsistent with the above paragraph, the terms of the above paragraph shall control.



## **Appendix 3**

### **Sodium Hydroxide Data Sheet**

Revision Date 16/02/2015

Revision 10

Supersedes date 24/05/13



## SAFETY DATA SHEET

### Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

#### SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

##### 1.1. Product identifier

<b>Product name</b>	Caustic Soda (Sodium Hydroxide Solution), 5 - 51%
<b>Synonyms, Trade Names</b>	Caustic Soda Liquor, Sodium Hydroxide Solution, Lye
<b>REACH Registration number</b>	01-2119457892-27
<b>CAS-No.</b>	1310-73-2
<b>EC No.</b>	215-185-5

##### 1.2. Relevant identified uses of the substance or mixture and uses advised against

<b>Identified uses</b>	Treatment of drinking water, has received approval by the European Committee for Standardisation. Treatment of waste water. Raw material. Neutralising agent. pH regulating agent Manufacture of substances. Absorbant for gases and liquids Manufacturing soaps Washing and cleaning products
------------------------	---

##### 1.3. Details of the supplier of the safety data sheet

<b>Supplier</b>	Industrial Chemicals Limited Hogg Lane Grays Essex RM17 5DU United Kingdom T: +44 (0)1375 389000 F: +44 (0)1375 389110 sds@icgl.co.uk
-----------------	---

##### 1.4. Emergency telephone number

+44 (0)1865 407333 (24-hour)

#### SECTION 2: HAZARDS IDENTIFICATION

##### 2.1. Classification of the substance or mixture

###### Classification (EC 1272/2008)

Physical and Chemical Hazards	Met. Corr. 1 - H290
Human health	Skin Corr. 1A - H314; Eye Dam. 1 - H318
Environment	Not classified.

###### Classification (1999/45/EEC)

C;R35.

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

###### Human health

Corrosive. Prolonged contact causes serious eye and tissue damage.

###### Environment

Substantial amounts of the product may lead to a local change in acidity in small water systems which may have adverse effects on aquatic organisms.

##### 2.2. Label elements

<b>EC No.</b>	215-185-5
<b>Contains</b>	SODIUM HYDROXIDE
<b>Label In Accordance With (EC) No. 1272/2008</b>	

# Caustic Soda (Sodium Hydroxide Solution), 5 - 51%


**Signal Word**

Danger

**Hazard Statements**

H290 May be corrosive to metals.  
 H314 Causes severe skin burns and eye damage.  
 H318 Causes serious eye damage.

**Supplementary Precautionary Statements**

P234 Keep only in original container.  
 P280 Wear protective gloves/protective clothing/eye protection/face protection.  
 P260 Do not breathe vapour/spray.  
 P264 Wash contaminated skin thoroughly after handling.  
 P321 Specific treatment (see medical advice on this label).  
 P301+330+331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.  
 P303+361+353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.  
 P304+340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.  
 P305+351+338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
 P310 Immediately call a POISON CENTER or doctor/physician.  
 P363 Wash contaminated clothing before reuse.  
 P390 Absorb spillage to prevent material damage.  
 P405 Store locked up.  
 P406 Store in corrosive resistant/... container with a resistant inner liner.  
 P501 Dispose of contents/container to ...

## 2.3. Other hazards

### SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

## 3.2. Mixtures

SODIUM HYDROXIDE		40-60%
CAS-No.: 1310-73-2	EC No.: 215-185-5	
Classification (EC 1272/2008)	Classification (67/548/EEC)	
Met. Corr. 1 - H290	C;R35	
Skin Corr. 1A - H314		
Eye Dam. 1 - H318		

The Full Text for all R-Phrases and Hazard Statements are Displayed in Section 16.

REACH Registration number 01-2119457892-27  
 CAS-No. 1310-73-2  
 EC No. 215-185-5

**Composition Comments**

Mercury (Rayon) grade contains a low level of mercury, typically less than 0.1 ppm. Diaphragm grade contains up to 1.3% sodium chloride, which increases the density of the solution.

### SECTION 4: FIRST AID MEASURES

## 4.1. Description of first aid measures

**General information**

Get medical attention immediately! CAUTION! First aid personnel must be aware of own risk during rescue!

## Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

### Inhalation

Rinse nose, mouth, and throat with running water.

### Ingestion

Do not induce vomiting. If confined to the mouth, rinse mouth thoroughly and ensure water is not swallowed. If swallowed, drink plenty of water. If substance has been swallowed, give water or milk to drink immediately. Get medical attention immediately!

### Skin contact

Remove contaminated clothes and rinse skin thoroughly with water. Get medical attention immediately!

### Eye contact

Promptly wash eyes with plenty of water while lifting the eye lids. Continue to rinse for at least 15 minutes.

## 4.2. Most important symptoms and effects, both acute and delayed

### General information

Strong corrosive action on all body tissue, causing burns and frequently deep ulceration, and ultimately scarring.

### Inhalation

Mist/droplets are irritating to the respiratory tract, and will cause a burning sensation in the throat, coughing, and breathing difficulties. Pulmonary oedema (excessive liquid in the lungs) can occur after inhalation of higher amounts.

### Ingestion

Causes severe damage to gastrointestinal tract. Can cause perforation and scarring.

### Skin contact

Burning pain and severe corrosive skin damage. Causes burns, deep ulceration, and scarring. Frequent contact with lower concentrations may cause eczema.

### Eye contact

Corrosive to eyes. May cause severe corneal damage, reduced vision, or even blindness.

## 4.3. Indication of any immediate medical attention and special treatment needed

## SECTION 5: FIREFIGHTING MEASURES

### 5.1. Extinguishing media

#### Extinguishing media

The product is non-combustible. Use fire-extinguishing media appropriate for surrounding materials.

### 5.2. Special hazards arising from the substance or mixture

#### Hazardous combustion products

Contact with some metals can liberate flammable hydrogen gas.

### 5.3. Advice for firefighters

#### Protective equipment for fire-fighters

Self contained breathing apparatus and full protective clothing must be worn in case of fire.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

Wear protective clothing as described in Section 8 of this safety data sheet. In case of spills, beware of slippery floors and surfaces.

### 6.2. Environmental precautions

Do not discharge into drains, water courses or onto the ground. Contain spillages with sand, earth or any suitable adsorbent material. Release to rivers will cause a strong increase in pH, resulting in death to aquatic organisms. Spillages or uncontrolled discharges into watercourses must be IMMEDIATELY alerted to the Environmental Agency or other appropriate regulatory body.

### 6.3. Methods and material for containment and cleaning up

Small Spillages: Neutralise with weak acid and wash away with water. Alternately, drench spill with water and wash away. Large Spillages: Isolate and pump into a tank. Dispose of via a licensed hazardous waste contractor. Keep people and animals away from contaminated areas.

### 6.4. Reference to other sections

## SECTION 7: HANDLING AND STORAGE

### 7.1. Precautions for safe handling



## Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

Following prolonged storage in metal tanks, a black sludge will collect at the bottom of the tank. This will contain iron, sodium carbonate, and when Mercury (Rayon) grade is stored, mercury. Test the atmosphere in the tank for oxygen and mercury vapour before entering. Appropriate care must be taken when removing and handling this sludge, including control of atmospheric levels. Handle with care as an alkaline material. Take care when diluting with water (heat generation). Avoid contact with skin and eyes. Avoid generation of sprays or mists.

### 7.2. Conditions for safe storage, including any incompatibilities

Store in vessels of mild steel. Keep away from acids and other chemicals that react with this product. Build-up of white metal carbonate crystals may occur if tank is open to air.

### 7.3. Specific end use(s)

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

Name	STD	TWA - 8 Hrs		STEL - 15 Min		Notes
SODIUM HYDROXIDE	WEL				2 mg/m <sup>3</sup>	

WEL = Workplace Exposure Limit.

### 8.2. Exposure controls

#### Protective equipment



#### Engineering measures

Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded.

#### Respiratory equipment

If ventilation is insufficient, suitable respiratory protection must be provided.

#### Hand protection

Wear protective gloves. Rubber or plastic.

#### Eye protection

Goggles/face shield are recommended.

#### Other Protection

Chemical suit and boots if handling large quantities.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

### 9.1. Information on basic physical and chemical properties

Appearance	Colourless liquid.
Odour	Odourless.
Solubility	Miscible with water
Initial boiling point and boiling range (°C)	142
Melting point (°C)	For 50% Membrane grade 12
Relative density	For 50% Membrane grade 1525 20
Viscosity	For 50% Membrane grade 78 cP 20
	For 50% Membrane grade

### 9.2. Other information

# Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

## SECTION 10: STABILITY AND REACTIVITY

### 10.1. Reactivity

### 10.2. Chemical stability

### 10.3. Possibility of hazardous reactions

### 10.4. Conditions to avoid

Vessels should not be open to air; substance absorbs water and carbon dioxide. In extreme cases, the carbonate can form white floating crystals. Do not store adjacent to incompatible materials, such as acids and amphoteric metals eg aluminium, magnesium, zinc, tin and bronze - may release hydrogen gas.

### 10.5. Incompatible materials

#### **Materials To Avoid**

Reaction with ammonium compounds releases ammonia. May react violently with acrolein, acrylonitrile, and allyl alcohol. Heating with trichloroethylene will form explosive mixtures of dichloroacetylene. Some plastics, leather and textiles are destroyed on contact. Mixture with water or acids will release large quantities of heat.

### 10.6. Hazardous decomposition products

Thermally stable to boiling point; does not decompose. Precipitation of metal hydroxide crystals can occur below 12C.

## SECTION 11: TOXICOLOGICAL INFORMATION

### 11.1. Information on toxicological effects

#### **General information**

Strong corrosive action on all body tissue, causing burns and frequently deep ulceration, with ultimate scarring.

#### **Inhalation**

Mist/droplets are corrosive to the respiratory tract, and will cause a burning sensation in the throat, coughing and breathing difficulties. Pulmonary oedema (excessive liquid in lungs) can occur after inhalation of higher amounts.

#### **Ingestion**

If ingested will cause severe damage to gastrointestinal tract. Can cause perforation and scarring.

#### **Skin contact**

Corrosive to body tissue, causing burns, deep ulceration, and scarring. Frequent contact with lower concentrations may cause eczema.

#### **Eye contact**

Vapour or spray may cause eye damage, impaired sight or blindness.

## SECTION 12: ECOLOGICAL INFORMATION

#### **Ecotoxicity**

Spillage will cause localised damage to animals and plants on the ground. Do not allow release into controlled waters; resulting high pH will affect aquatic life forms. If allowed to enter drains will damage effluent treatment organisms. Neutralisation and dilution will greatly reduce these effects. Product is chemically degradable into sodium carbonate.

### 12.1. Toxicity

LC 50, 96 Hrs, Fish mg/l                      45.4

### 12.2. Persistence and degradability

### 12.3. Bioaccumulative potential

### 12.4. Mobility in soil

### 12.5. Results of PBT and vPvB assessment

### 12.6. Other adverse effects

# Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

## SECTION 13: DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods

Neutralise with dilute acid and wash away with large amounts of water. Confirm disposal procedures with environmental engineer and local regulations.

## SECTION 14: TRANSPORT INFORMATION

### 14.1. UN number

UN No. (ADR/RID/ADN) 1824

### 14.2. UN proper shipping name

Proper Shipping Name SODIUM HYDROXIDE SOLUTION

### 14.3. Transport hazard class(es)

ADR/RID/ADN Class Class 8: Corrosive substances.

Transport Labels



### 14.4. Packing group

ADR/RID/ADN Packing group II

IMDG Packing group II

ICAO Packing group II

### 14.5. Environmental hazards

### 14.6. Special precautions for user

Hazard No. (ADR) 80

### 14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

## SECTION 15: REGULATORY INFORMATION

### 15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

### 15.2. Chemical Safety Assessment

No chemical safety assessment has been carried out.

## SECTION 16: OTHER INFORMATION

### General information

The material must only be loaded and unloaded from tankers by trained personnel, such as those with a Hazchem certificate.

Sodium hydroxide solution is used as a chemical for the treatment of drinking water, as approved by the European Committee for Standardisation under EN 896:2005.

This data sheet was prepared in accordance with EC 1907/2006 concerning REACH.

### Revision Comments

Updated Section(s) 1,

Issued By D.Kelly

## Caustic Soda (Sodium Hydroxide Solution), 5 - 51%

Revision Date 16/02/2015

Revision 10

Supersedes date 24/05/13

### Risk Phrases In Full

R35 Causes severe burns.

### Hazard Statements In Full

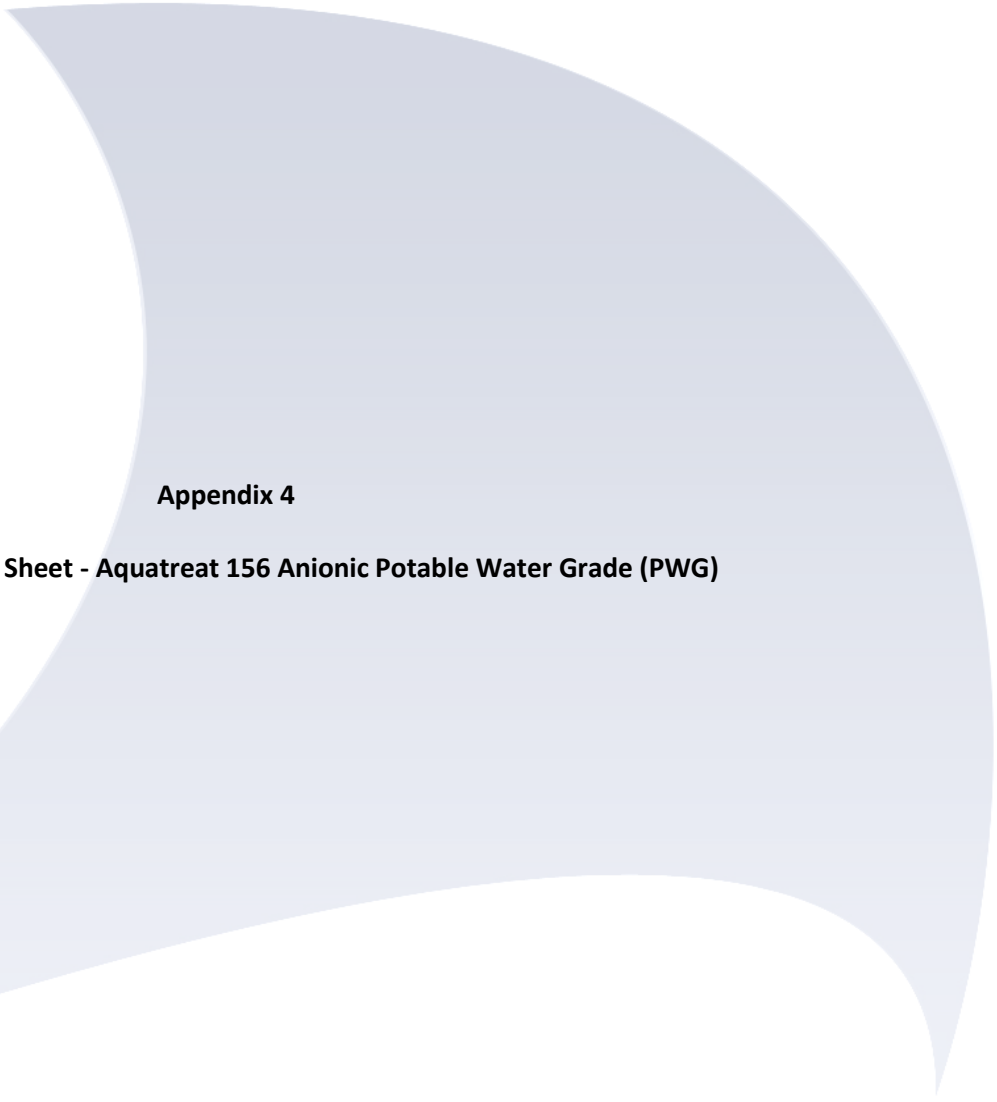
H318 Causes serious eye damage.

H314 Causes severe skin burns and eye damage.

H290 May be corrosive to metals.

### Disclaimer

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.



## **Appendix 4**

### **Anionic Polymer Data Sheet - Aquatreat 156 Anionic Potable Water Grade (PWG)**

## Material Safety Data Sheet

Page 1 of 5

### Section 1: Identification of Substance/mixture and of the company undertaking

#### 1.1: Product Identifier

Product Name    AQUATREAT 156

#### 1.2: Relevant Identified use of substance/mixture and uses advised against

#### 1.3: Details of the Supplier of the safety data sheet

Company Name: Aquatreat

Albany House  
North Dock  
Llanelli  
Carmarthenshire  
SA15 2LF

Telephone: 01554 775236

Fax: 01554 772253

E-mail: [enquiries@aquatreat.co.uk](mailto:enquiries@aquatreat.co.uk)

Website: [www.aquatreat.co.uk](http://www.aquatreat.co.uk)

#### 1.4: Emergency Telephone Numbers:

Emergency Telephone: 0333 333 949

### Section 2: Hazards Identification

#### 2.1: Classification of substance/mixture according to Regulation (EC) No 1272/2008

Classification under CLP:    NC                      Not Classified as Hazardous

Additional Information:

#### 2.2: Label Elements: Labelling according to Regulation (EC) No 1272/2008 [CLP/GHS]

Label elements under CLP:    NC                      Not Classified as Hazardous

Signal Words:

Hazard Pictograms:

Precautionary Statements

Wear protective gloves/protective clothing/eye protection/face protection.

Keep out of reach of children.

#### 2.3: Other Hazards

### Section 3: Composition information on hazardous ingredients

Does not contain any components classified as hazardous

EINECS	CAS No	CLP Classification	Percent

**Section 4: First Aid Measures****4.1: Description of First Aid measures**

**Skin Contact:** Remove contaminated clothing. Wash contaminated area well with soap and water. If irritation persists obtain medical attention.

**Eye Contact:** Irrigate eye with water for 15 minutes. If irritation or redness persists seek medical attention.

**Ingestion:** Do not induce vomiting. Do not give anything by mouth to an unconscious person. If conscious rinse out mouth with water and give water to drink. Rest and reassure patient and obtain medical attention

**Inhalation:** Remove person to fresh air. If recovery is delayed seek medical attention.

**4.2: Most important symptoms and effects both acute and delayed**

**Skin Contact:** No data available

**Eye Contact:** No data available

**Ingestion:** No data available

**Inhalation:** No data available

**4.3: Indication of any immediate medical treatment and special treatment required****Section 5: Fire fighting measures****5.1: Extinguishing media**

Foam, dry powder, CO2

**Unsuitable Media**

None

**5.2: Special hazards arising from the substance/mixture**

Product does not burn readily, but flammable dust clouds may be formed in air.

**5.3: Advice for firefighters**

Chemical protection suit, gloves, goggles, self-contained breathing apparatus.

**Section 6: Accidental Release Measures****6.1: Personal precautions, protective equipment and emergency procedures**

For personal protection see section 8.

**6.2: Environmental precautions**

Should not be released into the environment.

**6.3: Methods and Materials for containment and clean up**

Do not flush into surface waters or sanitary sewer system. Sweep up and shovel into suitable containers for disposal. Residues and small spillages may be hosed away with water. Spilled product which becomes wet may cause a slip hazard.

**6.4: References to other sections**

**Section 7.0: Handling and Storage****7.1: Precautions for safe handling**

Avoid dust formation during handling. For personal protection see section 8.

**7.2: Conditions for safe storage.**

To avoid product degradation and equipment corrosion, do not use iron, copper or aluminium containers or equipment. The product is hygroscopic. Protect from moisture.

**7.4: Specific End Use(s)****Section 8: Exposure controls/Personal Protection****8.1: Control Parameters**

Contains no substances with occupational exposure limit values.

WORKPLACE EXPOSURE		Respirable Dust	
8 Hour TWA	15MinSTEL	8 HoursTWA	15MinSTEL

**8.2: Exposure Controls**

**Engineering Measures** Handle in accordance with good industrial hygiene and safety practice. Ensure adequate ventilation. Ensure that eyewash stations and safety showers are close to the workstation location.

**Respiratory Protection** In case of inadequate ventilation wear respiratory protection. (filter P2)

**Hand Protection** Nitrile rubber gloves

**Eye Protection** Safety glasses/goggles

**Skin Protection** Normal work overalls

**Section 9.0: Physical and Chemical Properties****9.1: Information on basic physical and chemical properties**

State: Solid

Colour: White

Odour: Odourless

Relative Density: n/a

pH: n/a

**9.2: Other Information****Section 10: Stability and Reactivity****10.1: Reactivity****10.2: Chemical Stability**

Stable at ambient temperature.

**10.3: Possibility of Hazardous Reactions**

None known

**10.4: Conditions to Avoid**

Wet, damp, and humid conditions



## 10.5: Incompatible Materials

Strong oxidizing agents

## 10.6: Hazardous Decomposition Products

ammonia, Carbon oxides (COx), Nitrogen oxides (NOx)

## Section 11: Toxicological Information

AQUATREAT 156

ORAL	RAT	LD50	>2500 mg/kg
------	-----	------	-------------

## Section 12: Ecological Information

## 12.1: Toxicity

96 Hr LC50 (fish) expected to be > 100ppm by analogy to similar products

## 12.2: Persistence and Biodegradable

Ready biodegradability/OECD Test Guideline 301 D/28 d: < 10 %

## 12.3: Bioaccumulative Potential

Bioaccumulation is unlikely. Because of the high molecular weight of the polymer diffusion through biological membranes is very small.

## 12.4: Mobility in Soil

## 12.5: Results of PBT and vPvB Assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

## 12.6: Other adverse effects

## Section 13: Disposal Information

Recycling, recovery and reuse of materials is recommended if permitted by regulations. The organic ingredients can be incinerated in a suitable installation when in accordance with local regulations. Packages must be disposed of according to local and national regulations.

## Section 14: Transport Information

UN Number	
Shipping Name	Not classified as dangerous for transport
Transport Class	
Packing Group	
Environment Hazard	
Special Precautions	

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

## Section 15: Regulatory Information

## 15.1: Safety, Health and Environmental regulations/legislation specific for the substance/mixture

## 15.2: Chemical safety assessment

## Section 16: Other information

The above information is based on our present knowledge of the product at the time of publication. It is given in good faith, no warranty is implied as to the quality or specification of the product. Information contained in this data does not constitute an assessment of workplace risks. The user must satisfy himself that the product is entirely suitable for their purpose



Registered Office: InTec, Parc Menai, Bangor, Gwynedd, LL57 4FG

**Tel:** 01248 672666

**Fax:** 01248 672601

**Email:** [contact@caulmert.com](mailto:contact@caulmert.com)

**Web:** [www.caulmert.com](http://www.caulmert.com)