



Jones Brothers Limited

Land off Hafod Wen, Tonyrefail, Porth, South Wales

Surface water and silt management plan

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RSK GENERAL NOTES

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Title: Surface water and silt management plan – Land off Hafod Wen, Tonyrefail, Porth, South Wales

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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1 INTRODUCTION

1.1 Scope and objectives

RSK Environment Limited (RSK) was commissioned by Jones Brothers Limited to produce a Surface Water and Silt Management Plan (SWMP) for the land known as Land off Hafod Wen, Tonyrefail, Porth, South Wales. A site location plan is presented as **Figure 1**.

This site-specific SWMP has been developed to outline the initial mitigation measures and water/silt management strategies that will be applied in a staged approach to enable the construction of the site infrastructure, including the attenuation basins, main roads and associated drainage infrastructure. The mitigation and management measures are set out across four key development stages as shown on **Figures 3, 4, 5 and 6**.

The objectives of this SWMP are as follows:

- Recommend appropriate mitigation, including monitoring and implementation of contingencies to control and minimise surface water pollution associated with site activities.

The following aspects have been considered during the development of this SWMP:

- The development activities that produce potential sources of surface water pollution and their point(s) of release to surface water; and
- The mitigation measures that are to be implemented to prevent, as far as is practicably feasible, the potential effect of any pollution release to surface water, and details of the persons responsible for the actions at the site.

This document must be considered as a 'living' document and must be regularly reviewed and amended to reflect site-specific changes or conditions as the development/build progresses.

It is noted that the site management team will undertake routine inspections of the surface water infrastructure during the development programme. Silt mitigation specified within the SWMP will be reviewed during each of those inspections and where necessary, further advice sought from RSK.

This report is subject to the RSK service constraints given in **Appendix A**.

1.2 Site setting

The site is located in on the north-east outskirts of Tonyrefail approximately 0.7km northeast of the town centre at a National Grid Reference of 301862, 188693. The site is accessed via Hafod Wen in the approximate centre of the western site boundary.

The site covers approximately 2.5 hectares (Ha) in area. The site is set within a mixed rural and residential setting with existing residential areas to the west; agricultural fields to the north; and open grassland to the east. The site is bound to south by an unnamed

single track road with residential properties beyond. Land bounding the site to the east is designated as the Rhos Tonyrefail Site of Special Scientific Interest. (SSSI).

The site is located on the steep hillside north-east of the town centre. The site slopes down from north to south with an overall change of height of approximately 33m over a length of the site (approximately 233m). Access to the site is via an existing housing estate and Hafod Way. The western boundary comprises rear gardens of existing houses.

1.2.1 Environmental setting

1.2.1.1 Surface watercourses

A tributary of the Nant Muchudd surface water course flows from north to south along the eastern site boundary, within the designated SSSI. The watercourse becomes culverted beneath the residential estate to the south before emerging approximately 210 m south of the site boundary.

1.2.1.2 Geological and hydrogeological setting

Published British Geological Survey (BGS) geological records shows that the site is generally underlain by sandstone of the Rhondda member. The Rhondda member is described as comprising sandstone, mudstone and siltstone. Crossing through the north of the site, records show the conjectured outcrop of the No.1 Rhondda coal seam trending from east-west across the site.

Superficial deposits in the form of Till Devensian are indicated in the eastern and south-eastern part of the site only. No superficial deposits are shown overlying the bedrock in the west or north of the site. The Till is described as consisting of a heterogenous mixture of clay, sand, gravel, and boulders.

It is likely that the superficial deposits (where present) and the weathered bedrock are likely to and include clay, silt and sand with fine soils that contain a significant proportion of clay with a particle size of <0.002 mm and silt (0.002-0.05 mm size). These particle sizes readily mobilise to surface water when disturbed and remain suspended within the water column for long durations/distances. Suspended clay/silt can therefore migrate significant distances on these types of ground conditions and are difficult to settle from the water column without pre-treatment.

The bedrock is classified as a Secondary A aquifer and the Till as a Secondary undifferentiated aquifer. The site does not fall within a designated groundwater Source Protection Zone (SPZ). Therefore, the hydrogeological setting is expected to be less sensitive than the hydrology (surface water receptors).

1.2.1.3 Site history and ground investigations

An intrusive site investigation was undertaken by Integral Geotechnique in October 2020 with a supplementary deep borehole investigation later undertaken in March 2021. A copy of the report (ref 12710/RAH/20/SI/RevA, dated March 2021) detailing the investigation has been provided to RSK for review.

The intrusive investigation identified topsoil, comprising dark brown sandy slightly gravelly clay, over glacial Till in the majority of investigation locations. The Till was noted to

comprise soft firm orange brown, slightly gravelly sandy silty clay over firm stiff brown sandy gravelly silty clay and medium dense silty clay sandy gravel of sandstone. The glacial Till was proven to a depth of between 0.6 m and 2.2 m below ground level (bgl). The underlying bedrock geology was noted to comprise the weathered Rhondda Member (sandstone or mudstone) comprising grey brown sandy gravel with cobbles of sandstone and mudstone.

Infiltration of shallow perched groundwater was recorded in three locations at depths of between 1.0 m and 2.4 m bgl.

No visual or olfactory evidence of contamination was noted within either the topsoil or natural soils. Laboratory testing of the soils was only undertaken from the topsoil. None of the samples submitted to the laboratory identified any chemical compounds present at concentrations above the thresholds determined suitable for human health analysis.

1.2.1.4 Environmental designations

Based on publicly available information on the DEFRA website (<https://magic.defra.gov.uk/MagicMap.aspx>), designated environmentally sensitive land has been identified immediately to the east and approximately 390 m north of the site. The land immediately north and east of the site boundary have been designated a biological Site of Special Scientific Interest (SSSI) by the Countryside Council for Wales in 2007 known as Rhos Tonyrefail. Ancient woodland is located 178m south-east of the site.

1.2.2 Site walkover

RSK undertook a site inspection walkover on 15th March 2024 in support of the preparation of the initial SWMP report. At the time of the walkover, enabling works were underway at the site with significant earthworks having been undertaken to create 'terracing' to provide a suitable development formation. The central and south-eastern drainage basins were noted to be partially excavated. The central basin was larger in size than proposed so that it could temporarily contain surface water runoff at the site, preventing it from discharging. A small temporary basin was present within the northern 1/3 of the site collecting surface water runoff from the fields to the north.

Large stockpiles of excavated material were noted in the northern third of the site. Construction of the main highway infrastructure and below ground infrastructure was yet to commence. Works to retain the terraced walls were underway and a precast retaining wall was being installed along the site southern boundary.

Surface water at the site was being circulated via pumps between the two basins. Surface water runoff was being directed into each of the basins via temporary drainage channels with straw bales and gravel acting as check dams.

1.3 Proposed development & drainage system

The site is undergoing development for residential end use comprising traditional housing units with associated private gardens, associated infrastructure including foul and storm sewers, hardstanding and areas of soft landscaping and areas of public open space

(POS). The centre of the site has been set aside for a surface water attenuation basin together with a small attenuation feature on the south eastern corner of the site. Proposed development plans are included within **Appendix B**.

The completed surface water drainage system will comprise standard highway surface water gullies on roads across the site, areas of permeable paving and rain gardens at the front of proposed plots. These will drain into the below ground storm sewer system, that will discharge to the central attenuation basin via a gabion basket cascade. The central basin and southern half of the site surface water network drains either directly into a basin in the south-east corner of the site or into a swale, located along the eastern site boundary, before discharging into the south-east basin. The south-eastern attenuation basin will discharge into the stream bounding the site in the east. The basins and surface water management structures (swales) for the development have been designed to replicate Greenfield runoff rates and therefore flooding of the hydraulically down-stream environment is not envisaged to be relevant. Surface water attenuation capacity at the site is increased by the inclusion of below ground attenuation crates, designed beneath each of the basins. These will operate on overflow valves, filling up prior to each basin reaching capacity. At the time of undertaking the site walkover, the two basins have excavated within the proposed positions. However, neither are formed to their final shape and size. The central basin is currently noted to be enlarged to retain surface water on site and prevent water from discharging from the site.

To enable the construction of the basin and crate system, followed by the construction of the access roads and associated below ground infrastructure, temporary dewatering of the site via an automatic pump and treat, treatment system (provided by Siltbuster) will be required. This will pump water from the central and south-eastern basins via a treatment facility and settlement tanks to the outfall in the south-east corner of the site. This system will be used to remove suspended sediment from the water, on site, prior to discharge, under controlled conditions. Discharge from the automatic system will be made via an outfall pipe over a polishing capture channel at the discharge location until the outfall headwall is constructed. After which, the outfall headwall will be used with the passive management measures. Further details of this are set out in the following sections of this report.

Once dewatered, surface water at the site will be managed by chemical dosed passive means. Temporary swales across the site will be used with flocculant dosed silt mats and gel flocculant blocks to draw the sediment out of the water prior to reaching the basin in the south-east corner of the site. Water will then be discharged via the outfall in the south-east of the site.

Discharge of surface waters from the site will be made via one outfall location. As a result, the passive chemical treatment measures will only be implemented once the automatic pump and treat system (Siltbuster) is no longer required.

An emergency discharge point has established at the centre of the western boundary where the site entrance meets Hafod Wen. RSK understands that the local water authority has been approached to obtain a licence for discharging surface water to the existing off site foul network at a rate of 1 l/s. At the time of preparing this report, authorisation had not been granted.

Further details of the automatic chemical treatment facility and the passive treatment / management methods proposed for the site are detailed in the following sections of this report.

A separate foul water sewer system will be present on site. The proposed drainage layout drawings are presented within **Appendix B**.

1.3.1 Site discharge locations and discharge rates

Site surface water run-off will be discharged from the site boundary via a single point. The approximate location for the discharge point to the adjacent tributary of the Nant Muchudd is set out in **Table 1**.

Table 1: Site discharge point

Location		Outfall type	Easting	Northing
OF1	South-east corner	Basin Headwall	301961	188634
OF2	Automatic chemical treatment plant - South-east corner	Pipe adjacent to basin headwall	301961	188634
OF3	Western site boundary	Discharge to existing foul network – offsite	301791	188680

The discharge rates from the temporary automatic treatment system will be restricted to the discharge rates agreed through planning, to meet the Greenfield runoff rates. These are detailed on the drainage layout drawing contained in **Appendix B**. Discharge from the completed basin will be via a hydrobreak to a gabion headwall within the tributary of the Nant Muchudd. Discharge rates at the hydrobreak will also be restricted to the Greenfield run off rates as agreed through the planning process.

1.4 Sediment contaminant linkage

The process of sediment contamination of surface waters and receptors can be broken down into a pollutant linkage comprising of a source, pathway and receptor. This model forms the basis of land and groundwater contamination assessment and can also be used to assess the pollution of surface waters by construction related suspended solids. The source, pathway and receptors relating to the site and general construction activities is discussed below.

1.4.1 Sources of sediment mobilisation

Mobilised sediment is generated from disturbance and/or disintegration of soils across the site. Generally, the most significant volume of mobilised sediment is generated during the initial phase of enabling/preparatory works including infrastructure construction and soil stripping activities.

Mobilisation of soils are also subject to prevailing weather conditions, with adverse weather (heavy and/or prolonged precipitation) potentially causing significant sediment to be mobilised.

1.4.2 Pathways for sediment migration

Sediment can migrate via several pathways including direct surface run-off (over-ground flow) determined by topographic relief or preferential migration pathways, via new and proposed infrastructure (e.g. roads, land drains, gullies, culverts, drainage basins, swales), pumping (e.g. from dewatering of excavations) and natural migration of groundwater laterally through strata. Site-specific conditions normally determine the preferential pathways for sediment migration. At the Tonyrefail site, the primary migration pathway is via over-ground flow during rainfall and through the storm sewers during the construction phase.

1.4.3 Sensitive receptors to sediment

Potential sensitive receptors to mobilised sediment form the end part of the linkage, with a source and pathway preceding. Generally, mobilised sediment migrates along a pathway down a hydraulic gradient towards topographically lower-lying areas. Potential sensitive receptors generally include surface watercourses, infrastructure, vegetation, site occupiers, adjacent occupiers and designated environmentally sensitive sites.

On-site sensitive receptors to surface water and silt are identified as follows:

- Attenuation basins.
- Below ground surface water sewer system and attenuation crates.
- Residents in completed properties (upon completion and occupation).
- Highways on site (once constructed and completed).
- On site swales.

Off-site sensitive receptors to surface water and silt are as follows:

- The tributary to the Nant Muchudd along the eastern site boundary.
- The SSSI located off site to the east.
- Wider public highway realm off site beyond the site including the ford and highway culvert located immediately south-east.
- Residents beyond the site boundaries, particularly the southern boundary due to topographic changes.

2 SURFACE WATER POLLUTION SOURCE INVENTORY

2.1 Potential pre-existing contamination considerations

The site investigation works completed for the development area, indicated that the widespread presence of contamination (other than suspended solids) is not present and mitigation to be protective of controlled waters as a result of surface water runoff is not required.

2.2 Sources of surface water pollution

Due to the nature of site activities, there is the potential for suspended solids to be generated and mobilised in surface water run-off. **Table 2** provides a summary of the surface water pollution source inventory as well as associated hazards, receptors, and consequences.

Table 2: Surface water pollution sources identified at Tonyrefail, Porth

Hazard	Receptor	Pathway	Consequence at Receptor
Leak/spillage of hazardous material on site (e.g., oils and fuels).	Tributary of the Nant Muchudd	Via infiltration, overland flow or via the surface water drainage system (storm system).	Contamination of the tributary of the Nant Muchudd with hazardous substances.
Leak of oil/fuel from pumps used as part of a water treatment system or other temporary pumping activity.			
Discharge of water containing suspended solids (silt).		Overland flow from site boundary, or discharged from the outfall.	Contamination of the tributary of the Nant Muchudd water with suspended solids (silt).
Discharge of water containing chemicals from active treatment process.		Overland flow from site boundary, or discharged from the outfall.	Contamination of the tributary of the Nant Muchudd water with dosing chemicals.
Discharge of water containing chemicals from passive treatment process.		Overland flow from site boundary, or discharged from the outfall.	
Spillage of collected solids from settlement system.		Overland flow from site boundary, or discharged from the outfall.	Contamination of the tributary of the Nant

Hazard	Receptor	Pathway	Consequence at Receptor
Failure of pumping equipment – overflow of water from drainage etc.		Via surface flow or surface water drainage system.	Muchudd water with suspended solids (silt).
Vandalism – resulting in release of contaminants from containers.		Via surface flow.	Contamination of the tributary of the Nant Muchudd

3 PROTECTION MEASURES WITHIN ACTIVE DEVELOPMENT AREA

The 'active development area' refers to any phase/area of the site that is undergoing development. If the entirety of the site is undergoing some development, then the whole site should be considered under this section. For non-active development, refer to Section 4 of this report.

The primary source of sediment and silt-contaminated surface water is generated during the initial earthworks on site, during groundworks such as formation level excavation, forming of retaining walls and surface water basins, foundation excavation or below ground infrastructure emplacement. Furthermore, effects are likely to be greater during the winters months when higher rainfall levels are likely to occur. Without adequate sediment mitigation, there is the potential for controlled waters to be adversely affected by sediment contamination. The following section sets out proposed prevention and mitigation measures to address potential risks at each (four) major stage of the development. The prevention and mitigation measures for each of the four stages are illustrated on **Figures 3, 4, 5 and 6**.

The following protection measures should be implemented on all active development areas of the site. If conditions change that result in surface waters leaving the site boundary, then the silt mitigation must also be reviewed.

Silt mitigation should be reviewed regularly during the build phase. As the build progresses and areas are built out, silt mitigation prescribed during earlier phases may no longer be applicable. The silt mitigation should therefore be reviewed on a regular basis or as significant build milestones are completed.

3.1 Stage 1 works

The Stage 1 works are set to comprise the use of the active treatment system to dewater the central on-site basin. Stage 1 management and mitigation measures will enable the construction of the southern retaining wall and to dewater the site, enabling waters to be discharged rather than retained within the onsite basins. It is noted that the two southern cut off ditches / swales, shown on the Stage 1 management plan (**Figure 3**), are already in place at the development site and will become formalised as part of the mitigation measures.

Proposed management and mitigation measures for the Stage 1 works are set out on **Figure 3**.

3.1.1 Chemical treatment System

Due to the volume of sediment within the surface water collecting within the basins on site, initially, it will be important to utilise an active treatment system (under appropriate approval from Natural Resources Wales (NRW)). This will be used to dewater the basins on site until the passive treatment systems are operational. The proposed active chemical treatment system will assist with removing suspended sediment prior to discharge.

The active treatment measures will include liquid flocculant, coagulant and pH balancer pump and treat system. A copy of the chemical material safety data sheets are contained in **Appendix C**.

The active treatment system will be located in the south-east corner of the site with waters pumped from either of the basins off site to the discharge point (OF2). The treated waters will be discharged from the active treatment cell, via a clarifying / settlement unit and through a pipe to the temporary discharge point located at OF2.

3.1.2 Liquid flocculant, coagulant and pH balancer pump and treat system

The active pump and treat system will comprise a clarifying unit, utilising liquid flocculant, coagulant and pH balancer. The active system will comprise a pump passing water through a chemical pre-treatment system, which will dose incoming water with a flocculant, coagulant, and a pH balancer (if required). The dosing rate will vary depending on the incoming volume of suspended solids within the water and dosed accordingly.

The dosed water will then be distributed into clarifiers utilising a gravity based settlement system, which will remove the particles from suspension and capture them within the individual settlement tank units.

The treated water will be discharged from the treatment system and transferred via dedicated pipework to the designated discharge point (OF2).

The active pump and treat system will utilise ferric chloride as a coagulant and the anionic polymer AQ2084 (otherwise known as Aquatreat 2084) as the flocculant. If required, a pH balancer (sodium hydroxide) will be included into the treatment process to ensure that pH levels of water discharged from the treatment system do not fall below pH 6.

Depending on site conditions, the pumps supporting the liquid flocculant, coagulant and pH balancer pump and treat system will operate on a float switch or manually.

3.1.2.1 Maintenance of active treatment systems

Active treatment systems (including supporting pumps and pipework) will be monitored and maintained in accordance with the manufacturer's recommendations. Once set up and commissioned, the equipment supplier will provide full training to the site operatives detailing operational, management and maintenance procedures. The equipment supplier will ensure that sufficient training is received prior to discharging waters from the site.

When operational, the active treatment systems will be visually inspected on a daily basis by the site management team or other appointed person.

Additional monitoring will be undertaken as required during periods of higher use, such as during periods of heavy rainfall.

Should any evidence of faults be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought to address any issues or concerns prior to restarting the treatment process.

The active water treatment system should be retained until the passive management measures are fully established and water conditions, within the basins have sufficiently improved to enable discharge from the site without the treatment system. The pump and

treat automatic system can be removed once the south-eastern basin connection to the surface water is completed and waters within the basin are below the agreed threshold for sediment.

3.1.3 Passive management measures

To support the dewatering, the following passive mitigation and management measures should be established. These passive measures will be established for multiple phases of works at the development:

- Silt fencing should be installed along the northern boundary and part the way along the north-eastern boundary as shown on **Figure 3** to direct surface water runoff from the fields to the north around the site boundary.
- Silt fencing is to comprise a semi-permeable membrane staked at regular intervals with typical installation details presented on **Figure 3**. Importantly, the base of the membrane on silt fencing should be buried to prevent surface water from passing beneath it. For longer term protection and to reduce maintenance requirements, the fence installation would benefit from reinforcement with stockproof wire mesh fencing to reduce wind damage to the membrane. Examples of the silt fence materials and installation are also presented within **Appendix E**.
- All temporary basins should be compartmentalised. Compartmentalisation should be achieved through the use of a silt curtain of geotextile membrane wrapped straw bales to provide weir walls. The silt curtain design may be variable however, it is advised that the attenuation basin is compartmentalised for each inlet, ensuring that the silt curtain covers the full width of the basin including the sloping sides. The curtain / weir wall should be staked or weighed down to prevent lifting. Installation of the silt curtain / weir walls need to be reviewed and undertaken when water levels are low, alternatively, the basin may need to be dewatered with water moved to other basins (temporarily) to allow for installation.
- The temporary small pond located in the north of the site should be retained to capture surface water runoff from the northern third of the site and reduce the risk of surface water flooding in that area. A section of pipework should be used to divert the water from within the temporary basin towards the swales proposed for the eastern site boundary as shown on **Figure 3**.
- A series of temporary swales / cut off ditches, connected by sections of pipe, located beneath haul routes, are designed to direct surface water to the basin in the south-east corner of the site. The swales / ditches along the eastern boundary, where possible, should be installed in a zig zag format to help slow the flow of water. Stone check dams should be installed within each swale / trench at approximate 10 m intervals. These check dams should be supported by the placement of floc mats and silt mats as set out on **Figure 3**.
- Discharge from the site during this stage will be via pipework from the Siltbuster to a silt polishing channel along the site boundary. The polishing channel will protect the underlying soils between the discharge point and the watercourse to prevent silt from being remobilised. The channel will comprise a lined base using plastic sheeting, lined with silt mats and silt wattles.

- A separate settlement tank to the automatic treatment system shall be established adjacent to the site entrance at the western site boundary. This will be utilised if required, during periods of heavy rainfall to discharge surface water to the existing off-site foul drainage network (OF3) at a maximum discharge rate of 1 l/s (subject to approval from the local water board).

3.2 Stage 2 works

The Stage 2 works are set to comprise the use of the passive management measures supplemented by chemical treatment within the passive measures. At this stage, the active treatment system (Siltbuster) is expected to be removed from the site. Stage 2 management and mitigation measures will enable the construction of the central basin, along with the below ground attenuation crates and the construction of the retaining wall to the north. It is noted that the passive measures set out in Stage 1 will remain for the Stage 2 works. However, all surface water will temporarily bypass the central temporary basin.

Proposed management and mitigation measures for the Stage 2 works are set out on **Figure 4**. The following passive management measures are as follows:

- Silt fencing should be retained along the northern boundary and part the way along the north-eastern boundary as shown on **Figure 4** to direct surface water runoff from the fields to the north around the site boundary.
- Silt fencing is to comprise a semi-permeable membrane staked at regular intervals with typical installation details presented on **Figure 4**. Importantly, the base of the membrane on silt fencing should be buried to prevent surface water from passing beneath it. For longer term protection and to reduce maintenance requirements, the fence installation would benefit from reinforcement with stockproof wire mesh fencing to reduce wind damage to the membrane. Examples of the silt fence materials and installation are also presented within **Appendix E**.
- All temporary basins should be compartmentalised. Compartmentalisation should be achieved through the use of a silt curtain of geotextile membrane wrapped straw bales to provide weir walls. The silt curtain design may be variable however, it is advised that the attenuation basin is compartmentalised for each inlet, ensuring that the silt curtain covers the full width of the basin including the sloping sides. The curtain / weir wall should be staked or weighed down to prevent lifting. Installation of the silt curtain / weir walls need to be reviewed and undertaken when water levels are low, alternatively, the basin may need to be dewatered with water moved to other basins (temporarily) to allow for installation.
- The temporary small pond located in the north of the site should be retained to capture surface water runoff from the northern third of the site and reduce the risk of surface water flooding in that area. A section of pipework should be retained to divert the water from within the temporary basin towards the swales proposed for the eastern site boundary as shown on **Figure 4**.
- A series of temporary swales / cut off ditches, connected by sections of pipe, located beneath haul routes, are designed to direct surface water to the basin in the south-

east corner of the site. The swales / ditches along the eastern boundary, where possible, should be retained in a zig zag format to help slow the flow of water. Stone check dams should be retained and maintained within each swale / trench at approximate 10 m intervals. These check dams should be supported by the placement of floc mats and silt mats as set out on **Figure 4**.

- The sides of the swales / cut off ditches should be lined, turfed or seeded to prevent erosion of the banks and the mobilisation of sediment into the surface water feature.
- Gell flocculant blocks will be installed in three locations throughout the swales / cut off ditches to promote settlement of suspended solids (silt).
- Four gel blocks will be installed at each deployment position with a ratio of two Gel Flocculant 494 and two Gel Flocculant 398 blocks. 494 blocks will be installed upstream of the 398 blocks in an alternating chain approach. Locations for the placement and number of each flocculant block required is set out on **Figure 4**.
- Discharge from the site during this stage will be via a temporary overflow channel from the temporary basin in the south-east of the site to a silt polishing channel along the site boundary. The polishing channel will protect the underlying soils between the discharge point and the watercourse to prevent silt from being remobilised. The channel will comprise a lined base using plastic sheeting, lined with silt mats and silt wattles.
- A separate settlement tank to the automatic treatment system shall be retained adjacent to the site entrance at the western site boundary. This will be utilised if required, during periods of heavy rainfall to discharge surface water to the existing off-site foul drainage network (OF3) at a maximum discharge rate of 1 l/s (subject to approval from the local water board).
- Headwall protection is required at all inlets and outfalls to all basins and swales. The position of protection to be fitted and a generic design is presented in **Appendix E**.

3.3 Stage 3 works

The Stage 3 management and mitigation measures will enable the construction of the site access roads and associated below ground infrastructure, in the southern half of the site. It is noted that the passive measures set out in Stages 1 and 2 will remain for the Stage 3 works. However, the completed central basin will be lined, seeded and segregated ready to be brought online and used once the associated below ground infrastructure is complete. This completed basin will form part of the mitigation and management measures from Stage 4 onwards.

It is important to note that the attenuation crates, beneath the central basin, should be blocked off and not used until construction works at the site are complete. This will enable them to remain sediment free and ensure that their full capacity is retained.

Proposed management and mitigation measures for the Stage 3 works are set out on **Figure 5**. The following passive management measures are as follows:

- Silt fencing should be retained along the northern boundary and part the way along the north-eastern boundary as shown on **Figure 5** to direct surface water runoff from the fields to the north around the site boundary.
- Silt fencing is to comprise a semi-permeable membrane staked at regular intervals with typical installation details presented on **Figure 5**. Importantly, the base of the membrane on silt fencing should be buried to prevent surface water from passing beneath it. For longer term protection and to reduce maintenance requirements, the fence installation would benefit from reinforcement with stockproof wire mesh fencing to reduce wind damage to the membrane. Examples of the silt fence materials and installation are also presented within **Appendix E**.
- All temporary basins and the completed central basin should be compartmentalised. Compartmentalisation should be achieved through the use of a silt curtain of geotextile membrane wrapped straw bales to provide weir walls. The silt curtain design may be variable however, it is advised that the attenuation basin is compartmentalised for each inlet, ensuring that the silt curtain covers the full width of the basin including the sloping sides. The curtain / weir wall should be staked or weighed down to prevent lifting. Installation of the silt curtain / weir walls need to be reviewed and undertaken when water levels are low, alternatively, the basin may need to be dewatered with water moved to other basins (temporarily) to allow for installation.
- The temporary small pond located in the north of the site should be retained to capture surface water runoff from the northern third of the site and reduce the risk of surface water flooding in that area. A section of pipework should be retained to divert the water from within the temporary basin towards the swales proposed for the eastern site boundary as shown on **Figure 5**.
- A series of temporary swales / cut off ditches, connected by sections of pipe, located beneath haul routes, are designed to direct surface water to the basin in the south-east corner of the site. The swales / ditches along the eastern boundary, where possible, should be retained in a zig zag format to help slow the flow of water. Stone check dams should be retained and maintained within each swale / trench at approximate 10 m intervals. These check dams should be supported by the placement of floc mats and silt mats as set out on **Figure 5**.
- The sides of the swales / cut off ditches should remain lined, turfed or seeded to prevent erosion of the banks and the mobilisation of sediment into the surface water feature.
- Gell flocculant blocks will be installed in three locations throughout the swales / cut off ditches to promote settlement of suspended solids (silt).
- Four gel blocks will be installed at each deployment position with a ratio of two Gel Flocculant 494 and two Gel Flocculant 398 blocks. 494 blocks will be installed upstream of the 398 blocks in an alternating chain approach. Locations for the placement and number of each flocculant block required is set out on **Figure 5**.
- Discharge from the site during this stage will be via a temporary overflow channel from the temporary basin to a silt polishing channel along the site boundary. The polishing channel will protect the underlying soils between the discharge point and the

watercourse to prevent silt from being remobilised. The channel will comprise a lined base using plastic sheeting, lined with silt mats and silt wattles.

- A separate settlement tank to the automatic treatment system shall be retained adjacent to the site entrance at the western site boundary. This will be utilised if required, during periods of heavy rainfall to discharge surface water to the existing off-site foul drainage network (OF3) at a maximum discharge rate of 1 l/s (subject to approval from the local water board).
- Headwall protection is required at all inlets and outfalls to all basins and swales. The position of protection to be fitted and a generic design is presented in **Appendix E**.

3.4 Stage 4 works

The Stage 4 management and mitigation measures will enable the construction of the southern plots between the central basin and the southern boundary of the site. The measures set out in this stage are expected to remain for the remainder of the build at the site. However, these measures should be regularly reviewed to ensure their efficiency.

To complete the major infrastructure construction in the southern half of the site, the basin in the south-east corner of the site will need to be formalised with the below ground attenuation crates, formalised eastern boundary swales and basin forebay. During this period, the temporary zig zag swales / cut off ditches will be diverted to the central basin, bypassing the installed attenuation crates at this stage. From here, the collected surface water will be over pumped to the polishing channel at OF1.

Once the formalised swale leading to the south-eastern basin is completed, surface water will be drained from the central basin either by overland pipe or the finalised below ground infrastructure.

It is important to note that the attenuation crates, beneath the central and south-eastern basin, should remain blocked off as soon as constructed and not used until construction works at the site are complete. This will enable them to remain sediment free and ensure that their full capacity is retained. .

Proposed management and mitigation measures for the Stage 4 works are set out on **Figure 6**. The following passive management measures are as follows:

- Silt fencing should be retained along the northern boundary and part the way along the north-eastern boundary as shown on **Figure 6** to direct surface water runoff from the fields to the north around the site boundary.
- Silt fencing is to comprise a semi-permeable membrane staked at regular intervals with typical installation details presented on **Figure 6**. Importantly, the base of the membrane on silt fencing should be buried to prevent surface water from passing beneath it. For longer term protection and to reduce maintenance requirements, the fence installation would benefit from reinforcement with stockproof wire mesh fencing to reduce wind damage to the membrane. Examples of the silt fence materials and installation are also presented within **Appendix E**.
- All temporary basins and the completed basins should be compartmentalised. Compartmentalisation should be achieved through the use of a silt curtain of geotextile

membrane wrapped straw bales to provide weir walls. The silt curtain design may be variable however, it is advised that the attenuation basin is compartmentalised for each inlet, ensuring that the silt curtain covers the full width of the basin including the sloping sides. The curtain / weir wall should be staked or weighed down to prevent lifting. Installation of the silt curtain / weir walls need to be reviewed and undertaken when water levels are low, alternatively, the basin may need to be dewatered with water moved to other basins (temporarily) to allow for installation.

- The temporary small pond located in the north of the site should be retained until development within the area is required, to capture surface water runoff from the northern third of the site and reduce the risk of surface water flooding in that area. A section of pipework should be retained to divert the water from within the temporary basin, under haul road routes, towards the swales proposed for the eastern site boundary as shown on **Figure 6**.
- A series of temporary swales / cut off ditches, connected by sections of pipe, located beneath haul routes, are designed to direct surface water to the central basin. The swales / ditches along the eastern boundary, where possible, should be retained in a zig zag format to help slow the flow of water. Stone check dams should be retained and maintained within each swale / trench at approximate 10 m intervals. These check dams should be supported by the placement of floc mats and silt mats as set out on **Figure 6**.
- The formalised swale and basin forebay should also have stone check dams installed, approximately every 10 m as soon as completed. As with the temporary swales / cut off ditches, these should be supported by the placement of floc mats and silt mats as set out on **Figure 6**.
- The sides of the swales / cut off ditches should remain lined, turfed or seeded to prevent erosion of the banks and the mobilisation of sediment into the surface water feature.
- Gell flocculant blocks will be installed in three locations throughout the swales / cut off ditches to promote settlement of suspended solids (silt). The position of these should be moved as the build phase moves on, to ensure that there is at least 30 m between each placement location.
- Four gel blocks will be installed at each deployment position with a ratio of two Gel Flocculant 494 and two Gel Flocculant 398 blocks. 494 blocks will be installed upstream of the 398 blocks in an alternating chain approach. Locations for the placement and number of each flocculant block required is set out on **Figure 5**.
- Discharge from the site during this stage will be via a formalised concrete headwall from the completed basin to a silt polishing channel along the site boundary. The polishing channel will protect the underlying soils between the discharge point and the watercourse to prevent silt from being remobilised. The channel will comprise a lined base using silt mats and silt wattles over clean stone to enable the growth of vegetation within the formalised channel.
- A separate settlement tank to the automatic treatment system shall be retained adjacent to the site entrance at the western site boundary. This will be utilised if

required, during periods of heavy rainfall to discharge surface water to the existing off-site foul drainage network (OF3) at a maximum discharge rate of 1 l/s (subject to approval from the local water board).

- Headwall protection is required at all inlets and outfalls to all basins and swales. The position of protection to be fitted and a generic design is presented in **Appendix E**.

3.5 Passive recirculation chemical treatment measures

To supplement the removal of sediment by passive treatment measures, gel flocculants will be deployed in the following passive treatment measures across the development site.

Deployment locations for measures containing flocculants, coagulants and pH balancers are recorded on the Stage management plans (**Figures 3, 4, 5 and 6**) and shall be held within the site office for reference by the site management team and visitors.

A settlement test / dosing trial has been undertaken by the equipment supplier to confirm the appropriate dosing rates. The validation and settlement testing has identified that a combination of WL494 and WL 398 will be most effective gel flocculant combination. Details of the validation testing are contained within **Appendix D**.

Given the constantly evolving nature of site activities, should any alteration in the effectiveness of the active treatment systems be identified, during monitoring, then the suppliers will be notified, and a new settlement test / dosing trial will be completed to confirm whether any amendments are required to the dosing rates.

3.5.1 Use of flocculants, coagulants, and pH balancer

The deployment and use of flocculants, coagulants, and pH balancers will be undertaken under appropriate approval from NRW. Given the environmental permit application consultation period, it is considered that approval for acceptable operating parameters will be sought via a Local Enforcement Position prior to operation of the active treatment system.

Where employed, all flocculants, coagulants, and pH balancers present on the site will be deployed and utilised in accordance with the manufacturer's instructions.

3.6 General site management measures

In addition to the above site-specific measures, the following should also be implemented during construction:

- All internal construction roads should be constructed to the sub-base level to allow for a clean/cleaner running course and preferably to finished black top. Construction roads should not comprise exposed soil. The sealing of roads with clean stone/black top will remove the primary source of contamination (exposed soil).
- Where temporary access roads are required, it is recommended to install aggregate at the surface to provide a more competent running surface and reduce the likelihood of soft ground being cut-up by vehicles during wet conditions.

- Gully guards must be installed within all road gullies at the earliest possible opportunity following construction. The condition of the gully guards should be reviewed at regular intervals by the site management team to ensure they remain in good condition and replaced/cleaned when necessary. A layer of geotextile (terram) should also be placed over the top of the gully guard and secured immediately beneath the metal grate cover to prevent bulk ingress of sediment to the gully. This will also prolong the effectiveness of the gully guard itself.
- Mortar silos will be present on site. Silos can give rise to contamination through the mixing of construction surface water run-off with the mortar, which has a high pH (alkaline). This can lead to alkaline enriched waters entering the drainage system and making their way to surface waters and affecting wildlife. The direct ingress of mortar to the drainage system rarely occurs when managed appropriately and is not considered to be a significant risk.
- A traffic management plan should be maintained to control routes for plant/machinery around the site. This is to prevent remobilisation of silt to roads and unnecessarily exposing soil to rainwater.
- Minimise the movement of machinery on and off roads to prevent the tracking of excess soil onto roads and highways (i.e. planning of working day). Prevent, where feasible, tracking of machinery across areas designated as 'undisturbed' ground and the boundaries.
- The installation of hardstanding areas at key points across each phase to allow 'clean' forklift access.
- The placement of hardstanding or topsoil and reseeded at the earliest opportunity to control surface run-off from completed areas.
- Seeding of any exposed soils after construction and landscaping once finished, to prevent direct remobilisation of silt from exposed soil.
- The placement of stockpiled materials (topsoil / subsoil) within a designated area as far as practicably possible away from the boundaries, storm drains and road gullies.
- The key to controlling water quality during the wider construction phase is road cleanliness. Provision of a road sweeper on internal roads within build phases and the link with Hafod Wen is necessary. This is to be continually assessed by site management and the frequency increased during periods of inclement weather and on/off site plant movement. No tipping or storage of road sweeper residues should be undertaken within the development site. Where required, apply scraping of the roadways using a grading bucket to remove the bulk of the sediment. A road brush should then be applied to remove excess sediment and lastly a road sweeper should be applied to provide a final finish to the road surface. Road sweepers should not be used to treat heavily silt-impacted roads as the equipment is not designed to treat heavy silt burden on roads.
- General good housekeeping of the site.
- Retain additional spare silt fencing and silt trap materials on site to enable deployment at short notice and to facilitate on-going maintenance of installations.

- Small-scale storage of hydrocarbons (typically diesel fuel) of low volume will occur on site. The hydrocarbons are used to re-fuel heavy plant. Heavy plant also contains small volumes of hydrocarbons, lubricants, oils and hydraulic fluids. The accidental release/spillage of fuel is a possibility and cannot be fully discounted. Particular risks are not posed to the underlying aquifer, via infiltration to ground. Likewise, trespassing and vandalism can result in the release of hydrocarbons. Regulations which set standards for the storage of oil in Wales are set out in The Water Resources (Control of Pollution) (Oil Storage) (Wales) Regulations 2016. The regulations set standards for oil storage facilities which aim to prevent the escape of oil and the resulting risk of water pollution and damage to land and property. As a minimum, a spill kit, boom and fire extinguisher should be present at the fuel cell, with the cell placed on a drip tray and be double bunded. In the case of accidental release/loss of diesel, fuels or hydraulic oils to ground or the storm drainage system, emergency environmental response should be undertaken. This would include the use of spill kits. If the hydrocarbons have entered to storm drain system, then this should be contained as far as is practicable, such as by diverting or bunging the system. A vacuum tanker may be used to uplift any free-phase hydrocarbons. If necessary, impacted soil would need to be delineated and removed for off-site disposal. An environmental consultant (RSK) should be contacted for specialist advise, where necessary.
- General chemicals including cleaning products are to be stored in the compound. They are of very low volume and used for cleaning of toilets and kitchen areas. These are unlikely to drive a significant risk through spillage/leaks at the development.
- It is intended to use the storm drain system, swales and the attenuation pond as the principal silt mitigation measures for the development. The storm drain system, particularly the below ground pipes and the attenuation pond are likely to retain residual silt/sediment at the completion of the build. It will be necessary to clean out the pipe run leading to the basin and the basin itself. Suitable provision needs to be planned for these final cleaning works. This would be undertaken by jetting the storm run and flushing the sediment into the basin. It will also be necessary to remove excessive sediment build up to the base of the basin. This may require the re-profiling of the basin, depending on whether the pond is lined, or the excavation of the sediment. Suitable method statements would need to be prepared to set out how the pond would be de-silted however, options may include conventional excavation using machine plant, or suction excavation using a suction pump and row-row skip. Final methods and details would be supplied when necessary, once volumes of sediment are quantified.
- The effectiveness of the construction phase mitigation should be reviewed on a regular (quarterly basis). Depending upon the performance of the prescribed silt mitigation, it may be necessary to consider additional mitigation measures.

3.7 Site personnel and documentation

The following measures are to be implemented to increase awareness and bring existing site documentation up to date:

- Include a detailed section relating to surface water and silt protection within the site induction folder for all phases of the work.
- Continued documented review by the site management team of the existing site conditions in relation to this SWMP and update the requirements on a routine basis.
- The site management team to undertake documented daily site inspections of the outfalls and obtain support from the appointed Environmental Consultant if/when required. All photographs collected should be saved onto a server as evidence.
- Conduct a site pre-start meeting with all relevant parties to agree methods of working to control surface water and silt management. This is particularly relevant for the Principal Contractor.
- Undertake additional detailed site-based awareness training (Site Briefing / Toolbox Talk) on surface water and silt management and protection for all pertinent site staff including groundworkers. Clear guidance should be given to groundworkers on the mitigation measures discussed.

Actions reported for project personnel include:

Technical team:

- Ensure this SWMP is communicated to the site management team and updated as necessary.

Site managers:

- Undertake environmental monitoring at key points across the site, including, at each basin, chemical treatment locations, active treatment plant, site entrances and swales/cut off ditches.
- Ensure the measures presented within this SWMP are implemented by the site construction contractors.
- Brief sub-contractors and site operatives on effective water management and their responsibilities.
- Undertake regular documented inspections and checks to ensure the effectiveness of the pollution prevention measures, especially during and after heavy rainfall events, adverse weather and during the wetter seasons (winter and spring).
- Notify the Jones Brothers safety / environmental managers, should the site be contacted by any enforcing authority and/or members of the public raising concerns over the quality of water leaving the site.
- Report any environmental incident (such as silt ingress to the stream/drain) to an appointed environmental advisor.

Contractors:

- Ensure that this SWMP is communicated to all relevant site teams and groundworkers.
- Ensure appropriate water management controls are included in relevant risk assessments and method statements, as well as detailed arrangements regarding

increased supervision and management during adverse weather, or large scale works that may impact upon the drainage basins / surface watercourses.

- Ensure gully protection is fitted as soon as the surface water drainage system is completed and thereafter maintain the gully bags until completion of the construction phase.
- Report any damage to silt mitigation features (e.g. silt fencing) as a result of plant movement or work and arrange for repairs to be made as soon as practicable.
- Follow and implement water management and pollution prevention controls as instructed by the site manager and identified in the risk assessment/method statements (RAMS).
- Immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water sewer system.
- Report any environmental incident or near miss to the site manager immediately.

3.8 Dewatering of excavations

Dewatering of excavations during the installation of sub-surface infrastructure without appropriate water treatment can result in significant pollution of controlled waters. It should be reiterated that if dewatering is required then dewatered silt-contaminated surface water should not be discharged into the surface water drainage system, the attenuation basin and boundary water channels or directly to the offsite water courses. NRW follow the Environment Agency regulatory position statement (RPS 261) "Temporary dewatering of excavations to surface waters", January 2023 requires discharged water to:

- Be clean water, for example clear rainwater or infiltrated groundwater which has collected in the bottom of temporary excavations.
- Not result in water containing fine or coarse suspended solids (silty water) entering surface water.
- Not last more than three consecutive months (the activity may stop and restart, but the clock does not restart) – if the activity is likely to go over three consecutive months, then a permit must be applied for.
- Be made to surface water, such as a river, stream or the sea.
- Have a method statement that minimises the risk of pollution.

The discharge must not:

- Pollute surface water.
- Contain any chemical dosing agents, flocculants or coagulants.
- Be from a site which is contaminated by oil, metals, hydrocarbons, solvents or pesticides or other polluting substances.
- Result in the spread of non-native invasive species, parasites or disease.
- Cause flooding from surface water.
- Cause erosion of the banks or bed of the receiving watercourse.

- Contain concrete wash water even if it has been treated.
- Contain site drainage from surface areas such as haul roads, storage or working areas.
- Be from a site with naturally elevated concentrations of substances which exceed environmental quality standards.

If active pumping of water from foundation trenches is considered, care needs to be taken that water will not be discharged direct to surface water drains without prior treatment to remove silt to <50 mg/l. If required, consideration to dispose of silt-contaminated water into the foul water system on an emergency basis, which would allow higher concentrations of suspended solids, should be sought. This would require approval from the local water board and there is typically up to 4-6 months of lead in time to obtain appropriate licences. It is understood that a license is being applied for by Jones Brothers.

The use of a flocculant dosing system to control water quality is subject to an environmental permit. Furthermore, discharge of water (treated or otherwise) beyond a period of three months, from a construction site, is also subject to an environmental permit.

RSK understand that Jones Brothers are preparing a permit application for the use of chemical treatment, for which this surface water management plan will provide the basis for the application.

4 PROTECTION MEASURES WITHIN NON-ACTIVE DEVELOPMENT ZONE

The following protection measures are to be implemented on non-active development areas of the site (i.e. later phases, and completed phases) to protect the surface water systems:

- Re-seed areas that are set aside for later phases, to bind soils and reduce remobilisation of sediment.
- Prevent the movement of any machinery within vegetated areas of the site, or areas not subject to active development which may cause disturbance to existing surface cover (i.e. control the build area with fencing or a site traffic management plan).
- Any pumping (dewatering) must be undertaken either to the active treatment system or to a pumping cell constructed of straw bales, supported by a perimeter silt fence and the pipe must have a dewatering/dirt bag at the outlet.
- All gulley protection should remain in place until such time completed areas of the development are no longer used for construction traffic.

5 SITE MONITORING PROCEDURES AND RECORDS

The following monitoring procedures should be carried out on a regular basis (at least weekly, and during/immediately following a storm event) by the site management team to enable continuous review of the measures listed above, as included in **Figures 3 to 6**. A comprehensive record of the effectiveness of the system should then be maintained to enable further review by any parties attending site, this is intended to be a live working document to be regularly reviewed and updated as required. Examples of site monitoring checklists (proformas) are included in **Appendix C**. Either the presented proformas will be used, or a specific document that Jones Brothers has. Either way, monitoring of the points listed below will be undertaken on a weekly basis, or more frequently depending on weather conditions:

- **Discharge Points (OF1 and 2):** Monitor the water quality and discharge to the tributary of the Nant Muchudd. A supply of 500 ml plastic bottles to be retained on site for the collection of water samples in case of inspection or for testing purposes.

The site management team should undertake routine inspections of the wider site to monitor and keep records of the basin and channel water quality, water quality at the final outfall any other environmental issues. The inspections will continue on a regular basis for the duration of the project with records kept. It is recommended that daily inspections are completed for the outfall to the offsite watercourse.

Regular inspection of implemented surface water and silt management measures (e.g., silt fencing and headwall protection measures).

Regular inspection of all gullies and conditions of the public highway at site entrances.

All records should be reviewed on a regular basis, but advice can be obtained by the site management team at any time from an appointed Environment Consultant (RSK).

Calls to the appointed Environmental Consultant (RSK) should be made in the event of heavy rainfall breaching protective measures or silt pollution incidents being recorded.

To enable a prompt response to changing site conditions, it is advisable to ensure a supply of straw bales, silt fencing and silt matting is readily available to implement emergency measures.

A comprehensive record of the effectiveness of surface water management measures should then be maintained to enable further review by any parties attending site.

Any emissions to surface water identified will result in the implementation of the protocols detailed herein. Any complaints in relation to surface water emissions will be fully investigated as detailed in the following sections. The resultant actions will be recorded in site records.

5.1.1 Meteorological conditions

Meteorological forecasts and weather conditions (including precipitation) will be monitored to identify high rainfall events, which could result in elevated site water levels to be predicated and appropriate additional management measure implemented.

5.1.2 Regular inspection and monitoring

Due to the nature of the development, visual monitoring techniques will principally be used within the boundary of the site. These will be supplemented by the collection of water samples from the outfall location.

Regular visual inspections of surface water discharge quality as well as the overall condition of the wider site will be undertaken as part of general site walkovers completed by the site management team and site operatives during their daily tasks.

When operational, the active treatment system will be visually inspected on a daily basis by the site management team or other appointed person. Should any evidence of faults with the active treatment system be identified the treatment and discharge will be suspended and suitable expertise from the supplier sought, to address any issues or concerns prior to restarting the treatment process.

Additional monitoring beyond the site boundary, above the monitoring at the discharge point, will be completed in response to the identification of potential emissions to surface water from the site or upon receipt of complaints. All monitoring will be carried out in cognisance of the prevailing weather conditions and site activities.

In addition to this, weekly routine inspections of the site to monitor and record surface water run-off quality and other environmental issues will be undertaken by the site management team or other appointed person. Records of these inspections will be kept for the duration of the project.

Regular inspection of implemented surface water management measures, including passive and active treatment measures, will also be undertaken, either by the site manager or a nominated person.

Inspection frequencies will be increased as required in response to prevailing meteorological conditions.

5.2 Water sample collection and testing

To supplement the regular visual inspections, telemetry output from the automatic chemical dosing system and monitoring of surface water discharges from the site, instantaneous (spot) samples of discharged water will be collected by the site management team (or nominated deputy) for analysis to confirm it adheres to emission limits presented in **Table 3**.

It is recommended that water samples will be inspected periodically and after storm events, from each of the two discharge points. A test frequency will be agreed with the EA prior to commencing works.

Samples collected for laboratory analysis will be tested for the determinands and limits presented in **Table 3**.

Table 1: Tonyrefail, Porth - Discharge point monitoring parameters and limits

Parameter	Limit (Including Unit)	Compliance Statistic
Total suspended solids	20 mg/l	Maximum
Total aluminium as Al	1,000 µg/l	Maximum
Total iron as Fe	5 mg/l	Maximum
Total dissolved iron as Fe	1 mg/l	Maximum
pH	6 to 9	Minimum and maximum

In addition to the above, visual inspection for oil and/or grease will be completed.

It is recommended that field readings are undertaken at each watercourse discharge point. This will comprise of measuring Total Suspended Solids (TSS) directly or recording turbidity (NTU) of discharged water using a suitable monitoring device, such as a portable turbidity meter. NTU reading will subsequently be converted to an approximate corresponding TSS value using a site-specific NTU/TSS calibration curve.

Additionally, a portable pH meter can be used to provide an on-site indication of the pH level of water being discharged from the site.

6 EMERGENCY PROCEDURE AND COMPLAINTS HANDLING

6.1 Emergency Procedure

Supplementary surface water protection measures, treatment capacity or off-site removal of surface water shall be deployed as necessary to provide additional surface water treatment/containment/management capacity.

If required, advice should also be sought from specialist environmental advisors.

6.1.1 Spillage emergency procedure

In the event of a major liquid spillage/leak the following actions will be taken, where appropriate:

- Report the occurrence to the site management team immediately;
- Trained facility operatives to take immediate action to try and contain the spillage/leak where it is safe to do so using appropriate materials (such as spill kits);
- If it is safe to do so, the cause of the spill or leak will be isolated and/or moved to a bunded area;
- Inert material such as clay or sandbags are to be used to make a temporary containment bund to prevent pollution of any water or land;
- Drainage covers will be installed over any road gullies to prevent ingress into the site's drainage system;
- Access to the immediate area will be restricted until a disposal/clean up solution is implemented;
- If the spillage cannot be contained using approved methods, senior management will be contacted immediately, and specialist advice and help will be sought; and
- If a vehicle is identified as leaking, wherever practicable, it is to be stored on an impermeable pavement within a bunded area, where the spillage can be contained until such a time as the vehicle is repaired.

Once the spillage has been contained the site management team will make necessary arrangements for the appropriate removal of the spillage from the site.

Any incidents or near misses should be reported as soon as possible so that the appropriate environmental advisor is notified as soon as possible. Where damaged or missing protection measures have been identified, the site manager should implement repairs or replacements as soon as possible.

Report any environmental incident (such as silt ingress to the stream/drain) through the Jones Brothers emergency contact procedures, to a designated coordinator who will contact / report the incident with NRW where necessary.

Site staff should immediately report to the site manager if pollution prevention measures are not in place, are damaged or ineffective, or if works results in a silt release to surface water or the storm water sewer system.

6.2 Complaints process

Any complaints received at the site or via the regulatory bodies (including NRW and Local Authority), will be recorded and investigated via a combination of visual inspection at the location of the complaint and collection of water samples for analysis to determine the source of the pollution to be identified.

Where possible, as much information and detail about the complaint will be recorded, whether this be from the relevant authority or complainant. This information will assist the investigation in determining the source of the surface water pollution.

Should a complaint be received, the following information will be gathered and recorded:

- Complaint details (including the address of the complainant where possible) and the location where surface water pollution is perceived;
- Weather conditions including rainfall levels;
- Results of the latest round of monitoring carried out by site personnel;
- Operational status of the site (noting any abnormal conditions that may have caused the complaint);
- Inspection of site conditions upon the receipt of a complaint (where feasible); and
- Details of the proposed corrective action, if required.

A subsequent follow up to the complainant shall be provided, detailing whether the corrective action, if required, was successful. If not, details shall be set out of any new strategy implemented, until the issue is resolved.

Records of complaints received will be kept for inspection and review by both internal and external personnel.

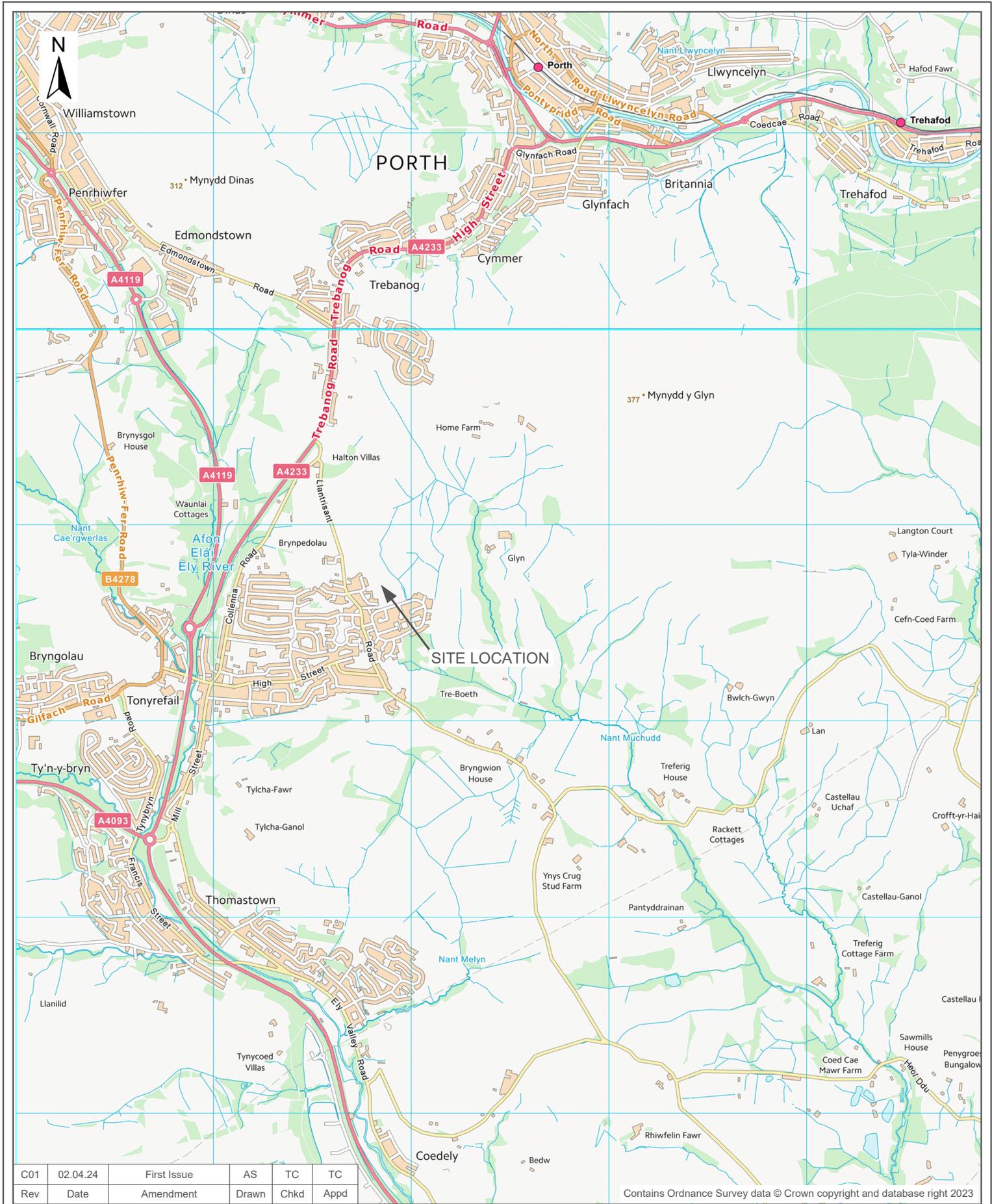
In the event that surface water discharges from the site are found to be causing a pollution incident – as determined by investigation into off site complaints or during routine monitoring, the following measures will be taken to confirm the source:

- Supplementary monitoring will be undertaken to identify the extent and potential cause of the event i.e., damage to perimeter protection measures or fault in treatment system;
- Examination of the operational activities at the site at the time of the complaint or event identification;
- Examination of the meteorological conditions at the time of the complaint or event identification;
- Examination of the process conditions via the plant operational records / telemetry (where recorded);

- A review of the operational procedure, process controls and the instigation of any control measures immediately following identification of the pollution; and
- Further visual monitoring will be carried out to ensure the issue has been addressed and to monitor the effectiveness of any control measures undertaken.

All complaints will be investigated however, direct calls to site from complainants will allow for an immediate response and investigation. However, it is the site management team's experience that complaints submitted to regulatory authorities can sometimes be made long after the occurrence of a surface water pollution event. This can result in a delayed notification to the site management team and commencement of investigation works. Due to the transient nature of surface water pollution and meteorological conditions, this may result in the pollution pathway being unidentifiable.

FIGURES



C01	02.04.24	First Issue	AS	TC	TC
Rev	Date	Amendment	Drawn	Chkd	Appd

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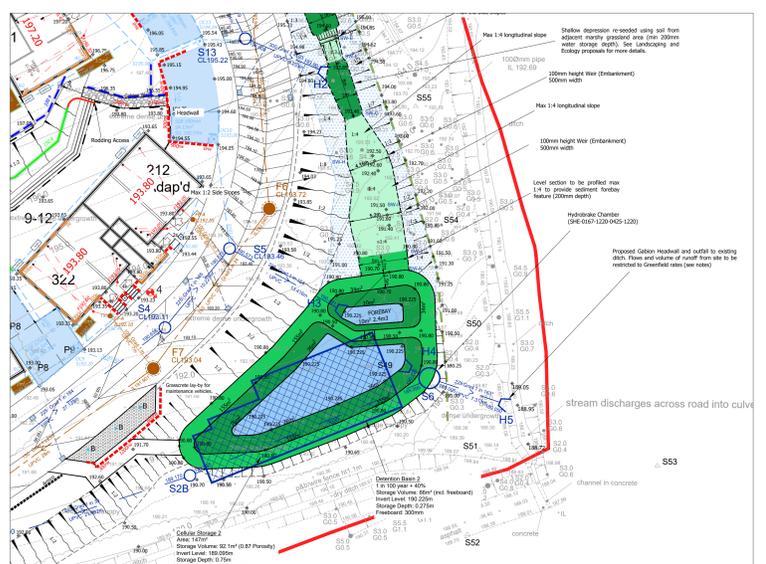
**RSK
GEOSCIENCES**

The Old School
Stillhouse Lane
Bristol
BS3 4EB

Tel: +44(0)1414 180471
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client	Jones Brothers				
Project Name	Hafod Wen, Tonyrefail				
Description	Site Location Plan				

Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	301850, 188694	315539	11101	P01	315539-BL-111-SS-D-C-11101-P01



GENERAL NOTES:

The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work starts. Any discrepancy is to be reported to Spring Design before work commences.

The Contractor is to comply in all respects with current building legislation - Building Standard Specifications, Building Regulations etc., whether or not specifically stated on this drawing.

The drawing must be read with and checked against any structural, geotechnical or other specialist documentation provided.

The developer must self-verify and certify that the design criteria, material standards and workmanship specifications for the proposed adoptable sewers are in accordance with Sewers for Adoption 7th edition, the requirements of DCWW as the statutory Sewerage Undertaker and the Welsh Ministers Build Standards.

All the sewer trenches sited within proposed roads are to be back-filled with stone, unless specific written approval is sought and received from the Local Authority's Engineer to return excavated material. Where road levels dictate, the material employed as fill is to be approved by the Local Authority's Engineer.

No responsibility will be taken for any construction work undertaken prior to receipt of technical approvals for the intended construction, or when work is not executed strictly in accordance with the drawings.

Four Drainage Construction Details see Drawing Number 2420-700.

Cover Frames to have a minimum 150mm depth.

NOTE: Where depth of cover to crown of pipe is less than 1.2m the following protection measures should be provided:

- a) a concrete slab in accordance with details shown on 2420-700, or
- b) a concrete surround with flexible joints in accordance with details shown on 2420-700 - 700 - 0, or
- c) a ductile iron pipe should be used.

SITE CATCHMENT

Greenfield

Total Area = 2.02ha
Greenfield Catchment Area = 1.00ha

Total or proposed impermeable area

Greenfield Runoff Rates (1.00ha)

1 in 1yr = 12.4 l/s
1 in 10yr = 24.9 l/s
1 in 100yr = 30.8 l/s

Pre-Development Volume Discharge (100yr 30mins)

1 in 100yr (30mins) = 42m³
Total Volume = 1.1m³

Post-Development

Impermeable Area = 1.00ha

Post-Development peak flow rate

1 in 1yr = 12.0 l/s (0.4 l/s)
1 in 10yr = 24.9 l/s (0.4 l/s)
1 in 100yr = 20.4 l/s (0.3 l/s)

Discharge Volume (100yr 30mins)

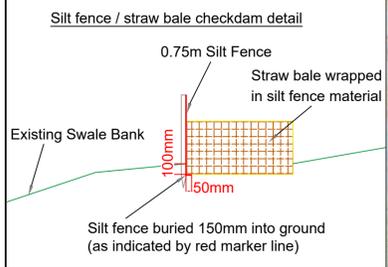
Post-Dev - 1 in 100yr = 30m³ (30mins) = 42m³
Total Volume = 1.1m³

SUDs Measures

The above development flow rates are based on a traditional storm network model assumption. However, the above flow rates are to be controlled by a SUDs feature which will further reduce the above discharge rate.

The SUDs components will effectively increase concentration time, reduce flow velocities and rates, and provide significant attenuation through evaporation and transpiration.

The following are in abeyance:
ASHP positions



Cut off ditch: consider adding Floc Mats™ along with the Silt Mats™. Each set should contain 6 mats in a ratio of 1:1. First, install the Floc Mats upstream followed by the check dam, then the Silt Mats. Repeat this sets every 10 metres upstream, then space them out more towards the discharge location.

Construction of retaining wall

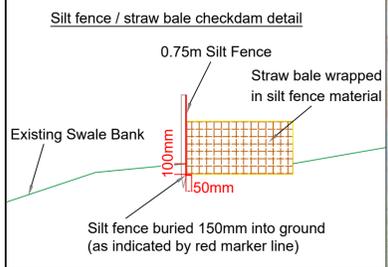
LEGEND		Notes:	
Site boundary	Temporary basin	Base plan provided by client. Drawing Ref.: 2420-520-U - Engineering Layout.	
Active treatment facility	Piped section of surface water channels		
Cut off ditch / swale with gravel check dams supported by Silt Mat™	Recommended line of silt fencing		
Floc Mat™	Construction area		
Temporary, emergency settlement tank prior to discharge to foul sewer	Surface water drainage		
Polishing channel	Foul water drainage		

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Client		Jones Brothers	
Project Name		Hafod Wen, Tonyrefail	
Description		Surface Water Management Plan - Stage 1	
Dimension	Scale	Size	
m	NTS	A1	
Project ID	Drawing no.	Revision	File name
315539	27601	C01	315539-BL-276-SS-D-C-27601-C01

Rev	Date	Amendment	Drawn	Chkd	Appd
C01	02.04.24	First Issue	AS	TC	TC



Cut off ditch: consider adding Floc Mats™ along with the Silt Mats™. Each set should contain 6 mats in a ratio of 1:1. First, install the Floc Mats™ upstream followed by the check dam, then the Silt Mats™. Repeat this sets every 10 metres upstream, then space them out more towards the discharge location.



Each dosing location should contain 4 Gel Flocculant blocks. At each location, the Gel Flocculant blocks should be arranged in the sequence 494, 398, 494, and 398. Note that the block labeled 494 should always be positioned first (upstream).



Construction of retaining wall and basin with crate system installed but blocked off



LEGEND

- Site boundary
- Temporary basin
- ▬ Cut off ditch / swale with gravel check dams supported by Silt Mat™
- Floc Mat™
- ▬ Piped section of surface water channels
- Temporary, emergency settlement tank prior to discharge to foul sewer
- ▬ Polishing channel
- Construction area
- Gel Flocculant dosing points
- ▬ Recommended line of silt fencing
- ▬ Basin weir wall
- Surface water drainage
- Foul water drainage

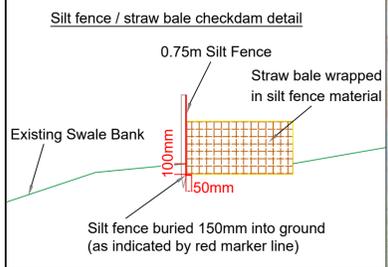
Notes:
Base plan provided by client.
Drawing Ref.: 2420-520-U - Engineering Layout.

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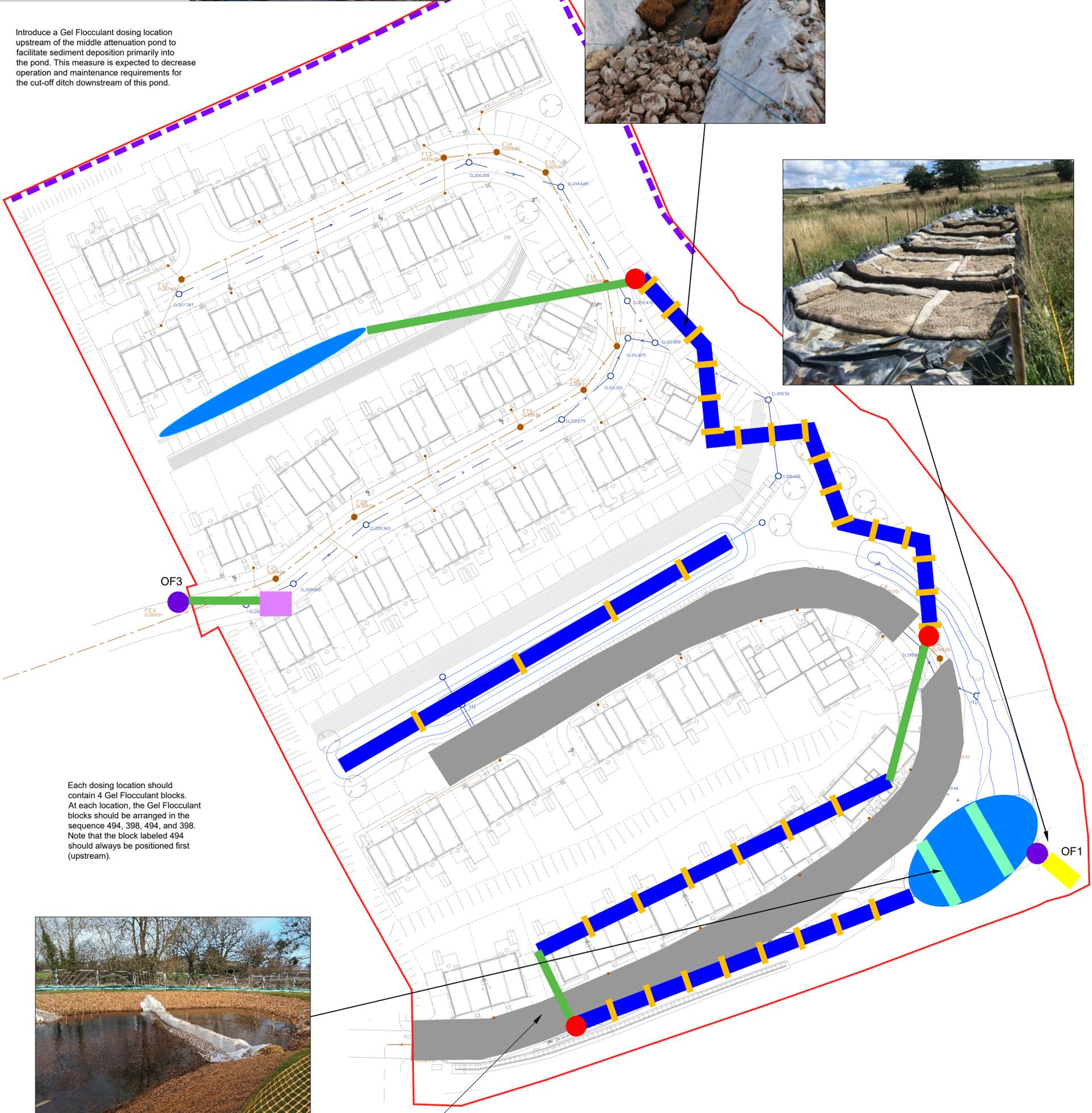
Tel: +44(0)1414 180471
Email: info@rsk.co.uk
Web: www.rsk.co.uk

Client		Jones Brothers		
Project Name		Hafod Wen, Tonyrefail		
Description		Surface Water Management Plan - Stage 2		
Dimension	Scale	Size	Project ID	Drawing no.
m	NTS	A1	315539	27602
			Revision	File name
			C01	315539-BL-276-SS-D-C-27602-C01

C01	02.04.24	First Issue	AS	TC	TC
Rev	Date	Amendment	Drawn	Chkd	Appd



Introduce a Gel Flocculant dosing location upstream of the middle attenuation pond to facilitate sediment deposition primarily into the pond. This measure is expected to decrease operation and maintenance requirements for the cut-off ditch downstream of this pond.



Each dosing location should contain 4 Gel Flocculant blocks. At each location, the Gel Flocculant blocks should be arranged in the sequence 494, 398, 494, and 398. Note that the block labeled 494 should always be positioned first (upstream).

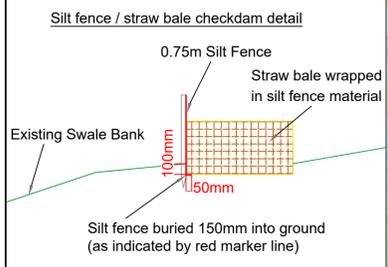


Construction of access road and infrastructure

LEGEND					
	Site boundary		Piped section of surface water channels		Gel Flocculant dosing points
	Temporary basin		Temporary, emergency settlement tank prior to discharge to foul sewer		Recommended line of silt fencing
	Cut off ditch / swale with gravel check dams supported by Silt Mat™		Polishing channel		Basin weir wall
	Floc Mat™		Construction area		Surface water drainage
					Foul water drainage

Notes:
Base plan provided by client.
Drawing Ref.: 2420-520-U - Engineering Layout.

<p>The Old School Stillhouse Lane Bristol BS3 4EB</p> <p>Tel: +44(0)1414 180471 Email: info@rsk.co.uk Web: www.rsk.co.uk</p>		Client		Jones Brothers									
		Project Name		Hafod Wen, Tonyrefail									
Description		Surface Water Management Plan - Stage 3											
Dimension	Scale	Size	Project ID	Drawing no.	Revision	File name							
m		A1	315539	27603	C01	315539-BL-276-SS-D-C-27603-C01							
		Rev		Date		Amendment		AS		TC		TC	
		1		02.04.24		First Issue		AS		TC		TC	
								Drawn		Chkd		Appd	



Each dosing location should contain 4 Gel Flocculant blocks. At each location, the Gel Flocculant blocks should be arranged in the sequence 494, 398, 494, and 398. Note that the block labeled 494 should always be positioned first (upstream).



LEGEND		Notes:	
Site boundary	Piped section of surface water channels	Base plan provided by client. Drawing Ref.: 2420-520-U - Engineering Layout.	
Temporary basin	Temporary, emergency settlement tank prior to discharge to foul sewer		
Cut off ditch / swale with gravel check dams supported by Silt Mat™	Polishing channel		
Floc Mat™	Construction area		
	Gel Flocculant dosing points		
	Recommended line of silt fencing		
	Basin weir wall		
	Surface water drainage		
	Foul water drainage		

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Web: www.rsk.co.uk

Client Jones Brothers			
Project Name Hafod Wen, Tonyrefail			
Description Surface Water Management Plan - Stage 4			
Dimension m	Scale NTS	Size A1	Project ID 315539
			Drawing no. 27603
			Revision C01
			File name 315539-BL-276-SS-D-C-27603-C01

Rev	Date	Amendment	Drawn	Chkd	Appd
C01	02.04.24	First Issue	AS	TC	TC

APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Jones Brothers (the "Client") in accordance with the RSK terms of a contract [RSK Environment Standard Terms and Conditions] between RSK and the Client, dated 13 March 2024. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates, or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate, or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, persistent, bioaccumulative or toxic chemicals (including PFAS/ PFOS) or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site,

unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):

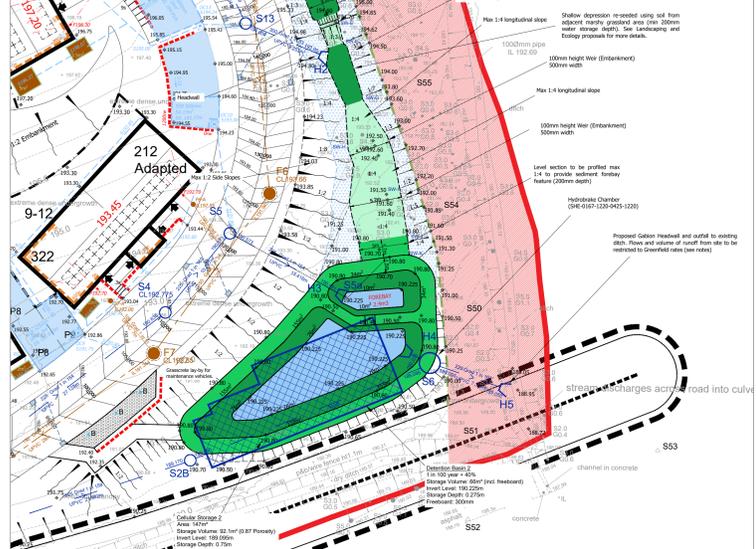
- a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.
- b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.
- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.
11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.
12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B

DRAINAGE LAYOUT



GENERAL NOTES:

The Contractor is to check and verify all building and site dimensions, levels and sewer invert levels at connection points before work starts. Any discrepancy is to be reported to Spring Design before work commences.

The Contractor is to comply in all respects with current building legislation - Building Standard Specifications, Building Regulations etc., whether or not specifically stated on this drawing.

The drawing must be read with and checked against any structural, geotechnical or other specialist documentation provided.

The developer must self-verify and certify that the design criteria, material standards and workmanship specifications for the proposed adoptable sewers are in accordance with Sewers for Adoption 7th edition, the requirements of DCWW as the statutory Sewerage Undertaker and the Welsh Ministers Build Standards.

All the sewer trenches sited within proposed roads are to be back-filled with stone, unless specific written approval is sought and received from the Local Authority's Engineer to return excavated material. Where road levels dictate, the material employed as fill is to be approved by the Local Authority's Engineer.

No responsibility will be taken for any construction work undertaken prior to receipt of technical approval for the intended construction, or when work is not executed strictly in accordance with the drawings.

For Drainage Construction Details see Drawing Number 2420-700.

Cover Frames to have a minimum 150mm depth.

NOTE: Where depth of cover to crown of pipe is less than 1.2m the following protection measures should be provided:

- a) a concrete slab in accordance with details shown on 2420-700; or
- b) a concrete surround with flexible joints in accordance with details shown on 2420-700; or
- c) a ductile iron pipe should be used.

NOTE: Concrete construction required for shallow length between F8 and F9.

SITE CATCHMENT

Greenfield

Total Area = 2.02ha
Greenfield Catchment Area = 1.00ha

*Based on proposed impermeable area

Greenfield Runoff Rates (1.00ha)

1 in 1yr = 2.24 l/s
1 in 10yr = 2.24 l/s
1 in 100yr = 30.8 l/s

DCWW Development volume discharge (100yr 30min)

1 in 100yr (30min) = 463m³

All Greenfield runoff discharges to existing ditch network and is conveyed to the southern site boundary.

DCWW Development peak flow rate

1 in 1yr = 12.0 l/s (0.4 l/s)
1 in 10yr = 12.0 l/s (0.4 l/s)
1 in 100yr = 20.4 l/s (0.5 l/s)

Discharge Volume (100yr 30min)

Post Dev - 1 in 100yr = 308m³ (30min) = 463m³

Total Volume = 1m³

The above peak development flow rates are based on a traditional storm network model simulation. However, the use of a SuDS system will reduce the above discharge volume.

The SuDS components will effectively increase concentration time, reduce flow velocities and rates, and provide significant storage through evaporation and evapotranspiration.

- KEY**
- 100mm height Water (Environment) 500mm width
 - 150mm height Water (Environment) 500mm width
 - 225mm height Water (Environment) 500mm width
 - 300mm height Water (Environment) 500mm width
 - 450mm height Water (Environment) 500mm width
 - 600mm height Water (Environment) 500mm width
 - 750mm height Water (Environment) 500mm width
 - 900mm height Water (Environment) 500mm width
 - 1050mm height Water (Environment) 500mm width
 - 1200mm height Water (Environment) 500mm width
 - 1350mm height Water (Environment) 500mm width
 - 1500mm height Water (Environment) 500mm width
 - 1650mm height Water (Environment) 500mm width
 - 1800mm height Water (Environment) 500mm width
 - 2000mm height Water (Environment) 500mm width
 - 2250mm height Water (Environment) 500mm width
 - 2500mm height Water (Environment) 500mm width
 - 2750mm height Water (Environment) 500mm width
 - 3000mm height Water (Environment) 500mm width
 - 3250mm height Water (Environment) 500mm width
 - 3500mm height Water (Environment) 500mm width
 - 3750mm height Water (Environment) 500mm width
 - 4000mm height Water (Environment) 500mm width
 - 4250mm height Water (Environment) 500mm width
 - 4500mm height Water (Environment) 500mm width
 - 4750mm height Water (Environment) 500mm width
 - 5000mm height Water (Environment) 500mm width
 - 5250mm height Water (Environment) 500mm width
 - 5500mm height Water (Environment) 500mm width
 - 5750mm height Water (Environment) 500mm width
 - 6000mm height Water (Environment) 500mm width
 - 6250mm height Water (Environment) 500mm width
 - 6500mm height Water (Environment) 500mm width
 - 6750mm height Water (Environment) 500mm width
 - 7000mm height Water (Environment) 500mm width
 - 7250mm height Water (Environment) 500mm width
 - 7500mm height Water (Environment) 500mm width
 - 7750mm height Water (Environment) 500mm width
 - 8000mm height Water (Environment) 500mm width
 - 8250mm height Water (Environment) 500mm width
 - 8500mm height Water (Environment) 500mm width
 - 8750mm height Water (Environment) 500mm width
 - 9000mm height Water (Environment) 500mm width
 - 9250mm height Water (Environment) 500mm width
 - 9500mm height Water (Environment) 500mm width
 - 9750mm height Water (Environment) 500mm width
 - 10000mm height Water (Environment) 500mm width

APPENDIX C

ACTIVE TREATMENT SYSTEM MSDS

Material Safety Data Sheet

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

1.1: Product Identifier

Product Name AQUATREAT 2084

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

Website: www.aquatreat.co.uk

1.4: Emergency Telephone Numbers:

Emergency Telephone: 0333 333 9499

Section 2: Hazards Identification

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

Classification under CLP: NC Not Classified

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

P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P302+P352 IF ON SKIN: Wash with plenty of soap and water.

P301+P330+P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.

2.3: Other Hazards

Section 3: Composition information on hazardous ingredients

Hydrocarbons, C12 - C15, isoalkanes, cyclics <2% aromatics

EINECS	CAS No	Classification according to Regulation (EC) 1272:2008	Percent
920-107-4		H302; ASP Tox.1	20 - 45

Isotridecanol, ethoxylated

EINECS	CAS No	Classification according to Regulation (EC) 1272:2008	Percent
Polymer		H318; Eye Dam.1, H302; Acute Tox.4	<5

Section 4: First Aid Measures

4.1: Description of First Aid measures

Skin Contact: Wash off immediately with soap and plenty of water and remove any contaminated clothing. If persistent irritation occurs, seek medical advice

Eye Contact: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Alternatively, rinse immediately with Diphoterine. Get prompt medical attention

Ingestion: Rinse mouth with water. DO NOT induce vomiting. Seek medical attention immediately

Inhalation: Move to fresh air. No special first aid measures required.

4.2: Most important symptoms and effects both acute and delayed

Skin Contact: None under normal use

Eye Contact: None under normal use

Ingestion: None under normal use

Inhalation: None under normal use

4.3: Indication of any immediate medical treatment and special treatment required

None reasonably foreseeable.

Section 5: Fire fighting measures

5.1: Extinguishing media

Use fire extinguishers appropriate to the surrounding fire

Unsuitable Media

None

5.2: Special hazards arising from the substance/mixture

Oxides of Carbon and Nitrogen. Hydrogen cyanide may be produced as a result of combustion in an oxygen deficient atmosphere.

5.3: Advice for firefighters

Wear self contained breathing apparatus and protective clothing. Spills become extremely slippery when wet

Section 6: Accidental Release Measures

6.1: Personal precautions, protective equipment and emergency procedures

Wear appropriate PPE - See section 8

6.2: Environmental precautions

Do not allow spills to enter surface water drains and watercourses

6.3: Methods and Materials for containment and clean up

Soak up with inert material. Sweep and shovel into suitable closed containers and arrange disposal

6.4: References to other sections

Section 7.0: Handling and Storage

7.1: Precautions for safe handling

Avoid contact with skin and eyes. Renders surfaces extremely slippery when spilled. Do not eat, drink or smoke when using this product

7.2: Conditions for safe storage.

Keep away from heat and sources of ignition. Do not allow the product to freeze. Incompatible with oxidising agents

7.4: Specific End Use(s)

Section 8: Exposure controls/Personal Protection

8.1: Control Parameters

None known

8 Hour TWA:

15MinSTEL:

8.2: Exposure Controls

Engineering Measures	Use local exhaust ventilation if misting occurs
Respiratory Protection	respiratory protective equipment is not normally required under normal conditions of use
Hand Protection	PVC or other plastic material gloves
Eye Protection	Safety glasses with side shields
Skin Protection	Coveralls or chemical apron

Section 9.0: Physical and Chemical Properties

9.1: Information on basic physical and chemical properties

State: Liquid
 Colour: Milky
 Odour: Aliphatic
 Specific Gravity: 1.05
 pH: 5 - 8 @5g/l

9.2: Other Information

Section 10: Stability and Reactivity**10.1: Reactivity**

Stable under recommended conditions of storage and use

10.2: Chemical Stability

Stable under recommended conditions of storage and use

10.3: Possibility of Hazardous Reactions

None known

10.4: Conditions to Avoid

Heat, Sunlight and frost

10.5: Incompatible Materials

Oxidising Agents

10.6: Hazardous Decomposition Products

Oxides of Carbon and Nitrogen

Section 11: Toxicological Information

Aquatreat 2084

Dermal	Rat	LD50	>5000 mg/kg (estimated)
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Aquatreat 2084

Oral	Rat	LD50	>5000 mg/kg (estimated)
------	-----	------	-------------------------

Section 12: Ecological Information**12.1: Toxicity**

LC50/Oncorhynchus mykiss/ 96hours>100mg/l (estimated), EC50/Daphnia Magna/48 hours>100mg/l (estimated), IC50/Algae/72 hours>100mg/l(estimated)

12.2: Persistence and Biodegradable

Not readily biodegradable

12.3: Bioaccumulative Potential

This product is not expected to bioaccumulate

12.4: Mobility in Soil

No data available

12.5: Results of PBT and vPvB Assessment

Not according to the criteria of Annex XIII of REACH

12.6: Other adverse effects

None

Section 13: Disposal Information

Dispose of waste in accordance with local or national regulations

Section 14: Transport Information

UN Number			
Shipping Name	Not classified as hazardous for transport		
Transport Class			
Packing Group			
Environment Hazard			
Special Precautions			
Tunnel Code		Transport Category	

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

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

FERRIC CHLORIDE 25 - 99%

Version 6.1

Print Date 2017/11/20

Revision date / valid from 2017/11/20

MSDS code: MFIC010

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name : FERRIC CHLORIDE 25 - 99%

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

Use of the Substance/Mixture : Identified use: See table in front of appendix for a complete overview of identified uses.

Uses advised against : At this moment we have not identified any uses advised against

Remarks : Before referring to any Exposure Scenario attached to this Safety Data Sheet please check the grade of the product: the Exposure Scenarios presented are not related to the product grade

1.3. Details of the supplier of the safety data sheet

Company : Brenntag UK Limited
Alpha House, Lawnswood Business Park
GB LS16 6QY Leeds

Telephone : +44 (0) 113 3879 200
Telefax : +44 (0) 113 3879 280
E-mail address : msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number : Emergency only telephone number (open 24 hours):
+44 (0) 1865 407333 (N.C.E.C. Culham)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Corrosive to metals	Category 1	---	H290

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Acute toxicity (Oral)	Category 4	---	H302
Skin irritation	Category 2	---	H315
Serious eye damage	Category 1	---	H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

Most important adverse effects

Human Health : See section 11 for toxicological information.
 Physical and chemical hazards : See section 9/10 for physicochemical information.
 Potential environmental effects : See section 12 for environmental information.

2.2. Label elements**Labelling according to Regulation (EC) No 1272/2008**

Hazard symbols :



Signal word : Danger

Hazard statements : H290 May be corrosive to metals.
 H302 Harmful if swallowed.
 H315 Causes skin irritation.
 H318 Causes serious eye damage.

Precautionary statements

Prevention : P234 Keep only in original container.
 P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response : P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
 P302 + P352 IF ON SKIN: Wash with plenty of water/soap.
 P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.

Hazardous components which must be listed on the label:

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- Iron trichloride

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
Iron trichloride			
CAS-No. : 7705-08-0	>= 25 - <= 99	Acute Tox.4	H302
EC-No. : 231-729-4		Skin Irrit.2	H315
EU REACH- : 01-2119497998-05-xxxx		Eye Dam.1	H318
Reg. No.		Met. Corr.1	H290

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

- General advice : Take off all contaminated clothing immediately.
- If inhaled : Move to fresh air in case of accidental inhalation of vapours. If breathing is irregular or stopped, administer artificial respiration. If unconscious place in recovery position. Call a physician immediately.
- In case of skin contact : After contact with skin, wash immediately with plenty of water. If symptoms occur, call a physician.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
- If swallowed : Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. If a person vomits when lying on his back, place him in the recovery position. Call a physician immediately.

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

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Symptoms : See Section 11 for more detailed information on health effects and symptoms.

Effects : See Section 11 for more detailed information on health effects and symptoms.

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

Treatment : Treat symptomatically.No further information available.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. The product itself does not burn.

Unsuitable extinguishing media : High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting : Keep containers cool by spraying with water if exposed to fire, Heating will cause a pressure rise - with risk of bursting

Hazardous combustion products : Hydrogen chloride gas, Chlorine

5.3. Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus.Wear personal protective equipment.

Further advice : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment. Keep away unprotected persons. Ensure adequate ventilation. Avoid contact with skin and eyes. Do not breathe vapours or spray mist.

6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration.

6.3. Methods and materials for containment and cleaning up

Methods and materials for containment and cleaning up : Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders). Keep in suitable, closed containers for disposal.

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Further information : Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
 See Section 8 for information on personal protective equipment.
 See Section 13 for waste treatment information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling : Keep container tightly closed. Ensure adequate ventilation. Avoid formation of aerosol. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.

Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store in original container.

Advice on protection against fire and explosion : Normal measures for preventive fire protection. The product is not flammable.

Further information on storage conditions : Keep tightly closed in a dry and cool place. Keep in a well-ventilated place.

Advice on common storage : Keep away from food, drink and animal feedingstuffs.

Suitable packaging materials : Polyethylene

Unsuitable packaging materials : , Aluminium, copper, Nickel, Tin, iron

7.3. Specific end use(s)

Specific use(s) : Identified use: See table in front of appendix for a complete overview of identified uses.

SECTION 8: Exposure controls/personal protection

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8.1. Control parameters

Component:	Iron trichloride	CAS-No. 7705-08-0
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Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)

DNEL		
Workers, Long-term - systemic effects, Inhalation	:	2 mg/m ³
DNEL		
Workers, Acute - systemic effects, Inhalation	:	2 mg/m ³
DNEL		
Workers, Long-term - systemic effects, Skin contact	:	0.57 mg/kg bw/day
DNEL		
Workers, Acute - systemic effects, Skin contact	:	0.57 mg/kg bw/day
DNEL		
Consumers, Long-term - systemic effects, Inhalation	:	0.5 mg/m ³
DNEL		
Consumers, Acute - systemic effects, Inhalation	:	0.5 mg/m ³
DNEL		
Consumers, Long-term - systemic effects, Skin contact	:	0.29 mg/kg bw/day
DNEL		
Consumers, Acute - systemic effects, Skin contact	:	0.29 mg/kg bw/day
DNEL		
Consumers, Long-term - systemic effects, Ingestion	:	0.29 mg/kg bw/day

Predicted No Effect Concentration (PNEC)

Sewage treatment plant (STP) as Fe	:	500 mg/l
Fresh water sediment as Fe	:	49500 mg/kg dry weight (d.w.)
Marine sediment as Fe	:	49500 mg/kg dry weight (d.w.)
Soil as Fe	:	55500 mg/kg dry weight (d.w.)

Other Occupational Exposure Limit Values

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UK. EH40 Workplace Exposure Limits (WELs), Short Term Exposure Limit (STEL):, as Fe
2 mg/m³

UK. EH40 Workplace Exposure Limits (WELs), Time Weighted Average (TWA):, as Fe
1 mg/m³

ELV (IE), Time Weighted Average (TWA):, as Fe
1 mg/m³

ELV (IE), Short Term Exposure Limit (STEL):, as Fe
2 mg/m³

8.2. Exposure controls

Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment

Respiratory protection

Advice : In case of insufficient ventilation, wear suitable respiratory equipment.
When aerosol or mist is formed use suitable respiratory protection.
Respiratory protection complying with EN 141.
Combination filter:B-P2
Combination filter:E-P2

Hand protection

Advice : Protective gloves complying with EN 374.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.
Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.
Protective gloves should be replaced at first signs of wear.
The following information applies to aqueous, saturated solutions.

Material : Natural Rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : polychloroprene
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Nitrile rubber
Break through time : ≥ 8 h
Glove thickness : 0.35 mm

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Material : butyl-rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Fluorinated rubber
Break through time : ≥ 8 h
Glove thickness : 0.4 mm

Material : Polyvinylchloride
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Eye protection

Advice : Safety goggles

Skin and body protection

Advice : Wear personal protective equipment.

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.

SECTION 9: Physical and chemical properties**9.1. Information on basic physical and chemical properties**

Form : liquid
Colour : brown
Odour : weak characteristic
Odour Threshold : no data available
pH : ca. 1
Melting point/freezing point : ca. -12 °C
Boiling point/boiling range : 100 - 105 °C
Flash point : Not applicable
Evaporation rate : no data available

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Flammability (solid, gas)	: Not applicable
Upper explosion limit	: Not applicable
Lower explosion limit	: Not applicable
Vapour pressure	: no data available
Relative vapour density	: no data available
Density	: 1.42 g/cm ³ solution 40% 1.48 g/cm ³ 45% solution
Water solubility	: completely soluble
Partition coefficient: n-octanol/water	: log Kow -4 (24 °C) applies to anhydrous substance
Auto-ignition temperature	: Not applicable
Thermal decomposition	: 315 °C Decomposes on heating.
Viscosity, dynamic	: no data available
Explosivity	: Product is not explosive.
Oxidizing properties	: not oxidising

9.2. Other information

Corrosion to metals	: Corrosive to metals
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SECTION 10: Stability and reactivity**10.1. Reactivity**

Advice	: No decomposition if stored and applied as directed.
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10.2. Chemical stability

Advice	: Stable under recommended storage conditions.
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10.3. Possibility of hazardous reactions

Hazardous reactions	: Gives off hydrogen by reaction with metals. Reacts with alkalis. Reacts with reducing agents. Corrosive in contact with metals
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10.4. Conditions to avoid

Conditions to avoid	: Heat
Thermal decomposition	: 315 °C Decomposes on heating.

10.5. Incompatible materials

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Materials to avoid : Strong bases, Acids, alkalis

10.6. Hazardous decomposition products

Hazardous decomposition : hydrogen chloride, Chlorides products

SECTION 11: Toxicological information
11.1. Information on toxicological effects
Data for the product
Acute toxicity
Oral

Acute toxicity estimate : 505 - 2000 mg/kg) (Calculation method)

Inhalation

Not classified based on the calculation method according to CLP regulation.

Dermal

Not classified based on the calculation method according to CLP regulation.

Irritation
Skin

Result : Classified based on the calculation method according to CLP regulation.

Eyes

Result : Classified based on the calculation method according to CLP regulation.

Sensitisation

Result : Not classified based on the calculation method according to CLP regulation.

CMR effects
CMR Properties

Carcinogenicity : Not classified based on the calculation method according to CLP regulation.

Mutagenicity : Not classified based on the calculation method according to CLP regulation.

Teratogenicity : no data available

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Reproductive toxicity : no data available

Specific Target Organ Toxicity
Single exposure

Remarks : Not classified based on the calculation method according to CLP regulation.

Repeated exposure

Remarks : Not classified based on the calculation method according to CLP regulation.

Other toxic properties
Repeated dose toxicity

no data available

Aspiration hazard

Not applicable,

Component:	Iron trichloride	CAS-No. 7705-08-0
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Acute toxicity
Oral

LD50 : 1300 mg/kg (Mouse) Read-across (Analogy)

Inhalation

no data available

Dermal

LD50 : > 2000 mg/kg (Rat) (OECD Test Guideline 402)

Irritation
Skin

Result : Irritating to skin. (Rat)

Eyes

Result : Irreversible damage. (Rabbit) (OECD Test Guideline 405) Read-across (Analogy)

Sensitisation

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Result : not sensitizing (Local lymph node test; Mouse) (OECD Test Guideline 429) Read-across (Analogy)

CMR effects
Carcinogenicity

(negative, Rat, Fischer 344/DuCrj, male and female)(Oral)(OECD Test Guideline 451)

CMR Properties

Carcinogenicity : It is not considered carcinogenic.
 Mutagenicity : In vitro tests did not show mutagenic effects
 Teratogenicity : no data available
 Reproductive toxicity : no data available

Genotoxicity in vitro

Result : negative (Chromosome aberration test in vitro; Chinese hamster fibroblasts; with and without metabolic activation) (OECD Test Guideline 487)
 negative (In vitro gene mutation study in mammalian cells; mouse lymphoma cells; with and without metabolic activation) (OECD Test Guideline 476)
 negative (reverse mutation assay; Salmonella typhimurium) (OECD Test Guideline 471)

Genotoxicity in vivo

Result : negative (Chromosome aberration test in vivo; Mouse)

Specific Target Organ Toxicity
Single exposure

Remarks : The substance or mixture is not classified as specific target organ toxicant, single exposure.

Repeated exposure

Remarks : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties
Repeated dose toxicity

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NOEL : 277 mg/kg
(Rat, male)(Oral; 90-day) (OECD Test Guideline 408)

NOEL : 314 mg/kg
(Rat, female)(Oral; 90-day) (OECD Test Guideline 408)

Aspiration hazard

No aspiration toxicity classification,

SECTION 12: Ecological information
12.1. Toxicity

Component:	Iron trichloride	CAS-No. 7705-08-0
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Acute toxicity
Fish

LC50 : 20.3 mg/l (Lepomis macrochirus (Bluegill sunfish); 96 h)

Toxicity to daphnia and other aquatic invertebrates

EC50 : 9.6 mg/l (Daphnia magna (Water flea); 48 h) (Immobilization;
OECD Test Guideline 202)

algae

ErC50 : 6.9 mg/l (Pseudokirchneriella subcapitata (green algae); 72 h)
(OECD Test Guideline 201)

NOEC : 2.4 mg/l (Pseudokirchneriella subcapitata (green algae); 72 h)
(OECD Test Guideline 201)

Chronic toxicity
Fish

NOEC : 0.32 mg/l (Pimephales promelas (fathead minnow); 33 d)

Aquatic invertebrates

NOEC : 0.7 mg/l (Daphnia magna (Water flea); 21 d)

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12.2. Persistence and degradability

Component:	Iron trichloride	CAS-No. 7705-08-0
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Persistence and degradability

Persistence

Result : no data available

Biodegradability

Result : The methods for determining the biological degradability are not applicable to inorganic substances.

12.3. Bioaccumulative potential

Component:	Iron trichloride	CAS-No. 7705-08-0
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Bioaccumulation

Result : BCF: < 20 (Cyprinus carpio (Carp); 5 mg/l; Test substance: iron (II) sulfate heptahydrate) Bioaccumulation is not expected.

12.4. Mobility in soil

Component:	Iron trichloride	CAS-No. 7705-08-0
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Mobility

Soil : immobile

12.5. Results of PBT and vPvB assessment

Data for the product

Results of PBT and vPvB assessment

Result : 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.

Component:	Iron trichloride	CAS-No. 7705-08-0
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Results of PBT and vPvB assessment

Result : This substance is not considered to be persistent, bioaccumulating nor toxic (PBT)., This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Result : The PBT or vPvB criteria of Annex XIII to the REACH Regulation does not apply to inorganic substances.

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12.6. Other adverse effects

Data for the product

Additional ecological information

Result : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.

Component:	Iron trichloride	CAS-No. 7705-08-0
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Additional ecological information

Result : Do not flush into surface water or sanitary sewer system.
Harmful effects to aquatic organisms due to pH-shift.
Avoid subsoil penetration.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

- Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.
- Contaminated packaging : Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. If recycling is not practicable, dispose of in compliance with local regulations.
- European Waste Catalogue Number : No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information

14.1. UN number

2582

14.2. UN proper shipping name

ADR : FERRIC CHLORIDE SOLUTION
RID : FERRIC CHLORIDE SOLUTION
IMDG : FERRIC CHLORIDE SOLUTION

14.3. Transport hazard class(es)

ADR-Class : 8
(Labels; Classification Code; Hazard identification No; Tunnel restriction code) 8; C1; 80; (E)
RID-Class : 8

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(Labels; Classification Code; Hazard identification No) : 8; C1; 80
 IMDG-Class : 8
 (Labels; EmS) : 8; F-A, S-B

14.4. Packaging group

ADR : III
 RID : III
 IMDG : III

14.5. Environmental hazards

Environmentally hazardous according to ADR : no
 Environmentally hazardous according to RID : no
 Marine Pollutant according to IMDG-Code : no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information

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

Data for the product

EU. REACH, Annex XVII, : ; The substance/mixture does not fall under this legislation.
 Marketing and Use
 Restrictions (Regulation
 1907/2006/EC)

EU. Directive : ; The substance/mixture does not fall under this legislation.
 2012/18/EU (SEVESO
 III) Annex I

Component:	Iron trichloride	CAS-No. 7705-08-0
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EU. Regulation EU No. : ; The substance/mixture does not fall under this legislation.
 649/2012 concerning the
 export and import of
 dangerous chemicals

EU. REACH, Annex XVII, : ; The substance/mixture does not fall under this legislation.
 Marketing and Use

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Restrictions (Regulation
1907/2006/EC)

EU. Directive : ; The substance/mixture does not fall under this legislation.
2012/18/EU (SEVESO
III) Annex I

UK. Releases to air and : Annual reporting level threshold: 10,000 kg
water (UK ISR)

WGK (DE) : WGK 1: slightly water endangering: 515; Classification source
is Annex 2.

Notification status

Iron trichloride:

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
EINECS	YES	231-729-4
ENCS (JP)	YES	(1)-213
IECSC	YES	
ISHL (JP)	YES	(1)-213
KECI (KR)	YES	KE-21134
NZIOC	YES	HSR004016
PICCS (PH)	YES	
TSCA	YES	

15.2. Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Full text of H-Statements referred to under sections 2 and 3.

H290	May be corrosive to metals.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.

Abbreviations and Acronyms

BCF	bioconcentration factor
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BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service
CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

Further information

Key literature references and sources for data	:	Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.
Methods used for product classification	:	The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
Hints for trainings	:	The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.
Other information	:	The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with

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regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship.

The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance	3	8	NA	1, 2, 3, 8b	1	NA	ES950
2	Formulation & (re)packing of substances and mixtures	3	NA	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 14, 15	2, 5	NA	ES952
3	Use in adhesives and sealants	3	NA	NA	5, 7, 8a, 8b, 9, 10, 12, 13, 14	5	NA	ES966
4	Use in adhesives and sealants	21	NA	1	NA	8c, 8f	4, 7, 8, 11, 13	ES978
5	Use in adhesives and sealants	22	NA	NA	8a, 8b, 9, 10, 11, 13, 19	8c, 8f	NA	ES972
6	Use in agrochemicals	21	NA	12, 27	NA	8a, 8d	NA	ES976
7	Use in agrochemicals	22	1	NA	1, 2, 8a, 8b, 11, 13	8a, 8d	NA	ES970
8	Use in laboratories	3	24	NA	15	4	NA	ES1500
9	Use in laboratories	22	24	NA	15	8e	NA	ES969
10	Use in process water treatment	3	NA	NA	2, 5, 8a, 8b	4	NA	ES954
11	Use in process water treatment	22	8, 10, 23, 24	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 15	8c, 8f	NA	ES7412
12	Use in sewage water treatment	3	NA	NA	2, 5, 8a, 8b	5	NA	ES956
13	Use as processing aid	3	8, 14	NA	2, 3, 4, 8b, 9, 15, 22, 26	4, 5, 6a, 6b	NA	ES960
14	Use in metal surface treatment.	3	10, 15, 16	NA	5, 7, 8a, 8b, 13	2, 6b	NA	ES962
15	Use in metal surface treatment.	21	NA	14	NA	8a, 8d	NA	ES974
16	Use in soil treatment	22	19	NA	2, 8a, 8b	8e	NA	ES11596
17	Use in gas treatment	3	NA	NA	2, 8a, 8b	2	NA	ES958

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1. Short title of Exposure Scenario 1: Manufacture of substance

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	145000 ton(s)/year
	Daily amount per site	483.333 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0.15 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Given the highly controlled conditions used in the manufacture of the substance to prevent the release of gases, it can be assumed that the release in any form to air is effectively zero
	Water	Wastewater release into municipal STP.
	Soil	Soil emission controls are not applicable as there is no direct release to soil.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	10,000 m3/d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
	Air emission controls are not applicable as there is no direct release to air.	

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of	liquid

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	use)	
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm ²) (PROC1, PROC3)
	Exposed skin area	Palms of both hands (480 cm ²) (PROC2)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(PROC1, PROC2, PROC3)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.(PROC1, PROC2, PROC3)	
	Wear chemically resistant gloves. (Efficiency: 90 %)(PROC1, PROC2, PROC3)	

2.3 Contributing scenario controlling worker exposure for: PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC8b)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

3. Exposure estimation and reference to its source

Environment

ERC1: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC1	---	Fresh water sediment	PEC	45g/kg	0.9091
ERC1	---	Soil	PEC	53g/kg	0.9636

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Workers

PROC1, PROC2, PROC3, PROC8b: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC8b	---	Worker - inhalative, long-term - systemic	1.8mg/m ³	0.39
PROC1, PROC2, PROC3, PROC8b	---	Worker - dermal, long-term - systemic	0.14mg/kg bw/day	0.11

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 2: Formulation & (re)packing of substances and mixtures

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p> <p>PROC15: Use as laboratory reagent</p>
Environmental Release Categories	<p>ERC2: Formulation of preparations</p> <p>ERC5: Industrial use resulting in inclusion into or onto a matrix</p>

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC5

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	50 ton(s)/year
	Daily amount per site	166.67 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Disposal or recovery, Recovery of sludge for agriculture or horticulture
Conditions and measures related	Waste treatment	Waste water treatment may vary at different sites.

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to external treatment of waste for disposal		Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm ²) (PROC1, PROC3)
	Exposed skin area	Palms of both hands (480 cm ²) (PROC2)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	
2.3 Contributing scenario controlling worker exposure for: PROC4, PROC5, PROC9, PROC14, PROC15		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Amount used	Amount per Day	420 kg
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC4, PROC5, PROC9, PROC14)
	Exposed skin area	Palm of one Hand 240 cm ² (PROC15)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	
2.4 Contributing scenario controlling worker exposure for: PROC8a, PROC8b		
Product characteristics	Concentration of the Substance in	Covers percentage substance in the product up to 100 %.
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	Mixture/Article	
	Physical Form (at time of use)	solid
Amount used	Amount per Day	166.67 kg
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC8b)
	Exposed skin area	Two hands 960 cm ² (PROC8a)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

3. Exposure estimation and reference to its source

Environment

ERC2, ERC5: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2, ERC5	---	Soil	PEC	50.1g/kg	0.9109
ERC2, ERC5	---	Fresh water sediment	PEC	45g/kg	0.9091

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15	---	Worker - inhalative, long-term - systemic	1.8mg/m ³	0.39
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15	---	Worker - dermal, long-term - systemic	0.7mg/kg bw/day	0.54

FERRIC CHLORIDE 25 - 99%**4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario**

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 3: Use in adhesives and sealants

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	<p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC12: Use of blowing agents in manufacture of foam</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletisation</p>
Environmental Release Categories	ERC5: Industrial use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC5

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	60 ton(s)/year
	Daily amount per site	200 kg
Frequency and duration of use	Continuous exposure	300 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14

Product characteristics	Concentration of the Substance in	Covers percentage substance in the product up to 100 %.
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FERRIC CHLORIDE 25 - 99%

	Mixture/Article	
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC5, PROC8b, PROC9, PROC14)
	Exposed skin area	Two hands 960 cm ² (PROC8a)
	Exposed skin area	Palm of one Hand 240 cm ² (PROC12)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures(except PROC14)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)(except PROC14)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)	
	Use suitable eye protection.	
	Wear suitable protective clothing.	
2.3 Contributing scenario controlling worker exposure for: PROC7, PROC10, PROC13		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
	Exposure duration	240 min(PROC7)
Human factors not influenced by risk management	Exposed skin area	Hands and forearms. 1500 cm ² (PROC7)
	Exposed skin area	Two hands 960 cm ² (PROC10)
	Exposed skin area	Palms of both hands (480 cm ²) (PROC13)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use(PROC10, PROC13)	
	Indoor or outdoor use(PROC7)	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(PROC10)	
	Carry out in a vented booth or extracted enclosure.	
	Provide local exhaust ventilation (LEV).(Indoor PROC7)	
	Ensure containment of the emission source(Outdoor PROC7)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene	Wear chemically resistant gloves. (Efficiency: 90 %)	
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and health evaluation

Use suitable eye protection.

Wear suitable protective clothing.

In case of inadequate ventilation wear respiratory protection.

Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Indoor PROC7)

or

Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Outdoor PROC7)

3. Exposure estimation and reference to its source

Environment

ERC5: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC5	---	Soil	PEC	50g/kg	0.9091
ERC5	---	Fresh water sediment	PEC	45g/kg	0.9091

Workers

PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC12, PROC13, PROC14: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC5, PROC8a, PROC8b, PROC9, PROC12, PROC14	---	Worker - inhalative, long-term - systemic	2.2mg/m ³	0.48
PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC12, PROC13, PROC14	---	Worker - dermal, long-term - systemic	0.3mg/kg bw/day	0.21
PROC7	---	Worker - inhalative, long-term	3.3mg/m ³	0.72

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 4: Use in adhesives and sealants

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC1: Adhesives, sealants
Article categories	AC4: Stone, plaster, cement, glass and ceramic articles AC7: Metal articles AC8: Paper articles AC11: Wood articles AC13: Plastic articles
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 50%
Amount used	Annually total	900 tonnes
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0 %

2.2 Contributing scenario controlling consumer exposure for: PC1

Product characteristics	Concentration of the Substance in Mixture/Article	Covers concentrations up to 50%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	365 days/year
Other given operational conditions affecting consumers exposure	Indoor use	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Avoid contact with skin. Avoid contact with eyes.

3. Exposure estimation and reference to its source

Environment

ERC8c, ERC8f: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8c, ERC8f	---	Fresh water sediment	PEC	45g/kg	0.9091

Consumers

PC1: ConsExpo 4.1

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Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC1	---	Consumer - dermal, long-term - systemic	0.0008mg/kg bw/day	0.001

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see:

<http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 5: Use in adhesives and sealants

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Process categories	PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC10: Roller application or brushing PROC11: Non industrial spraying PROC13: Treatment of articles by dipping and pouring PROC19: Hand-mixing with intimate contact and only PPE available
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f

Product characteristics	Concentration of the Substance in Mixture/Article	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Amount used	Annual amount per site	12.300 ton(s)/year
	Daily amount per site	41 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
	Emission or Release Factor: Soil	0 %
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Collect all unused material for disposal as hazardous waste in compliance with local and national regulations

2.2 Contributing scenario controlling worker exposure for: PROC8a, PROC8b, PROC9, PROC19

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	

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Human factors not influenced by risk management	Exposed skin area	Two hands 960 cm ² (PROC8a)
	Exposed skin area	Palms of both hands (480 cm ²) (PROC8b, PROC9)
	Exposed skin area	More than hands and forearms. 1980 cm ² (PROC19)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

2.3 Contributing scenario controlling worker exposure for: PROC10, PROC11, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
	Exposure duration	240 min(PROC11)
	Frequency of use	3 days/week(PROC11)
Human factors not influenced by risk management	Exposed skin area	Two hands 960 cm ² (PROC10)
	Exposed skin area	Hands and forearms. 1500 cm ² (PROC11)
	Exposed skin area	Palms of both hands (480 cm ²) (PROC13)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use(PROC10, PROC13)	
	Indoor or outdoor use(PROC11)	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Carry out in a vented booth or extracted enclosure.	
	Provide local exhaust ventilation (LEV).(Indoor PROC11)	
	Ensure containment of the emission source(Outdoor PROC11)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
	Clean equipment and the work area every day.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	
	If no LEV or vented laminar spray booth available. Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Indoor PROC11) or Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Outdoor PROC11)	

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3. Exposure estimation and reference to its source

Environment

ERC8c, ERC8f: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8c, ERC8f	---	Soil	PEC	50g/kg	0.9091
ERC8c, ERC8f	---	Fresh water sediment	PEC	45g/kg	0.9091

Workers

PROC8a, PROC9, PROC10, PROC11, PROC13, PROC19: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8a, PROC9, PROC19	---	Worker - inhalative, long-term - systemic	2.2mg/m ³	0.48
PROC8a, PROC9, PROC10, PROC13, PROC19	---	Worker - dermal, long-term - systemic	0.27mg/kg bw/day	0.21
PROC11	---	Worker - inhalative, long-term	3.3mg/m ³	0.72
PROC11	---	Worker - dermal, long-term - systemic	0.3mg/kg bw/day	0.21

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 6: Use in agrochemicals

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC12: Fertilizers PC27: Plant protection products
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
Frequency and duration of use	Continuous exposure	365 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	5 %
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d

2.2 Contributing scenario controlling consumer exposure for: PC12, PC27

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	365 days/year
Other given operational conditions affecting consumers exposure	Indoor or outdoor use	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable gloves. Avoid contact with skin. Avoid contact with eyes.

3. Exposure estimation and reference to its source

Environment

ERC8a, ERC8d: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a, ERC8d	---	Fresh water sediment	PEC	45g/kg	0.9091

Consumers

PC12: StoffenManager (inhalation exposure)

PC12: ECETOC TRA worker V3

PC12, PC27: ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR

FERRIC CHLORIDE 25 - 99%

PC12, PC27	Indoor use	Consumer - inhalative, long-term - systemic	0.59mg/m ³	0.54
PC12, PC27	solid, with gloves	Consumer - dermal, long-term - systemic	0.28mg/kg bw/day	0.4
PC12	liquid, without gloves	Consumer - dermal, long-term - systemic	0.14mg/kg bw/day	0.2
PC12	Indoor use	Inhalation	0.59mg/m ³	0.54
PC12	Indoor use	Inhalation	1.1mg/m ³	1

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see:

<http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 7: Use in agrochemicals

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU1: Agriculture, forestry, fishery
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p>
Environmental Release Categories	<p>ERC8a: Wide dispersive indoor use of processing aids in open systems</p> <p>ERC8d: Wide dispersive outdoor use of processing aids in open systems</p>

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	24 ton(s)/year
	Daily amount per site	200 kg
Frequency and duration of use	Continuous exposure	120 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Number of emission days per year	120
	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	5 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid

FERRIC CHLORIDE 25 - 99%

	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	120 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm ²) (PROC1)
	Exposed skin area	Palms of both hands (480 cm ²) (PROC2, PROC8b)
	Exposed skin area	Two hands 960 cm ² (PROC8a)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(except PROC1)	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(except PROC1)	
	Use suitable eye protection.	
	Wear suitable protective clothing.	

2.3 Contributing scenario controlling worker exposure for: PROC11, PROC13

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	120 days/year(PROC13)
	Covers daily exposures up to 8 hours(PROC13)	
	Frequency of use	3 days/week(PROC11)
Human factors not influenced by risk management	Exposed skin area	Hands and forearms. 1500 cm ² (PROC11)
	Exposed skin area	Palms of both hands (480 cm ²) (PROC13)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Carry out in a vented booth or extracted enclosure.	
	Provide local exhaust ventilation (LEV).	
	Avoid carrying out operation for more than 4 hours.(Indoor PROC11) Ensure containment of the emission source(Outdoor PROC11)	
Organisational measures to prevent /limit releases, dispersion and exposure	Clean equipment and the work area every day.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)	
	Use suitable eye protection.	
	Wear suitable protective clothing.	
	If no LEV or vented laminar spray booth available. Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Indoor PROC11) or Wear a full face respirator TM3 conforming to EN147 with type A filter or better (Efficiency: 95 %)(Outdoor PROC11)	

3. Exposure estimation and reference to its source

FERRIC CHLORIDE 25 - 99%

Environment

ERC8a, ERC8d: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8a, ERC8d	---	Soil	PEC	50g/kg	0.9091
ERC8a, ERC8d	---	Fresh water sediment	PEC	45g/kg	0.9091

Workers

PROC1, PROC2, PROC8a, PROC8b, PROC11, PROC13: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC8a, PROC8b, PROC11, PROC13	---	Worker - dermal, long-term - systemic	0.27mg/kg bw/day	0.21
PROC2, PROC8a, PROC8b	---	Worker - inhalative, long-term - systemic	2.2mg/m ³	0.48
PROC11	---	Worker - inhalative, long-term	3.3mg/m ³	0.48

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 8: Use in laboratories

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU24: Scientific research and development
Process categories	PROC15: Use as laboratory reagent
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid
Amount used	Worker contact is generally very low as most operations are remotely controlled and sampling/analysis events are of short duration.	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm ²)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Clean equipment and the work area every day.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. Wear suitable protective clothing.	
	Wear eye protection/ face protection. If no LEV: Wear respiratory protection Particle filter:P2	

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Workers

PROC15: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term - systemic	2.01mg/m ³	0.43

FERRIC CHLORIDE 25 - 99%

PROC15	---	Worker - dermal, long-term - systemic	0.03mg/kg bw/day	0.02
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4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented
Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 9: Use in laboratories

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU24: Scientific research and development
Process categories	PROC15: Use as laboratory reagent
Environmental Release Categories	ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8e

As no environmental hazard was identified no environmental related exposure assessment and risk characterization was performed

2.2 Contributing scenario controlling worker exposure for: PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid
Amount used	Worker contact is generally very low as most operations are remotely controlled and sampling/analysis events are of short duration.	
Frequency and duration of use	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palm of one hand (240cm ²)
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)	
	Wear a full face respirator conforming to EN136 with Type A/P2 filter or better. (Efficiency: 90 %)	
	Use suitable eye protection.	
	Wear suitable protective clothing.	

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Workers

PROC15: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC15	---	Worker - inhalative, long-term	2.01mg/m ³	0.43
PROC15	---	Worker - dermal, long-term - systemic	0.01mg/kg bw/day	0.01

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

FERRIC CHLORIDE 25 - 99%

For further information on the assessment method, see: <http://www.ecetoc.org/tra>
Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented
Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 10: Use in process water treatment

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles

2.1 Contributing scenario controlling environmental exposure for: ERC4

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	540 ton(s)/year
	Daily amount per site	1800 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	1 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC5, PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid

FERRIC CHLORIDE 25 - 99%

Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC2, PROC8b)
	Exposed skin area	Two hands 960 cm ² (PROC8a)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place (PROC8a, PROC8b)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures (except PROC5)	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing. (except PROC5)	
	Wear chemically resistant gloves. (Efficiency: 90 %) (except PROC5)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %) (PROC8a, PROC8b)	

2.3 Contributing scenario controlling worker exposure for: PROC5

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

3. Exposure estimation and reference to its source

Environment

ERC4: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4	---	Fresh water sediment	PEC	45g/kg	0.9091
ERC4	---	Soil	PEC	50g/kg	0.9091

Workers

PROC2, PROC5, PROC8a, PROC8b: ECETOC TRA worker V3

FERRIC CHLORIDE 25 - 99%

PROC5, PROC8a, PROC8b, PROC9, PROC15: MEASE

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC5, PROC8a, PROC8b	---	Worker - inhalative, long-term - systemic	2.01mg/m ³	0.43
PROC2, PROC5, PROC8a, PROC8b	---	Worker - dermal, long-term - systemic	0.3mg/kg bw/day	0.23
PROC5, PROC8a, PROC8b, PROC9, PROC15	with gloves	Dermal worker exposure	< 0.69mg/kg	< 0.403

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 11: Use in process water treatment

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU23: Recycling SU24: Scientific research and development
Process categories	PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent
Environmental Release Categories	ERC8c: Wide dispersive indoor use resulting in inclusion into or onto a matrix ERC8f: Wide dispersive outdoor use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC8c, ERC8f

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	25
	Dilution Factor (Coastal Areas)	250
	Other data. Other information	Local freshwater dilution factor 10 - 40
	Other data. Other information	Local marine water dilution factor 100 - 400
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	It is required that the flow of release to municipal wastewater or to surface water do not cause significant in pH changes
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
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FERRIC CHLORIDE 25 - 99%

	Physical Form (at time of use)	Aqueous solution
Frequency and duration of use	Frequency of use	220 days/year
	Covers daily exposures up to 8 hours	
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide adequate ventilation.	
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.	
Conditions and measures related to personal protection, hygiene and health evaluation	Chemically resistant gloves tested to EN374.(except PROC1, PROC2)	

3. Exposure estimation and reference to its source

Environment

Exposure is considered negligible.

Workers

PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15: MEASE

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC15	with gloves	Dermal worker exposure	< 0.69mg/kg bw/day	< 0.403

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

If measured data are not available, the DU may make use of an appropriate scaling tool such as MEASE (www.ebrc.de/mease.html) to estimate the associated exposure.

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 12: Use in sewage water treatment

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC5: Industrial use resulting in inclusion into or onto a matrix

2.1 Contributing scenario controlling environmental exposure for: ERC5

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	73 ton(s)/year
	Daily amount per site	200 kg
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10 (ERC5)
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	1
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid

FERRIC CHLORIDE 25 - 99%

Frequency and duration of use	Frequency of use	365 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC2, PROC8b)
	Exposed skin area	Two hands 960 cm ² (PROC8a)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(except PROC2)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(PROC8b)	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

2.3 Contributing scenario controlling worker exposure for: PROC5

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	365 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

3. Exposure estimation and reference to its source

Environment

ERC5: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC5	---	Fresh water sediment	PEC	45g/kg	0.9091
ERC5	---	Soil	PEC	50.8g/kg	0.9236

Workers

PROC8a: ECETOC TRA worker V3

FERRIC CHLORIDE 25 - 99%

PROC8a, PROC8b: StoffenManager (inhalation exposure)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8a	---	Worker - dermal, long-term - systemic	0.3mg/kg bw/day	0.23
PROC8a, PROC8b	---	Inhalation	2.01mg/m ³	0.43

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

1. Short title of Exposure Scenario 13: Use as processing aid

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products) SU14: Manufacture of basic metals, including alloys
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) PROC15: Use as laboratory reagent PROC22: Manufacturing and processing of minerals and/or metals at substantially elevated temperature PROC26: Handling of solid inorganic substances at ambient temperature
Environmental Release Categories	ERC4: Industrial use of processing aids in processes and products, not becoming part of articles ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC5, ERC6a, ERC6b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	6000 ton(s)/year
	Daily amount per site	20 tonnes
Frequency and duration of use	Continuous exposure	300 days/year
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	0.5 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge

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	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.
2.2 Contributing scenario controlling worker exposure for: PROC2, PROC3		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC2)
	Exposed skin area	Palm of one hand (240cm ²) (PROC3)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves. (Efficiency: 90 %)	
	Wear suitable protective clothing. Use suitable eye protection.	
2.3 Contributing scenario controlling worker exposure for: PROC4, PROC9, PROC15, PROC22, PROC26		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC4, PROC9)
	Exposed skin area	Palm of one hand (240cm ²) (PROC15)
	Exposed skin area	More than hands and forearms. 1980 cm ² (PROC22, PROC26)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection. Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	
2.4 Contributing scenario controlling worker exposure for: PROC8b		
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.

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	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC8b)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV). (Efficiency: 90 %)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	

3. Exposure estimation and reference to its source

Environment

ERC4, ERC5, ERC6a, ERC6b: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC4, ERC5, ERC6a, ERC6b	---	Soil	PEC	50.8g/kg	0.9236
ERC4, ERC5, ERC6a, ERC6b	---	Fresh water sediment	PEC	45g/kg	0.9091

Workers

PROC2, PROC3, PROC4, PROC8b, PROC9, PROC15, PROC22, PROC26: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC3, PROC4, PROC8b, PROC9, PROC15, PROC22, PROC26	---	Worker - inhalative, long-term - systemic	1.8mg/m ³	0.39
PROC2, PROC3, PROC4, PROC8b, PROC9, PROC15, PROC22, PROC26	---	Worker - dermal, long-term - systemic	0.7mg/kg bw/day	0.54

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default

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values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

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1. Short title of Exposure Scenario 14: Use in metal surface treatment.

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys) SU15: Manufacture of fabricated metal products, except machinery and equipment SU16: Manufacture of computer, electronic and optical products, electrical equipment
Process categories	PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) PROC7: Industrial spraying PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC13: Treatment of articles by dipping and pouring
Environmental Release Categories	ERC2: Formulation of preparations ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC6b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	50.100 ton(s)/year
	Daily amount per site	167 kg
Frequency and duration of use	Continuous exposure	300 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	2 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC5, PROC7, PROC13

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Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC5, PROC13)
	Exposed skin area	Palm of one hand (240cm ²) (PROC7)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Spraying	Use product only in closed system.
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Regular cleaning of equipment and work area	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves.	
	Use suitable eye protection.	

2.3 Contributing scenario controlling worker exposure for: PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	300 days/year
	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Provide local exhaust ventilation (LEV).	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures Regular cleaning of equipment and work area	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves.	
	Use suitable eye protection.	

3. Exposure estimation and reference to its source

Environment

ERC2, ERC6b: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2, ERC6b	---	Fresh water sediment	PEC	45g/kg	0.9091

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ERC2, ERC6b	---	Soil	PEC	51.8g/kg	0.9418
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Workers

PROC5, PROC7, PROC8a, PROC8b, PROC13: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC5, PROC7, PROC8a, PROC8b, PROC13	---	Worker - inhalative, long-term - systemic	1.8mg/m ³	0.39
PROC5, PROC7, PROC8a, PROC8b, PROC13	---	Worker - dermal, long-term - systemic	0.14mg/kg bw/day	0.11

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented

Assumes a good basic standard of occupational hygiene is implemented.

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1. Short title of Exposure Scenario 15: Use in metal surface treatment.

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC14: Metal surface treatment products, including galvanic and electroplating products
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8d

No exposure assessment presented for the environment

2.2 Contributing scenario controlling consumer exposure for: PC14

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 40 %
	Physical Form (at time of use)	liquid
Other given operational conditions affecting consumers exposure	Indoor or outdoor use	
Conditions and measures related to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	Wear suitable gloves. Avoid contact with skin. Avoid contact with eyes.

3. Exposure estimation and reference to its source

Environment

No exposure assessment presented for the environment.

Consumers

PC14: ConsExpo 4.1

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC14	---	Consumer - dermal, long-term - systemic	< 0.36mg/kg bw/day	< 0.86

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

For further information on the assessment method, see:

<http://www.rivm.nl/en/healthanddisease/productsafety/ConsExpo.jsp>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

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1. Short title of Exposure Scenario 16: Use in soil treatment

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU19: Building and construction work
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC8e: Wide dispersive outdoor use of reactive substances in open systems

2.1 Contributing scenario controlling environmental exposure for: ERC8e

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	100 tonnes
Frequency and duration of use	Continuous exposure	100 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0
	Emission or Release Factor: Soil	20 %
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid, solid
Amount used	Amount per Day	400 kg/day
Frequency and duration of use	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Breathing volume	10 m ³ /day
	Body weight	70 kg
	Exposed skin surface	480 cm ² (PROC2, PROC8b)
	Exposed skin surface	960 cm ² (PROC8a)

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Other operational conditions affecting workers exposure	Assumes use at not more than 20°C above ambient temperature.
Technical conditions and measures to control dispersion from source towards the worker	Ensure containment of the emission source Provide adequate ventilation.
Organisational measures to prevent /limit releases, dispersion and exposure	Ensure operatives are trained to minimise exposures.
Conditions and measures related to personal protection, hygiene and health evaluation	Safety glasses Use of gloves and working clothes have been considered additionally. In case of dust or aerosol formation: use respiratory protection with approved filter (P2)

3. Exposure estimation and reference to its source

Environment

ERC8e: EUSES 2.1

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC8e	---	Fresh water sediment	PEC	45g/kg	---
ERC8e	---	Agricultural soil	PEC	51.7g/kg	---

Workers

PROC8a: ECETOC TRA worker V3

PROC8a: StoffenManager (inhalation exposure)

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC8a	---	Worker - dermal, long-term - systemic	0.27mg/kg bw/day	0.21
PROC8a	---	Inhalation	2.01mg/m ³	0.43

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.

For further information on the assessment method, see: <http://www.ecetoc.org/tra>

Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Clean equipment and the work area every day.

Assumes a good basic standard of occupational hygiene is implemented.

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1. Short title of Exposure Scenario 17: Use in gas treatment

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process categories	PROC2: Use in closed, continuous process with occasional controlled exposure PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities
Environmental Release Categories	ERC2: Formulation of preparations

2.1 Contributing scenario controlling environmental exposure for: ERC2

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Amount used	Annual amount per site	2.409 ton(s)/year
	Daily amount per site	6.6 kg
Frequency and duration of use	Continuous exposure	365 days/year
Environment factors not influenced by risk management	Dilution Factor (River)	10
Other given operational conditions affecting environmental exposure	Emission or Release Factor: Air	0 %
	Emission or Release Factor: Water	1
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Air	Due to enclosed process air emissions are unlikely, except during transfer to and from the digester
	Water	Wastewater release into municipal STP.
Conditions and measures related to sewage treatment plant	Type of Sewage Treatment Plant	Municipal sewage treatment plant
	Flow rate of sewage treatment plant effluent	2,000 m ³ /d
	Sludge Treatment	Recovery of sludge for agriculture or horticulture
Conditions and measures related to external treatment of waste for disposal	Waste treatment	Waste water treatment may vary at different sites. Wastewater should be at least treated in either an on-site or a municipal secondary biological treatment plant prior to discharge
	Disposal methods	Can be landfilled or incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for: PROC2, PROC8a, PROC8b

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	365 days/year

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	Covers daily exposures up to 8 hours	
Human factors not influenced by risk management	Exposed skin area	Palms of both hands (480 cm ²) (PROC2, PROC8b)
	Exposed skin area	Two hands 960 cm ² (PROC8a)
	Breathing volume	10 m ³ /day
	Body weight	70 kg
Other operational conditions affecting workers exposure	Indoor use	
	Assumes use at not more than 20°C above ambient temperature.	
Technical conditions and measures to control dispersion from source towards the worker	Ensure that a mechanical ventilation is in place(except PROC2)	
Organisational measures to prevent /limit releases, dispersion and exposure	Provide basic employee training to prevent/minimize exposures	
Conditions and measures related to personal protection, hygiene and health evaluation	Use suitable eye protection.	
	Wear suitable protective clothing.	
	Wear chemically resistant gloves. (Efficiency: 90 %)	
	Wear a respirator conforming to EN140 with Type A/P2 filter or better. (Efficiency: 90 %)(except PROC2)	

3. Exposure estimation and reference to its source

Environment

ERC2: EUSES

Contributing Scenario	Specific conditions	Compartment	Value	Level of Exposure	RCR
ERC2	---	Fresh water sediment	PEC	45g/kg	0.9091
ERC2	---	Soil	PEC	50.1g/kg	0.9109

Workers

PROC2, PROC8a, PROC8b: ECETOC TRA worker V3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC2, PROC8a, PROC8b	---	Worker - inhalative, long-term - systemic	2.01mg/m ³	0.43
PROC2, PROC8a, PROC8b	---	Worker - dermal, long-term - systemic	0.3mg/kg bw/day	0.23

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The environmental emission has been evaluated using EUSES 2.1 (<http://ihcp.jrc.ec.europa.eu>), in which default values have been used, unless otherwise indicated.
 For further information on the assessment method, see: <http://www.ecetoc.org/tra>
 Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
 Only properly trained persons shall make use of scaling methods while checking whether the OC and RMM are within the boundaries set by the ES

Additional good practice advice beyond the REACH Chemical Safety Assessment

Ensure that good work practices are implemented
 Assumes a good basic standard of occupational hygiene is implemented.

FERRIC CHLORIDE 25 - 99%

SAFETY DATA SHEET according to Regulation (EC) No. 1907/2006

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

Version 12.1

Print Date 2021/02/11

Revision date / valid from 2021/02/11

MSDS code: **MCSS550**

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name : CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

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

Use of the Substance/Mixture : Identified use: See table in front of appendix for a complete overview of identified uses.

Uses advised against : At this moment we have not identified any uses advised against

1.3. Details of the supplier of the safety data sheet

Company : Brenntag UK Limited
Alpha House, Lawnswood Business Park
GB LS16 6QY Leeds

Telephone : +44 (0) 113 3879 200
Telefax : +44 (0) 113 3879 280
E-mail address : msds@brenntag.co.uk

1.4. Emergency telephone number

Emergency telephone number : Emergency only telephone number (open 24 hours):
+44 (0) 1865 407333 (N.C.E.C. Culham)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008

REGULATION (EC) No 1272/2008			
Hazard class	Hazard category	Target Organs	Hazard statements
Corrosive to metals	Category 1	---	H290
Skin corrosion	Category 1A	---	H314
Serious eye damage	Category 1	---	H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**Most important adverse effects**

Human Health	:	See section 11 for toxicological information.
Physical and chemical hazards	:	See section 9/10 for physicochemical information.
Potential environmental effects	:	See section 12 for environmental information.

2.2. Label elements**Labelling according to Regulation (EC) No 1272/2008**

Hazard symbols	:	
Signal word	:	Danger
Hazard statements	:	H290 May be corrosive to metals. H314 Causes severe skin burns and eye damage.
Precautionary statements	:	
Prevention	:	P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response	:	P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting. P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower. P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor. P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P390 Absorb spillage to prevent material damage.

Hazardous components which must be listed on the label:

- sodium hydroxide

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

2.3. Other hazards

For Results of PBT and vPvB assessment see section 12.5.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical nature : Aqueous solution

Hazardous components	Amount [%]	Classification (REGULATION (EC) No 1272/2008)	
		Hazard class / Hazard category	Hazard statements
sodium hydroxide			
Index-No. : 011-002-00-6	$\geq 5 - \leq 50$	Met. Corr.1	H290
CAS-No. : 1310-73-2		Skin Corr.1A	H314
EC-No. : 215-185-5		Eye Dam.1	H318
EU REACH- : 01-2119457892-27-xxxx			
Reg. No.			

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

- General advice : Take off all contaminated clothing immediately.
- If inhaled : In case of accident by inhalation: remove casualty to fresh air and keep at rest. If breathing is irregular or stopped, administer artificial respiration. Call a physician immediately.
- In case of skin contact : Call a physician immediately. Wash off immediately with soap and plenty of water.
- In case of eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Consult an eye specialist immediately. Go to an ophthalmic hospital if possible.
- If swallowed : Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician immediately.

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

- Symptoms : See Section 11 for more detailed information on health effects and symptoms.
- Effects : Extremely corrosive and destructive to tissue. If ingested,

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

severe burns of the mouth and throat, as well as a danger of perforation of the oesophagus and the stomach. See Section 11 for more detailed information on health effects and symptoms.

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

Treatment : Treat symptomatically.

SECTION 5: Firefighting measures
5.1. Extinguishing media

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
 Unsuitable extinguishing media : High volume water jet

5.2. Special hazards arising from the substance or mixture

Specific hazards during firefighting : Incomplete combustion may form toxic pyrolysis products.
 Hazardous combustion products : The formation of caustic fumes is possible.

5.3. Advice for firefighters

Special protective equipment for firefighters : In the event of fire, wear self-contained breathing apparatus. Wear appropriate body protection (full protective suit)
 Specific extinguishing methods : Control smoke with water spray.
 Further advice : Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

SECTION 6: Accidental release measures
6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions : Keep away unprotected persons. Use personal protective equipment. Ensure adequate ventilation. Avoid contact with the skin and the eyes. Do not breathe vapours or spray mist.

6.2. Environmental precautions

Environmental precautions : Do not flush into surface water or sanitary sewer system. Avoid subsoil penetration. If the product contaminates rivers and lakes or drains inform respective authorities. If material reaches soil inform authorities responsible for such cases.

6.3. Methods and materials for containment and cleaning up

Methods and materials for : Absorb with liquid-binding material (sand, diatomite, acid

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

containment and cleaning up : binders, universal binders). Keep in suitable, closed containers for disposal.
 : Use mechanical handling equipment. Keep in suitable, closed containers for disposal.

Further information : Treat recovered material as described in the section "Disposal considerations".

6.4. Reference to other sections

See Section 1 for emergency contact information.
 See Section 8 for information on personal protective equipment.
 See Section 13 for waste treatment information.

SECTION 7: Handling and storage
7.1. Precautions for safe handling

Advice on safe handling : Keep container tightly closed. Ensure adequate ventilation. Use personal protective equipment. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Use respirator with appropriate filter if vapours or aerosol are released. Emergency eye wash fountains and emergency showers should be available in the immediate vicinity.

Hygiene measures : Keep away from food, drink and animal feedingstuffs. Smoking, eating and drinking should be prohibited in the application area. Wash hands before breaks and at the end of workday. Take off all contaminated clothing immediately.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store in original container. Suitable materials for containers: Stainless steel; polyethylene; Polypropylene; Polyvinylchloride; Unsuitable materials for containers: Aluminium; Zinc; Copper

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Further information on storage conditions : Keep tightly closed in a dry and cool place. Keep in a well-ventilated place.

Advice on common storage : Keep away from food, drink and animal feedingstuffs.

Suitable packaging materials : Stainless steel, Polyethylene, Polypropylene, Polyvinylchloride

Unsuitable packaging materials : , Aluminium, Zinc, Copper

7.3. Specific end use(s)

Specific use(s) : No information available.

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)
SECTION 8: Exposure controls/personal protection
8.1. Control parameters

Component:	sodium hydroxide	CAS-No. 1310-73-2
Derived No Effect Level (DNEL)/Derived Minimal Effect Level (DMEL)		

DNEL		
Workers, Long-term - local effects, Inhalation	:	1.0 mg/m ³
DNEL		
Consumers, Long-term - local effects, Inhalation	:	1.0 mg/m ³

Predicted No Effect Concentration (PNEC)

No PNEC value was derived.	:	
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Other Occupational Exposure Limit Values

UK. EH40 Workplace Exposure Limits (WELs), as amended, Short Term Exposure Limit (STEL):		
2 mg/m ³ , (15 minutes)		
ELV (IE), Short Term Exposure Limit (STEL):		
2 mg/m ³ , (15 minutes)		

8.2. Exposure controls
Appropriate engineering controls

Refer to protective measures listed in sections 7 and 8.

Personal protective equipment
Respiratory protection

Advice : In case of brief exposure or low pollution use breathing filter apparatus.
Respiratory protection complying with EN 141.
In case of intensive or longer exposure use self-contained breathing apparatus.

Hand protection

Advice : Wear suitable gloves.

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The glove material has to be impermeable and resistant to the product / the substance / the preparation.
Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Protective gloves should be replaced at first signs of wear.

Material : Natural Rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : polychloroprene
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Nitrile rubber
Break through time : ≥ 8 h
Glove thickness : 0.35 mm

Material : butyl-rubber
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Material : Fluorinated rubber
Break through time : ≥ 8 h
Glove thickness : 0.4 mm

Material : Polyvinylchloride
Break through time : ≥ 8 h
Glove thickness : 0.5 mm

Eye protection

Advice : Safety goggles
Face-shield

Skin and body protection

Advice : Impervious clothing
Chemical resistant apron

Environmental exposure controls

General advice : Do not flush into surface water or sanitary sewer system.
Avoid subsoil penetration.
If the product contaminates rivers and lakes or drains inform respective authorities.
If material reaches soil inform authorities responsible for such cases.

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**SECTION 9: Physical and chemical properties****9.1. Information on basic physical and chemical properties**

Form	: liquid
Colour	: colourless
Odour	: odourless
Odour Threshold	: Not applicable
pH	: 14 - 15 (100 %) ((calculated)) (formulated product)
Melting point/range	: 12 °C 50% solution
Boiling point/boiling range	: 145 °C 50% solution
Flash point	: Not applicable
Evaporation rate	: Not applicable
Flammability (solid, gas)	: Not applicable
Upper explosion limit	: Not applicable
Lower explosion limit	: Not applicable
Vapour pressure	: no data available
Relative vapour density	: no data available
Density	: ca. 1.525 g/cm ³ (20 °C) 50% solution
Water solubility	: 1090 g/l (20 °C)
Partition coefficient: n-octanol/water	: no data available
Auto-ignition temperature	: no data available
Thermal decomposition	: no data available
Viscosity, dynamic	: 79 mPa.s (20 °C) 50% solution
Explosivity	: Product is not explosive.
Oxidizing properties	: no data available

9.2. Other information

Corrosion to metals	: Corrosive to metals
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CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)
SECTION 10: Stability and reactivity
10.1. Reactivity

Advice : No decomposition if stored and applied as directed.

10.2. Chemical stability

Advice : Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions : Corrosive in contact with metals Gives off hydrogen by reaction with base metals (zinc, aluminium). Reacts exothermically with water. Reacts exothermic with acids.

10.4. Conditions to avoid

Conditions to avoid : Heat, flames and sparks.
Thermal decomposition : no data available

10.5. Incompatible materials

Materials to avoid : Materials to avoid: Acids, Light metals, Alcohols, Halogenated hydrocarbon

10.6. Hazardous decomposition products

Hazardous decomposition products : hydrogen

SECTION 11: Toxicological information
11.1. Information on toxicological effects
Data for the product
Acute toxicity
Oral

no data available

Inhalation

no data available

Dermal

For this mixture is no data available.
Please find this information in the listing of the component/components below in this section.

Irritation

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)**Skin**

no data available

Eyes

no data available

Sensitisation

no data available

CMR effects**CMR Properties**

Carcinogenicity : no data available

Mutagenicity : no data available

Reproductive toxicity : no data available

Specific Target Organ Toxicity**Single exposure**

no data available

Repeated exposure

no data available

Other toxic properties**Repeated dose toxicity**

no data available

Aspiration hazard

no data available

Component: sodium hydroxide CAS-No. 1310-73-2**Acute toxicity****Oral****||**

No valid data available.

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)
Inhalation

|| No valid data available.

Dermal

|| No valid data available.

Dermal

|| No valid data available.

Irritation
Skin

|| Result : Very corrosive (Rabbit) (No guideline followed)
Corrosive

Eyes

|| Result : corrosive effects (Rabbit; Test substance: 10% solution) (OECD Test Guideline 405)Equivalent or similar to OECD Guideline

Sensitisation

|| Result : not sensitizing (human) (No guideline followed)Patch test on human volunteers did not demonstrate sensitisation properties.

CMR effects
CMR Properties

|| Carcinogenicity : No experimental references for cancerogenity available.
|| Mutagenicity : In vitro tests did not show mutagenic effects
In vivo tests did not show mutagenic effects
|| Teratogenicity : no data available
|| Reproductive toxicity : Not expected to impair fertility.

Specific Target Organ Toxicity
Single exposure

|| Remarks : The substance or mixture is not classified as specific target organ toxicant, single exposure.

Repeated exposure

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

|| Remarks : The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Other toxic properties
Aspiration hazard

|| Not applicable,

SECTION 12: Ecological information
12.1. Toxicity
Data for the product
Acute toxicity
Short-term (acute) aquatic hazard

Result : The product is not classified as dangerous for the environment.

Component: sodium hydroxide CAS-No. 1310-73-2

Acute toxicity
Fish

|| LC50 : 125 mg/l (Gambusia affinis; 96 h) (No guideline followed)
 || LC50 : 145 mg/l (Poecilia reticulata; 24 h) (No guideline followed)

Toxicity to daphnia and other aquatic invertebrates

|| EC50 : 40.4 mg/l (Ceriodaphnia (water flea); 48 h) (No guideline followed)

algae

|| : no data available

Bacteria

|| EC50 : 22 mg/l (Photobacterium phosphoreum; 15 min) (EPS 1/RM/24)

12.2. Persistence and degradability

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Persistence and degradability		
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Persistence		
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 Result	:	no data available
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Biodegradability		
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 Result	:	The methods for determining the biological degradability are not applicable to inorganic substances.
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12.3. Bioaccumulative potential

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Bioaccumulation		
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 Result	:	Does not bioaccumulate.
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12.4. Mobility in soil

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Mobility		
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 Water	:	The product is mobile in water environment.
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12.5. Results of PBT and vPvB assessment

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Results of PBT and vPvB assessment		
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 Result	:	The PBT or vPvB criteria of Annex XIII to the REACH Regulation does not apply to inorganic substances.
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12.6. Other adverse effects

Component:	sodium hydroxide	CAS-No. 1310-73-2
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Additional ecological information		
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 Result	:	Harmful effects to aquatic organisms due to pH-shift. Neutralization is normally necessary before waste water is discharged into water treatment plants. Do not flush into surface water or sanitary sewer system.
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SECTION 13: Disposal considerations

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)
13.1. Waste treatment methods

- Product : Disposal together with normal waste is not allowed. Special disposal required according to local regulations. Do not let product enter drains. Contact waste disposal services.
- Contaminated packaging : Empty contaminated packagings thoroughly. They can be recycled after thorough and proper cleaning. If recycling is not practicable, dispose of in compliance with local regulations.
- European Waste Catalogue Number : No waste code according to the European Waste Catalogue can be assigned for this product, as the intended use dictates the assignment. The waste code is established in consultation with the regional waste disposer.

SECTION 14: Transport information
14.1. UN number

|| 1824

14.2. UN proper shipping name

ADR	: SODIUM HYDROXIDE SOLUTION
RID	: SODIUM HYDROXIDE SOLUTION
IMDG	: SODIUM HYDROXIDE SOLUTION

14.3. Transport hazard class(es)

ADR-Class (Labels; Classification Code; Hazard Identification Number; Tunnel restriction code)	: 8 8; C5; 80; (E)
RID-Class (Labels; Classification Code; Hazard Identification Number)	: 8 8; C5; 80
IMDG-Class (Labels; EmS)	: 8 8; F-A, S-B

14.4. Packaging group

ADR	: II
RID	: II
IMDG	: II

14.5. Environmental hazards

Environmentally hazardous according to ADR	: no
Environmentally hazardous according to RID	: no

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Marine Pollutant according to IMDG-Code : no

14.6. Special precautions for user

Not applicable.

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

IMDG : Not applicable.

SECTION 15: Regulatory information**15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture****Data for the product**

EU. REACH, Annex XVII, : Point Nos.: , 3; Listed
Marketing and Use
Restrictions (Regulation
1907/2006/EC)

EU. Directive : ; The substance/mixture does not fall under this legislation.
2012/18/EU (SEVESO
III) Annex I

Other regulations : Occupational restrictions: Take note of Dir 92/85/EEC on the
safety and health of pregnant workers at work and of Dir
94/33/EC on the protection of young people at work.

Component:	sodium hydroxide	CAS-No. 1310-73-2
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|| EU. Regulation EU No. : ; The substance/mixture does not fall under this legislation.
649/2012 concerning the
export and import of
dangerous chemicals

EU. REACH, Annex XVII, : ; The substance/mixture does not fall under this legislation.
Marketing and Use
Restrictions (Regulation
1907/2006/EC)

|| EU. Regulation No : EC Number: , 215-185-5; Listed
1451/2007 [Biocides],
Annex I, OJ (L 325)

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EU. Regulation No. 1223/2009 on cosmetic products, Annex III: List of Restricted Substances in Cosmetic Products : Maximum concentration in ready for use preparation: 2 %; Hair straightener: General use; See the text of the regulation for applicable exceptions or provisions.

pH < 12,7.; pH adjuster for depilatories; See the text of the regulation for applicable exceptions or provisions.

Maximum concentration in ready for use preparation: 4.5 %; Hair straightener: Professional use; See the text of the regulation for applicable exceptions or provisions.

pH < 11.; Uses as pH adjuster other than for depilatories; See the text of the regulation for applicable exceptions or provisions.

Maximum concentration in ready for use preparation: 5 %; Nail cuticle solvent; See the text of the regulation for applicable exceptions or provisions.

Notification status sodium hydroxide:

Regulatory List	Notification	Notification number
AICS	YES	
DSL	YES	
EINECS	YES	215-185-5
ENCS (JP)	YES	(1)-410
IECSC	YES	
ISHL (JP)	YES	(1)-410
KECI (KR)	YES	97-1-136
KECI (KR)	YES	KE-31487
NZIOC	YES	HSR001547
PICCS (PH)	YES	
TSCA	YES	

15.2. Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information**Full text of H-Statements referred to under sections 2 and 3.**

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

Abbreviations and Acronyms

BCF	bioconcentration factor
BOD	biochemical oxygen demand
CAS	Chemical Abstracts Service

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CLP	Classification, Labelling and Packaging
CMR	carcinogenic, mutagenic or toxic to reproduction
COD	chemical oxygen demand
DNEL	derived no-effect level
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
GHS	Globally Harmonized System of Classification and Labelling of Chemicals
LC50	median lethal concentration
LOAEC	lowest observed adverse effect concentration
LOAEL	lowest observed adverse effect level
LOEL	lowest observed effect level
NLP	no-longer polymer
NOAEC	no observed adverse effect concentration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NOEL	no observed effect level
OECD	Organisation for Economic Cooperation and Development
OEL	occupational exposure limit
PBT	persistent, bioaccumulative and toxic
REACH Auth. No.:	REACH Authorisation Number
REACH AuthAppC. No.	REACH Authorisation Application Consultation Number
PNEC	predicted no-effect concentration
STOT	specific target organ toxicity
SVHC	substance of very high concern
UVCB	substance of unknown or variable composition, complex reaction products or biological materials
vPvB	very persistent and very bioaccumulative

Further information

Key literature references and sources for data	:	Supplier information and data from the "Database of registered substances" of the European Chemicals Agency (ECHA) were used to create this safety data sheet.
Methods used for product classification	:	The classification for human health, physical and chemical hazards and environmental hazards were derived from a combination of calculation methods and if available test data.
Hints for trainings	:	The workers have to be trained regularly on the safe handling of the products based on the information provided in the Safety Data Sheet and the local conditions of the workplace. National regulations for the training of workers in the handling of hazardous materials must be adhered to.
Other information	:	The information provided in this Safety Data Sheet is correct to our knowledge at the date of its revision. The information given only describes the products with

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regard to safety arrangements and is not to be considered as a warranty or quality specification and does not constitute a legal relationship.

The information contained in this Safety Data Sheet relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

|| Indicates updated section.

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No.	Short title	Main User Group (SU)	Sector of Use (SU)	Product Category (PC)	Process Category (PROC)	Environmental Release Category (ERC)	Article Category (AC)	Specified
1	Manufacture of substance - liquid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES035
2	Manufacture of substance - solid	3	8	NA	1, 2, 3, 4, 8a, 8b, 9	1	NA	ES057
3	Industrial use	3	10	NA	1, 2, 3, 4, 5, 7, 8a, 8b, 9, 10, 13, 15, 19, 23, 24	2, 4, 6a, 6b, 7	NA	ES065
4	Professional use	22	10	NA	1, 2, 3, 4, 5, 8a, 8b, 9, 10, 11, 13, 15, 19, 23, 24	8a, 8b, 8d, 9a	NA	ES067
5	Consumer use	21	NA	20, 35, 39	NA	8a, 8b, 8d, 9a	NA	ES075

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1. Short title of Exposure Scenario 1: Manufacture of substance - liquid

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Concentration of substance in product : 0% - 50%
	Physical Form (at time of use)	liquid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion	Application Area	Industrial use
	Use closed systems or covering of open containers (e.g. screens)	

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from source towards the worker	Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits If splashes are likely to occur: Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH- discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH- will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Modeled exposure data, very low vapour pressure, Without Local Exhaust Ventilation, without respiratory protection	Inhalation worker exposure	0.17mg/m ³	0.17
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b,	Measured exposure data, worst-case	Worker - inhalative, short-term - local	0.33mg/m ³	0.33

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PROC9				
PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9	Measured exposure data, worst-case	Worker - inhalative, long-term - local	0.14mg/m ³	0.14

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 2: Manufacture of substance - solid

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU8: Manufacture of bulk, large scale chemicals (including petroleum products)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p>
Environmental Release Categories	ERC1: Manufacture of substances

2.1 Contributing scenario controlling environmental exposure for: ERC1

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Industrial use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9

Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	solid
Frequency and duration of use	Frequency of use	200 days/year
	Frequency of use	8 hours/day
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	<p>Use closed systems or covering of open containers (e.g. screens)</p> <p>Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.)</p> <p>Use of pliers, grip arms with long handles with manual use to avoid direct</p>	

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

	contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	<p>Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes.</p> <p>Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer.</p> <p>The employer has also to ascertain that the required PPE is available</p>	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	<p>In case of dust or aerosol formation: use respiratory protection with approved filter (P2)</p> <p>Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min</p> <p>wear tightly fitting safety goggles, face-shield</p> <p>Wear suitable protective clothing, aprons, shield and suits</p> <p>If splashes are likely to occur: Rubber or plastic boots</p>	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC8a, PROC9: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.01mg/m ³	0.01
PROC3, PROC9	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.1mg/m ³	0.1
PROC4, PROC8a	Modeled exposure data, Low dustiness, no LEV, no respiratory protection (RPE)	Inhalation worker exposure	0.5mg/m ³	0.5
PROC9	Measured exposure data,	Worker - inhalative,	0.26mg/m ³	0.26

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worst-case

short-term - local

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA.

Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 3: Industrial use

Main User Groups	SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC7: Industrial spraying</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature</p> <p>PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles</p>
Environmental Release Categories	<p>ERC2: Formulation of preparations</p> <p>ERC4: Industrial use of processing aids in processes and products, not becoming part of articles</p> <p>ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)</p> <p>ERC6b: Industrial use of reactive processing aids</p> <p>ERC7: Industrial use of substances in closed systems</p>
Activity	Because sodium hydroxide has so many uses so widely it can potentially be used in all sectors of end use described by the use descriptor system (SU1-24), NaOH is used for different purposes in a variety of industrial sectors

2.1 Contributing scenario controlling environmental exposure for: ERC2, ERC4, ERC6a, ERC6b, ERC7

Activity	The environmental release categories mentioned above are assumed to be the most important ones but industrial environmental release categories could also be possible (ERC 1-12).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release	Application Area	Industrial use
Technical onsite conditions and measures to reduce or limit discharges, air emissions and	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general

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releases to soil Organizational measures to prevent/limit release from the site		most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.
Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC22, PROC23, PROC24		
Activity	The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC1 -27).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Industrial use
	Use closed systems or covering of open containers (e.g. screens) Transport over pipes, technical barrel filling/emptying of barrel with automatic systems (suction pumps etc.) Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head)	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Industrial use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Industrial use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min If splashes are likely to occur: wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

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3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/MWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m ³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m ³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m ³	---
PROC4, PROC5, PROC14	solid, no respiratory protection (RPE), With Local Exhaust Ventilation	Worker - inhalative, short-term - local	0.2mg/m ³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m ³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m ³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m ³	---

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure

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to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 4: Professional use

Main User Groups	SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
Sectors of end-use	SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
Process categories	<p>PROC1: Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions</p> <p>PROC2: Use in closed, continuous process with occasional controlled exposure</p> <p>PROC3: Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition</p> <p>PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises</p> <p>PROC5: Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact)</p> <p>PROC8a: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities</p> <p>PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities</p> <p>PROC9: Transfer of substance or preparation into small containers (dedicated filling line, including weighing)</p> <p>PROC10: Roller application or brushing</p> <p>PROC11: Non industrial spraying</p> <p>PROC13: Treatment of articles by dipping and pouring</p> <p>PROC15: Use as laboratory reagent</p> <p>PROC19: Hand-mixing with intimate contact and only PPE available</p> <p>PROC23: Open processing and transfer operations with minerals/ metals at elevated temperature</p> <p>PROC24: High (mechanical) energy work-up of substances bound in materials and/ or articles</p>
Environmental Release Categories	<p>ERC8a: Wide dispersive indoor use of processing aids in open systems</p> <p>ERC8b: Wide dispersive indoor use of reactive substances in open systems</p> <p>ERC8d: Wide dispersive outdoor use of processing aids in open systems</p> <p>ERC9a: Wide dispersive indoor use of substances in closed systems</p>

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a

Activity	The environmental release categories mentioned above are assumed to be the most important ones but industrial environmental release categories could also be possible (ERC 1-12).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Other given operational conditions affecting environmental exposure	Continuous exposure	
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	Application Area	Professional use
	Water	Regular control of the pH value during introduction into open waters is required.,In general discharges should be carried out such that pH changes in receiving surface waters are minimised.,In general most aquatic organisms can tolerate pH values in the range of 6-9. This is also reflected in the description of standard OECD tests with aquatic organisms.,Risk management measures related to the environment aim to avoid discharging the substance into municipal wastewater or to surface water, in case such discharges are expected to cause significant pH changes.

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Conditions and measures related to external treatment of waste for disposal	Disposal methods	Waste should be reused or discharged to the industrial wastewater and further neutralized if needed.
2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC22, PROC23, PROC24		
Activity	The process categories mentioned above are assumed to be the most important ones but other process categories could also be possible (PROC1 -27).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Concentration of the Substance in Mixture/Article	Concentration of substance in product: > 2%
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Frequency and duration of use	Frequency of use	8 hours/day
	Frequency of use	200 days/year
Technical conditions and measures to control dispersion from source towards the worker	Application Area	Professional use
	Use of pliers, grip arms with long handles with manual use to avoid direct contact and exposure by splashes (no working over one's head) Where possible use of specific dispensers and pumps specifically designed to prevent splashes/spills/exposure to occur.	
Organisational measures to prevent /limit releases, dispersion and exposure	Application Area	Professional use
	Replacing, where appropriated, manual processes by automated and/or closed processes. This would avoid irritating mists, sprayings and subsequent potential splashes. Workers in the risky process/areas identified should be trained a) to avoid to work without respiratory protection and b) to understand the corrosive properties and, especially, the respiratory inhalation effects and c) to follow the safety procedures instructed by the employer. The employer has also to ascertain that the required PPE is available	
Conditions and measures related to personal protection, hygiene and health evaluation	Application Area	Professional use
	In case of dust or aerosol formation: use respiratory protection with approved filter (P2) Wear chemically resistant gloves. material: butyl-rubber, PVC, polychloroprene with natural latex liner, material thickness: 0.5 mm, breakthrough time: >480 min material: nitrile-rubber, fluorinated rubber, material thickness: 0.35-0.4 mm, breakthrough time: > 480 min If splashes are likely to occur: wear tightly fitting safety goggles, face-shield Wear suitable protective clothing, aprons, shield and suits Rubber or plastic boots	

3. Exposure estimation and reference to its source

Environment

The aquatic effect and risk assessment only deals with the effect on organisms/ecosystems due to possible pH changes related to OH⁻ discharges, as the toxicity of the metal ion is expected to be insignificant compared to the (potential) pH effect. The high water solubility and very low vapour pressure indicates that the substance will be found predominantly in water. When the risk management measures related to the environment are implemented, there is no exposure to the activated sludge of a sewage treatment plant and there is no exposure to the receiving

CAUSTIC SODA LIQUOR $\geq 5\%$ - $\leq 50\%$ (11-106 °TW)

surface water. The sediment compartment is not considered, because it is not relevant for the substance. If emitted to the aquatic compartment, sorption to sediment particles will be negligible. Significant emissions to air are not expected due to the very low vapour pressure of the substance. If emitted to air as a water-based aerosol, the substance will be rapidly neutralised as a result of its reaction with CO₂ (or acids). Significant emissions to the terrestrial environment are not expected. The sludge application route is not relevant for the emission to agricultural soil, as no sorption of the substance to particulate matter will occur in STPs/WWTPs. If emitted to soil, sorption to soil particles will be negligible. Depending on the buffer capacity of the soil, OH⁻ will be neutralised in the soil pore water or the pH may increase. Bioaccumulation will not occur.

Workers

PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24: ECETOC TRA worker v3

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC10, PROC11, PROC13, PROC14, PROC15, PROC19, PROC23, PROC24	liquid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.17mg/m ³	---
PROC1, PROC2	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.01mg/m ³	---
PROC3, PROC15	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.1mg/m ³	---
PROC4, PROC5, PROC11, PROC14	solid, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.2mg/m ³	---
PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC19	solid, no LEV, no respiratory protection (RPE)	Worker - inhalative, short-term - local	0.5mg/m ³	---
PROC23	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.4mg/m ³	---
PROC24	solid, with RPE (90%)	Worker - inhalative, short-term - local	0.5mg/m ³	---

This substance is corrosive. For the handling of corrosive substances and formulations, immediate dermal contacts occur only occasionally and it is assumed that repeated daily dermal exposure can be neglected. Dermal exposure to the substance was not quantified. The substance is not expected to be systemically available in the body under normal handling and use conditions. Systemic effects of NaOH after dermal or inhalation exposure are not expected to occur. Based on workplace measurements and following the proposed risk management measures controlling worker and professional exposure, the inhalation exposure is below the DNEL.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

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The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in question are covered by the PROCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ECETOC TRA. Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

Additional good practice advice beyond the REACH Chemical Safety Assessment

Local exhaust ventilation is not required but good practice.
General ventilation is good practice unless local exhaust ventilation

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1. Short title of Exposure Scenario 5: Consumer use

Main User Groups	SU 21: Consumer uses: Private households (= general public = consumers)
Chemical product category	PC20: Products such as pH-regulators, flocculants, precipitants, neutralization agents PC35: Washing and cleaning products PC39: Cosmetics, personal care products
Environmental Release Categories	ERC8a: Wide dispersive indoor use of processing aids in open systems ERC8b: Wide dispersive indoor use of reactive substances in open systems ERC8d: Wide dispersive outdoor use of processing aids in open systems ERC9a: Wide dispersive indoor use of substances in closed systems
Activity	Note: this Exposure Scenario is only relevant for an appropriated use according to the quality grade of the substance delivered

2.1 Contributing scenario controlling environmental exposure for: ERC8a, ERC8b, ERC8d, ERC9a

NaOH is used by consumer at home for drain and pipe cleaning, wood treatment and it also used to make soap at home, NaOH is also used in batteries and oven-cleaner pads.

Activity	The environmental release categories mentioned above are assumed to be the most important ones but other wide dispersive environmental release categories could also be possible (ERC8 - 11b).	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
Technical conditions and measures at process level to prevent release Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil Organizational measures to prevent/limit release from the site	There are no specific risk management measures related to environment.	
Conditions and measures related to external treatment of waste for disposal	Disposal methods	This material and its container must be disposed of in a safe way (e.g. by returning to a public recycling facility)., If container is empty, trash as regular municipal waste., Batteries should be recycled as much as possible (e.g. by returning to a public recycling facility)., Recovery of the substance from alkaline batteries includes emptying the electrolyte, collection and neutralization.

2.2 Contributing scenario controlling consumer exposure for: PC20, PC35, PC39

Activity	Sodium hydroxide can be used in many different chemical product categories(PC): PC20, 35, 39 (neutralization agents, cleaning products, cosmetics, personal care products)., NaOH can also be used in other PCs in low concentrations e.g. PC3 (up to 0.01%). PC8 (up to 0.1%).PC28 and PC31 (up to 0.002%) but it can be used also in the remaining product categories (PC 0-40)., The other PCs are not explicitly considered in this exposure scenario.	
Product characteristics	Concentration of the Substance in Mixture/Article	Covers percentage substance in the product up to 100 %.
	Physical Form (at time of use)	liquid
	Physical Form (at time of use)	Solid, low dustiness
Conditions and measures related		It is required to use resistant labelling-package to

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to protection of consumer (e.g. behavioural advice, personal protection and hygiene)	Consumer Measures	<p>avoid its auto-damage and loss of the label integrity, under normal use and storage of the product. The lack of quality of the package provokes the physical loss of information on hazards and use instructions.</p> <p>It is advisable to deliver only in very viscous preparations.</p> <p>It is advisable to delivery only in small amounts. For use in batteries, it is required to use completely sealed articles with a long service life maintenance. It is required that improved use instructions, and product information should always be provided to the consumers. This clearly can efficiently reduce the risk of misuse.</p> <p>For reducing the number of accidents in which (young) children or elderly people are involved, it should be advisable to use these products in the absence of children or other potential sensitive groups.</p> <p>Do not apply product into ventilator openings or slots.</p> <p>Keep out of the reach of children.</p>
	Consumer Measures	<p>In case of dust or aerosol formation: use respiratory protection with approved filter (P2)</p> <p>Wear impervious chemical resistant protective gloves.</p> <p>If splashes are likely to occur: wear tightly fitting safety goggles, face-shield</p>

3. Exposure estimation and reference to its source

Environment

Consumer uses relate to already diluted products which will further be neutralized quickly in the sewer, well before reaching a WWTP or surface water.

Consumers

PC39, PC20, PC35: ConsExpo and SrayExpo

Contributing Scenario	Specific conditions	Exposure routes	Level of Exposure	RCR
PC20, PC35, PC39	Assessed only for the most critical use, (use of the substance in a spray oven cleaner)	consumer inhalation, acute - local	0.3 - 1.6mg/m ³	< 1

The calculated short-term exposure is slightly higher than the long term DNEL for inhalation, but smaller than the short term occupational exposure limit. The substance will be rapidly neutralised as a result of its reaction with CO₂ (or other acids). Consumer exposure to the substance in batteries is zero because batteries are sealed articles with a long service life maintenance.

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the Exposure Scenario

The DU works inside the boundaries set by the ES if either the proposed risk management measures as described above are met or the downstream user can demonstrate on his own that his operational conditions and implemented risk management measures are adequate. This has to be done by showing that they limit the inhalation and dermal exposure to a level below the respective DNEL (given that the processes and activities in

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question are covered by the PCs listed above) as given below

If measured data are not available, the DU may make use of an appropriate scaling tool such as ConsEXpo software.

Important note: By demonstrating a safe use when comparing exposure estimates with the long-term DNEL, the acute DNEL is therefore also covered (according to R.14 guidance, acute exposure levels can be derived by multiplying long-term exposure estimates by a factor of 2).

APPENDIX D

PASSIVE CHEMICAL TREATMENT MSDS AND CALCULATIONS

SAFETY DATA SHEET

Gel Flocculant 360

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 360

CHEMICAL FAMILY: Polyacrylamide/polyacrylate polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

medical attention.

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

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

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

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire.

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO₂, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required.

8.2.2. Individual Personal Protection

Eye Safety glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid.

Colour: Green to white or off-white

Odor: Slight vinegar odour.

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No Data Available

Auto-ignition temperature: No data available

Decomposition temperature: No data available.

pH: 7 (concentration dependent)

Viscosity: Not applicable.

Solubility (Water): Soluble in water but dissolves very slowly.

Partition Coefficient (KOW): No Data Available.

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials.

10.2. Chemical Stability

This product is stable.

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur.

10.4. Conditions to Avoid

High temperatures.

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia.

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO₂ NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur.

Respiratory of skin sensitization: No known effects.

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (*Oncorhynchus mykiss*): 96 hr LC₅₀: 140- 150 mg/L.

Invertebrates (*Daphnia magna*): 48 hr EC₅₀: ≥ 125 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure.

Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/ legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

DISCLAIMER OF RESPONSIBILITY

Information contained in this publication, while accurate to the best knowledge and belief of Frog Environmental Ltd (FEL) is not intended and should not be construed as a warranty or representation for which FEL assumes any legal responsibility.

Any information or advice obtained from FEL otherwise than by means of this publication is also given in good faith. However, it remains at all times the responsibility of the customer to ensure that the product is suitable for the particular purpose intended. Conditions of use are beyond our control, and therefore users are responsible for verifying the data under their own operating conditions to determine whether the product is suitable for their particular purposes and they assume all risks of their use, handling, and disposal of the product.

FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

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SAFETY DATA SHEET

Gel Flocculant 494

SECTION 1: IDENTIFICATION OF MIXTURE AND COMPANY

1.1 Product identifier

Gel Flocculant 494

CHEMICAL FAMILY: Polyacrylamide polymer

CAS NUMBER: none identified

CHEMICAL NAME: none identified

1.2 Relevant Identified Uses

Water treatment

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification

Not classified according to EU regulation 1272/2008 as implemented in The Chemicals (Health and Safety) and Genetically Modified Organisms (Contained Use) (Amendment etc.) (EU Exit) Regulations 2019.

2.2 Label elements

No labeling required

2.3. Other hazards

No component meets the criteria of a PBT or vPvB substance according to EU regulation 1907/2006 as implemented in The REACH etc. (Amendment etc.) (EU Exit) Regulations 2019 (as amended)

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

There are no components present, within the current knowledge of the supplier that are classified as hazardous to health or the environment and present at concentrations that require reporting in this section.

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General

Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid.

Skin

Wash skin with soap and water. Remove contaminated clothing. Launder contaminated clothing before reuse. If irritation occurs get medical attention.

Inhalation

Remove exposed person to fresh air. Seek medical attention if the patient feels unwell.

Eye

Flush eyes with large amounts of water for at least 15 minutes, lifting eyelids to insure complete flushing of surface. Seek medical attention if irritation persists.

Ingestion

Keep at rest. Never give anything by mouth to an unconscious person. Do not induce vomiting. If

1.3 Supplier

Frog Environmental Ltd

Business Contact

The Byre

0345 057 4040

Blackenhall Park

Emergency Contact

Bar Lane

Staffordshire DE13 8AJ

0345 057 4040 (not 24 hours)

24 Hour Emergency Contact

UK National Poisons Information Service: 0344 892 0111

vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Keep airway clear. Seek medical attention.

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

Signs and Symptoms of Acute Exposure

Inhalation: vapours, mists or dusts of the product may be irritating to the respiratory system. May irritate mouth, nose, and throat.

Ingestion: May cause irritation of the lining of the stomach.

Skin: Mild to moderate irritation can occur.

Eyes: Can cause mild to moderate irritation.

Chronic Health Effects

Prolonged or repeated contact may cause defatting and drying of the skin. Prolonged or repeated contact may cause discomfort and local redness. No known other chronic effects.

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

Treat symptomatically.

SECTION 5: FIRE FIGHTING MEASURES

5.1. Extinguishing Media

Suitable: Use extinguishing media suitable for the surrounding fire..

Unsuitable: None.

5.2. Special hazards arising from the mixture

Hazardous Combustion Products: Carbon and Nitrogen Oxides (CO, CO₂, NO_x)

5.3. Advice for Firefighters

Protective Equipment/Clothing: Wear full protective clothing including positive pressure self-contained breathing apparatus.

Fire Fighting Guidance: Fight large fires from maximum distance or use unmanned hose handlers or monitor nozzles. Move containers from fire area if you can do it without risk. Cool containers with flooding quantities of water until after fire is out.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear appropriate protective equipment (see section 8). Wet product and aqueous solutions of product are very slippery. Trace amounts of product on smooth surfaces can become extremely slippery when wet.

6.2 Environmental precautions

Prevent entry of concentrated solutions into waterways or sewers.

6.3. Methods and materials for containment and clear up

Sweep or scoop dry material and place in appropriate container. Absorb aqueous solutions with a dry inert material, such as clay, and place in an appropriate waste disposal container. After most of the material has been recovered, clean the area with warm, soapy water.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Normal precautions common to good manufacturing practice should be followed in handling and storage. Open and handle container with care. Keep the containers closed when not in use. Avoid physical damage to blocks. Use appropriate personnel protective equipment (See section 8).. Avoid contact with eyes, skin, and clothing. Do not ingest. After handling, wash hands thoroughly with soap and water.

7.2. Conditions for safe storage, including any incompatibilities.

Store in a cool, dry area. Store in accordance with good industrial practices. Keep away from direct sunlight. Protect against physical damage.

SECTION 8: EXPOSURE CONTROLS AND PERSONAL PROTECTION

8.1. Control parameters

None identified.

8.2. Exposure controls

8.2.1. Engineering Controls

No specific measures required

8.2.2. Individual Personal Protection

Eye Safety: glasses are required as a minimum. Use splash goggles or a face shield when eye contact due to splashing is possible.

Skin: Wear nitrile, butyl or Viton® gloves. The specification of glove depends on the work being undertaken; consult manufacturer's recommendations. Breakthrough times >480 mins (thickness ≥0.1 mm). When skin contact is possible for other than the hands, protective clothing including gloves, apron, sleeves, boots, head and face protection should be worn. Protective clothing must be cleaned thoroughly after each use.

Respiratory: No specific measures required.

Thermal: No hazard

Additional Remarks: Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Use good personal hygiene practices. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove soiled clothing and wash thoroughly before reuse. Use care in walking on spilled material. Material spilled on hard surfaces can be a serious slipping/falling hazard.

8.2.3. Environmental exposure controls

No specific measures identified for normal handling and use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Solid

Colour: Yellow to white or off-white

Odor: Slight vinegar odour

Melting Point: > 100 °C

Boiling Point: > 100 °C

Flammability: not flammable

Lower/Upper Flammable Limit: Not applicable

Flash Point: No data available

Auto-Ignition temperature: No data available

Decomposition temperature: No data available

pH: 5-7.5 (concentration dependent)

Viscosity: Not applicable

Solubility (Water): Soluble in water but dissolves very slowly

Partition Coefficient (KOW): No data available

Vapor Pressure: No data available

Relative density: ~1.1

Vapour density: No data available

Particle characteristics: Not applicable, bulk form

Other information : No relevant data identified

SECTION 10: STABILITY AND REACTIVITY

10.1: Reactivity

No hazardous reactions identified. Does not react with air, water or other common materials

10.2. Chemical Stability

This product is stable

10.3. Possibility of hazardous reactions

None identified. Hazardous polymerization will not occur

10.4. Conditions to Avoid

High temperatures

10.5. Incompatible materials

Oxidising agents. Strong bases may cause the release of ammonia

10.6. Hazardous Decomposition Products

Carbon and nitrogen oxides (CO, CO₂, NO_x)

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information on hazard classes

Acute Toxicity: This product is of a low order of acute toxicity. Oral LD50 (Rat) >5000 mg/kg

Skin Irritation: Mild to moderate irritation can occur. Prolonged or repeated contact may cause defatting and drying of the skin

Eye irritation: Transient mild to moderate irritation can occur

Respiratory of skin sensitization: No known effects

Germ cell mutagenicity: No known effects

Carcinogenicity: No known effects

Reproductive toxicity: No known effects

Specific target organ toxicity – single exposure: No known effects

Specific target organ toxicity – repeated exposure: No known effects

Aspiration hazard: not applicable for solids

11.2. Other information

The substance is not expected to have endocrine disrupting properties. No other relevant information identified

SECTION 12: ECOLOGICAL INFORMATION

12.1. Ecotoxicity

Fish (*Oncorhynchus mykiss*): 96 hr LC_{50} : > 2500 mg/L.
Invertebrates (*Daphnia magna*): 48 hr EC_{50} : immobility 705 mg/L.

12.2. Persistence and Degradability

Not readily biodegradable but complete mineralization is expected under environmental exposure.
Degradation initialization and rate are dependent on UV levels.

12.3. Bioaccumulation potential

The product is not expected to bioaccumulate.

12.4. Mobility in soil

The product is designed to bind to sediment and soil, so it is not expected to suffer from leaching or mobility.

12.5. Results of the PBT assessment

This product does not meet the criteria of a PBT or vPvB substance.

12.6 Endocrine disrupting properties

The substance is not expected to have endocrine disrupting properties

12.7 Other adverse effects

None identified

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods: Dispose of all waste must be in accordance with all applicable national and local health and environmental regulations. Empty containers should be recycled or disposed of through an approved waste management facility.

SECTION 14: TRANSPORT INFORMATION

14.1: UN number: Not applicable. The products is not classified as dangerous for transport.

14.2: UN proper shipping name: The products is not classified as dangerous for transport.

14.3: Transport hazard classes: Not applicable. The products is not classified as dangerous for transport

14.4: Packing group: Not applicable. The products is not classified as dangerous for transport

14.5: Environmental hazards: None identified.

14.6: Special precautions for users: None identified.

14.7. Maritime transport in bulk: Not applicable. The products is not classified as dangerous for transport

SECTION 15: REGULATORY INFORMATION

15.1. Safety, health and environmental regulations/legislation specific for the product

EU REACH: All components of this product have been registered with the European Chemicals Agency or are exempt from registration.

U.S. TSCA Inventory Status: All components of this product are either on the Toxic Substances Control Act (TSCA) Inventory List or exempt.

Canadian DSL Inventory Status: All components of this product are either on the Domestic Substances List (DSL), the Non-Domestic Substances List (NDSL) or exempt.

15.2. Chemical Safety Assessment

A chemical safety assessment has not been carried out for this product.

SECTION 16: OTHER INFORMATION

DATE: December 2022: First issue:

DISCLAIMER OF RESPONSIBILITY

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FEL accepts no liability whatsoever (except as otherwise expressly provided by law) arising out of the use of information supplied, the application, adaptation or processing of the products described herein, the use of other materials in lieu of FEL materials or the use of FEL materials in conjunction with such other materials. The information in this safety data sheet relates only to the product designated herein, and does not relate to its use in combination with any other material.

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Gel Flocculant Treatment System: Environmental Calculations

Project: Tonyrefail - STAGE 1

Overview

This sheet provides site specific assurance data for the "carry-over" of key elements to the environment from water treatment using gel flocculant blocks
 Calculations are derived from an estimated flow / treatment rate, forecast or known volumes of gel flocculant and compared against a worst case scenario release rate
 Worst case degradation rates are known from years of site trials, experience and technical review
 Carry over rates are compared to the most relevant Environmental Quality Standards (EQS)
 The approach is highly conservative, with worst case scenarios being adopted
 Carry Over Rates are prior to dilution within the receiving waterbody, nor do they take account of binding / capture within the subsequent methods of silt capture

Site Data

Number of Gel Flocculant Blocks / Mats in system		Flow Rate	
Type	No.	Total Discharge Rate (L / min)	1,800
360	0	Hours run per day	8
494	0	Discharge per day (Litres)	864,000
394	0	Days until replacement of Blocks	30
398	0	Discharge in litres per set of blocks	25,920,000
Total	0		
Number of Floc Mats in system			30

Aluminium

No. of Gel Flocculant (494)	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
1	0.009	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2	0.018	0.009	0.006	0.005	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.001
3	0.027	0.014	0.009	0.007	0.005	0.005	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002
4	0.037	0.018	0.012	0.009	0.007	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.003
5	0.046	0.023	0.015	0.011	0.009	0.008	0.007	0.006	0.005	0.005	0.004	0.004	0.004	0.003
6	0.055	0.027	0.018	0.014	0.011	0.009	0.008	0.007	0.006	0.005	0.005	0.005	0.004	0.004
7	0.064	0.032	0.021	0.016	0.013	0.011	0.009	0.008	0.007	0.006	0.006	0.005	0.005	0.005
8	0.073	0.037	0.024	0.018	0.015	0.012	0.010	0.009	0.008	0.007	0.007	0.006	0.006	0.005
9	0.082	0.041	0.027	0.021	0.016	0.014	0.012	0.010	0.009	0.008	0.007	0.007	0.006	0.006

Acrylamide

No. of Gel Flocculant blocks in	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
0	0.065	0.033	0.022	0.016	0.013	0.011	0.009	0.008	0.007	0.007	0.006	0.005	0.005	0.005

Polyelectrolyte

No. of Gel Flocculant blocks in	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
0	0.104	0.052	0.035	0.026	0.021	0.017	0.015	0.013	0.012	0.010	0.009	0.009	0.008	0.007

Project Specific Comparison: Carry Over Levels v Environmental Quality Standards

Discharge carry over aspect	EQS Value	Standard	Project Discharge Value	% below EQS
Aluminium	0.2 mg/l	Drinking Water Standard	0.000	#DIV/0!
Acrylamide	0.1 ug/l	Drinking Water Standard	0.022	78.30%
Polyelectrolyte	7.5 mg/l	Waste Water Treatment Stand	0.035	21500.00%



SUMMARY / NOTES:

Terms

The use of flocculants on construction sites requires permission from the environmental regulator.
 Proceeding with deployment of a flocculant without regulatory permission is not advised.
 Every construction site is different and whilst frog environmental provide site-specific proposals, frog environmental is not 'in control' of the construction site or any portion thereof at any time.
 frog environmental do not accept design liability for the efficacy of water treatment systems that are developed in conjunction with the customer.
 The quality and quantity of water discharged from site remains the sole responsibility of the customer at all times. Please refer to our full terms and conditions



Gel Flocculant Treatment System: Environmental Calculations

Project: Tonyrefail - STAGE 2

Overview

This sheet provides site specific assurance data for the "carry-over" of key elements to the environment from water treatment using gel flocculant blocks. Calculations are derived from an estimated flow / treatment rate, forecast or known volumes of gel flocculant and compared against a worst case scenario release rate. Worst case degradation rates are known from years of site trials, experience and technical review. Carry over rates are compared to the most relevant Environmental Quality Standards (EQS). The approach is highly conservative, with worst case scenarios being adopted. Carry Over Rates are prior to dilution within the receiving waterbody, nor do they take account of binding / capture within the subsequent methods of silt capture.

Site Data

Number of Gel Flocculant Blocks / Mats in system		Flow Rate	
Type	No.	Total Discharge Rate (L / min)	1,800
360	0	Hours run per day	8
494	4	Discharge per day (Litres)	864,000
394	0	Days until replacement of Blocks	30
398	4	Discharge in litres per set of blocks	25,920,000
Total	8		
Number of Floc Mats in system			30

Aluminium

No. of Gel Flocculant (494)	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
1	0.009	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
2	0.018	0.009	0.006	0.005	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.001
3	0.027	0.014	0.009	0.007	0.005	0.005	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002
4	0.037	0.018	0.012	0.009	0.007	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.003
5	0.046	0.023	0.015	0.011	0.009	0.008	0.007	0.006	0.005	0.005	0.004	0.004	0.004	0.003
6	0.055	0.027	0.018	0.014	0.011	0.009	0.008	0.007	0.006	0.005	0.005	0.005	0.004	0.004
7	0.064	0.032	0.021	0.016	0.013	0.011	0.009	0.008	0.007	0.006	0.006	0.005	0.005	0.005
8	0.073	0.037	0.024	0.018	0.015	0.012	0.010	0.009	0.008	0.007	0.007	0.006	0.006	0.005
9	0.082	0.041	0.027	0.021	0.016	0.014	0.012	0.010	0.009	0.008	0.007	0.007	0.006	0.006

Acrylamide

No. of Gel Flocculant blocks in	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
8	0.299	0.150	0.100	0.075	0.060	0.050	0.043	0.037	0.033	0.030	0.027	0.025	0.023	0.021

Polyelectrolyte

No. of Gel Flocculant blocks in	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
8	1.030	0.515	0.343	0.258	0.206	0.172	0.147	0.129	0.114	0.103	0.094	0.086	0.079	0.074

Project Specific Comparison: Carry Over Levels v Environmental Quality Standards

Discharge carry over aspect	EQS Value		Standard	Project Discharge Value	% below EQS
Aluminium	0.2	mg/l	Drinking Water Standard	0.012	1540.51%
Acrylamide	0.1	ug/l	Drinking Water Standard	0.100	0.32%
Polyelectrolyte	7.5	mg/l	Waste Water Treatment Standard	0.343	2084.27%





SUMMARY / NOTES:

Terms

The use of flocculants on construction sites requires permission from the environmental regulator.

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Every construction site is different and whilst frog environmental provide site-specific proposals, frog environmental is not 'in control' of the construction site or any portion thereof at any time.

frog environmental do not accept design liability for the efficacy of water treatment systems that are developed in conjunction with the customer.

The quality and quantity of water discharged from site remains the sole responsibility of the customer at all times. Please refer to our full terms and conditions



Gel Flocculant Treatment System: Environmental Calculations

Project: Tonyrefail - STAGE 3

Overview

This sheet provides site specific assurance data for the "carry-over" of key elements to the environment from water treatment using gel flocculant blocks
 Calculations are derived from an estimated flow / treatment rate, forecast or known volumes of gel flocculant and compared against a worst case scenario release rate
 Worst case degradation rates are known from years of site trials, experience and technical review
 Carry over rates are compared to the most relevant Environmental Quality Standards (EQS)
 The approach is highly conservative, with worst case scenarios being adopted
 Carry Over Rates are prior to dilution within the receiving waterbody, nor do they take account of binding / capture within the subsequent methods of silt capture

Site Data

Number of Gel Flocculant Blocks / Mats in system		Flow Rate	
Type	No.	Total Discharge Rate (L / min)	3,600
360	0	Hours run per day	8
494	6	Discharge per day (Litres)	1,728,000
394	0	Days until replacement of Blocks	30
398	6	Discharge in litres per set of blocks	51,840,000
Total	12		
Number of Floc Mats in system			30

Aluminium

No. of Gel Flocculant (494)	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
1	0.005	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000
2	0.009	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3	0.014	0.007	0.005	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001
4	0.018	0.009	0.006	0.005	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.001
5	0.023	0.011	0.008	0.006	0.005	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002
6	0.027	0.014	0.009	0.007	0.005	0.005	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002
7	0.032	0.016	0.011	0.008	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.002	0.002
8	0.037	0.018	0.012	0.009	0.007	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.003
9	0.041	0.021	0.014	0.010	0.008	0.007	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003

Acrylamide

No. of Gel Flocculant blocks in	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
12	0.208	0.104	0.069	0.052	0.042	0.035	0.030	0.026	0.023	0.021	0.019	0.017	0.016	0.015

Polyelectrolyte

No. of Gel Flocculant blocks in	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
12	0.747	0.373	0.249	0.187	0.149	0.124	0.107	0.093	0.083	0.075	0.068	0.062	0.057	0.053

Project Specific Comparison: Carry Over Levels v Environmental Quality Standards

Discharge carry over aspect	EQS Value	Standard	Project Discharge Value	% below EQS
Aluminium	0.2 mg/l	Drinking Water Standard	0.009	2087.34%
Acrylamide	0.1 ug/l	Drinking Water Standard	0.069	30.67%
Polyelectrolyte	7.5 mg/l	Waste Water Treatment Standard	0.249	2913.95%



SUMMARY / NOTES:

Terms

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Gel Flocculant Treatment System: Environmental Calculations

Project: Tonyrefail - STAGE 4

Overview

This sheet provides site specific assurance data for the "carry-over" of key elements to the environment from water treatment using gel flocculant blocks. Calculations are derived from an estimated flow / treatment rate, forecast or known volumes of gel flocculant and compared against a worst case scenario release rate. Worst case degradation rates are known from years of site trials, experience and technical review. Carry over rates are compared to the most relevant Environmental Quality Standards (EQS). The approach is highly conservative, with worst case scenarios being adopted. Carry Over Rates are prior to dilution within the receiving waterbody, nor do they take account of binding / capture within the subsequent methods of silt capture.

Site Data

Number of Gel Flocculant Blocks / Mats in system		Flow Rate	
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Total	12		
Number of Floc Mats in system			30

Aluminium

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	10	20	30	40	50	60	70	80	90	100	110	120	130	140
1	0.005	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000	0.000	0.000
2	0.009	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
3	0.014	0.007	0.005	0.003	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.001	0.001	0.001
4	0.018	0.009	0.006	0.005	0.004	0.003	0.003	0.002	0.002	0.002	0.002	0.002	0.001	0.001
5	0.023	0.011	0.008	0.006	0.005	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.002
6	0.027	0.014	0.009	0.007	0.005	0.005	0.004	0.003	0.003	0.003	0.002	0.002	0.002	0.002
7	0.032	0.016	0.011	0.008	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.002	0.002
8	0.037	0.018	0.012	0.009	0.007	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003	0.003
9	0.041	0.021	0.014	0.010	0.008	0.007	0.006	0.005	0.005	0.004	0.004	0.003	0.003	0.003

Acrylamide

No. of Gel Flocculant blocks in	Forced Mixing Degradation of Blocks in days (Pipe Reactor, typically >80 days)								Passive mixing degradation of blocks in days (drainage ditch/ drain/ culvert)					
	10	20	30	40	50	60	70	80	90	100	110	120	130	140
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Polyelectrolyte

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SUMMARY / NOTES:

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APPENDIX E

INSTALLATION EXAMPLES

INSTALLATION EXAMPLES

Retention of a wide vegetated buffer adjacent to a surface watercourse



Placement of stone to the front of plots to create clean forklift access



INSTALLATION EXAMPLES

Installation of silt fencing to control run-off from an unsurfaced area



Placement of silt matting to capture settled silt downgradient within a surface watercourse
(image courtesy of Frog Environmental)



INSTALLATION EXAMPLES

Silt matting installed along the base of an unsurfaced swale to capture settled suspended solids prior to discharge into a surface watercourse



Dewatering bag used to treat water pumped from excavations. Dewatering bag is placed upon a pallet for ease of movement, onto clean gravel to dissipate the flow and prevent scouring, in a vegetated area for infiltration.



INSTALLATION EXAMPLES

Utilisation of flocculant treated silt matting (Floc Mat) to treat water pumped from excavations
(image courtesy of Frog Environmental)



Silt Wattles utilised to separate clean and silty water within a watercourse
(image courtesy of Frog Environmental)



INSTALLATION EXAMPLES

Silt Wattles utilised to intercept silt laden run-off on a road
(image courtesy of Frog Environmental)



Silt matting and Silt Wattles deployed within a surface watercourse. Silt Wattles create a check dam promoting settlement of suspended solids, which is captured by the silt matting.
(image courtesy of Frog Environmental)



INSTALLATION EXAMPLES

Coarse stone used to create periodic check dams (in conjunction with a geotextile) to reduce scouring within a swale until vegetation establishes.



Silt Wattles utilised to intercept silt laden run-off from an unsurfaced slope
(image courtesy of Frog Environmental)

INSTALLATION EXAMPLES



Silt fencing and straw bales installed across an inlet headwall within an attenuation basin, to promote settlement of silt within the concrete apron (where it can more easily be removed) prior to discharge into the attenuation basin. Coarse stone installed to dissipate flow and prevent scouring, and further promote settlement at the headwall.



INSTALLATION EXAMPLES

Silt fencing and straw bales installed across an outlet headwall within an attenuation basin, to promote settlement of silt within the basin prior to discharge into the surface watercourse



Silt fencing installed across an outfall headwall, to promote settlement of silt within the concrete apron prior to discharge into the surface watercourse (in the event of breach of other control measures)



EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Product:	Application	Manufacturer and product
Gully Protection	Prevent silt and construction debris entering the drainage system and blocking gully pots. Proprietary products often yield superior results to straw and terram and require less maintenance.	<ul style="list-style-type: none"> • Forest Group – Gully Guard • Hy-Tex – Ultra drain guards
Silt Fencing	Attenuate water on site to promote settlement of silt within overland run-off.	<ul style="list-style-type: none"> • Frog Environmental – Silt Fence • Hy-Tex – Terrastop Silt Fence • Siltbuster – Silt Fence
Silt Matting	Capture settled silt as it naturally falls from suspension within watercourses, swales, attenuation basins to prevent its resuspension.	<ul style="list-style-type: none"> • Frog Environmental – Silt Mat • Hy-Tex – SediMat
Flocculant Treated Silt Matting	Capture settled silt within watercourses, swales, attenuation basins to prevent its resuspension. The addition of flocculant treatment encourages silt to settle out of suspension more readily. The Environment Agency must be consulted prior to utilisation of flocculants, and an environmental permit gained where required.	<ul style="list-style-type: none"> • Frog Environmental – Flocc Mat
Silt Wattle	Used as check dams within watercourses / swales providing filtration and also slowing the flow of water to promote settlement of silt. Typically used in conjunction with silt matting (or flocculant coated silt matting) to capture sediment that was caused to settle. Can also be used to separate silty and clear water (i.e. within attenuation basins, or watercourses), on slopes to reduce erosion from overland run-off or to divert silty water to collection areas (i.e. on roads to divert silty run-off away from gullies).	<ul style="list-style-type: none"> • Frog Environmental – Silt Wattle • Hy-Tex – Ultra Erosion Guard (suitable for use as a check dam to control erosion only, due to its different construction to the Frog Environmental Silt Wattle).
Filter socks	Fitted to hose end during dewatering of excavations to collect sediment. Capable of dealing with smaller volumes and lower flow rates.	<ul style="list-style-type: none"> • Hy-Tex – Pro-Tex Pipe Socks • Murlac – Silt Sock • Dirtbags UK – Utility Bag
Filter bags	Fitted to hose end during dewatering of excavations to collect sediment. Capable of dealing with larger volumes and larger flow rate, typically up to a 6" pump. Note – * denotes those bags which are sized to be used within a roll on roll off skip for ease of disposal of capture silt.	<ul style="list-style-type: none"> • Hy-Tex – Ultra Dewatering Bag • Siltbuster – Siltstoppa Dewatering Bag* • Murlac – Silt Bag • Dirtbags UK – Dirtbag / Titan Dirtbag*
Settlement Tanks	Settlement and capture of suspended solids during dewatering / over pumping works of a larger volume than suitable for a dewatering bag, or during extended periods of dewatering / over pumping. The unit required is dependent on the grain size of suspended particles, how quickly these settle from suspension, and the required flow rate. Liaison with the supplier is best undertaken to ensure a suitable product is selected. Can be used in conjunction with flocculants and coagulants to promote settlement, however the Environment Agency must be consulted prior to their utilisation, and an environmental permit gained where required.	<ul style="list-style-type: none"> • Siltbuster – wide range of settlement units available • Andrew Sykes Group – settlement tanks / Silt Away. • Dirtbags UK – Dirtbox

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

GULLEY PROTECTION

The Gully Guard

Installation guide



1. Lever open gully grid. Gully Guard is designed to fit all size gullies.



2. Hold handles at top of the Gully Guard, work beads to top and insert base into water filled gully pot.



3. Lower the Gully Guard into the pot. The beads will fall freely into the void within the pot.



4. Tuck the holding handles to the side of the Gully Guard.



5. Close gully grid.

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Tel: 01531 828960 Fax: 01531 828969

Email: info@forestgroupuk.co.uk

www.forestgroupuk.co.uk

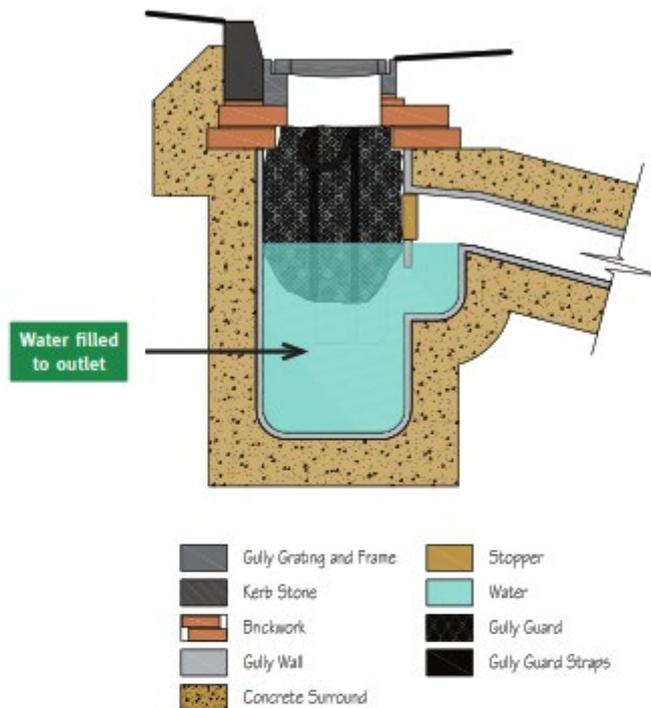
Patent no. 2472690

 **The Forest Group**
High performance, versatile solutions

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

The Gully Guard

Installation diagram



Maintenance

The Company (Forest Drainage Products) would recommend that an inspection procedure be put in place for the product by the organisation on a 3–4 months basis depending on site conditions.

Maintenance would simply involve the removal of the Product and power hose off in a bund to contain and manage silt and any contaminants prior to reinsertion back into the gully pot.

Without prior knowledge of the type and concentration of the contaminants that each Gully Guard has been subjected to, the Company cannot advise on appropriate disposal. The Company advises that an environmental risk assessment is conducted on an individual case-by-case basis to fully evaluate the nature of contaminants. In order to determine the appropriate method of disposal the Company would recommend that you follow your organisation's environmental waste disposal policy.

Forest Drainage Products Limited (the "Company")

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Tewkesbury Road, Newent, Gloucestershire GL18 1LG
Tel: 01531 828960 Email: info@forestgroupuk.co.uk

www.forestgroupuk.co.uk  

 **The Forest Group**
High performance, versatile solutions

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

- wildlife
- specialist
- biodegradables
- geotextiles**
- agrotextiles
- accessories

Hy-Tex Ultra Drain Guard for Drainage Gully Sediment Control



Ultra Drain Guards are designed to remove oil and sediment pollution from surface water running into gully drains from surrounding construction sites, farms, industrial estates, or other areas prone to storm water pollution or cleaning operations.

Ultra Drain Guards are made from a high permeability non-woven polypropylene geotextile that trap solids and oils but allow water to drain through and also incorporate bypass ports to further maintain flow into the drain.

They are designed to be easily placed directly into the drain gully pot to filter out materials as they flow into the drain without compromising drainage, and the Oil and Sediment model absorbs up to 3.29 litres of hydrocarbons as well as up to 18 kg of sediment, sand or debris.

Installation:

1. Remove catch basin grating
2. Clean dirt and debris from grating ledge
3. Insert Drain Guard.
4. Reinstall grate. To insure maximum effectiveness, Drain Guard skirt should be secured (pinched) between grating and ledge.
5. Cut the excess fabric off with a blade or knife if desired.

Maintenance and disposal:

6. The Ultra-Drain Guard filters are designed to be used for 3 to 6 months under normal conditions.
7. Where heavy contamination is present the unit will have a reduced life expectancy. When the unit has collected about 6 inches of sediment it is recommended that it be replaced. The unit should also be replaced if free oil can be seen floating and is not being absorbed. The Ultra-Drain Guards should be inspected on a regular basis.
8. Dispose of unit in accordance with applicable environmental laws and regulations. The user is solely responsible for compliance with maintenance and disposal laws and regulations. The manufacturer or seller assumes no responsibility for proper or improper maintenance or disposal.



Model	Code	Oil Capture	Sediment Capture	Collection Area	Flow Rate	Size
Oil & Sediment	9217	3.29 l (.87 gal)	18 kg (40 lbs)	25.4 x 45.7cm (10" x 18")	1893 l/min (500 gpm)	121.9 x 91.4 x 45.7cm (48" x 36" x 18")



Property	ASTM Test	Value
Material		Non-woven polypropylene geotextile
Grab Tensile Strength	D 4632	979 N (220 lb)
Elongation	D 4632	50%
Trapezoid Tear	D 4533	423 N (95 lb)
Puncture Resistance	D 4833	600 N (135 lbs)
Mullen Burst	D 3786	2,896 kpa (420 psi)
Permittivity	D 4491	1.4 sec ⁻¹
Pore Size	D 4751	180 micron (80 US sieve no)
UV Stability	D 4355	70% strength retained after 500hr
Weight	D 5261	272 g/m ² (8 oz/yd ²)
Flow Rate - Fabric	D 4491	3,660 l/min/m ² (90 gal/min/ft ²)
Flow Rate - Bypass Ports	D 4491	2,914 l/min



All of this was removed from 50 Ultra Drain Guards after just two weeks in storm drains

All data stated and the recommendations made herein are offered free of charge and are accurate to the best of our knowledge. Hy-Tex (UK) Ltd assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. Hy-Tex disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, material, or information furnished herewith. Final determination of the use of any information or material, or how it is useful, and whether the use infringes any patents is the sole responsibility of the user.

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Hy-Tex (UK) Limited

Committed to Quality, Value & Service

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT FENCING



product information sheet
Silt Fence
temporary silt control barrier



Silt Fence is inexpensive to buy and install, but it must be correctly positioned and maintained for it to be an effective pollution control measure.

Each line of Silt Fence should be inspected on a regular basis, especially after rainfall.

If stakes are broken or gaps appear between the fence and the ground, then the fence should be re-trenched. Accumulated silt must be removed regularly from Silt Fence, typically when it reaches a third of the way up the fence.

Multiple smaller runs of silt fence are usually more effective at controlling pollution than longer lines.

Applications

- Silt Fence is deployed on construction sites to help prevent silt pollution in water bodies or from impacting public highways.
- Silt Fence provides a 'ponding' function; it allows silt laden water to collect behind it and for silt to drop out of suspension while the water slowly drains away or evaporates.
- Silt Fence is usually deployed in conjunction with other silt pollution control measures, especially on sites with clayey soils.

frog environmental Silt Fence is made from high specification geo-textile material and has medium porosity, making it suitable for use on most construction sites.

Poorly installed Silt Fence can cause erosion underneath or around the edges of fencing. This can lead to an increased silt pollution risk.

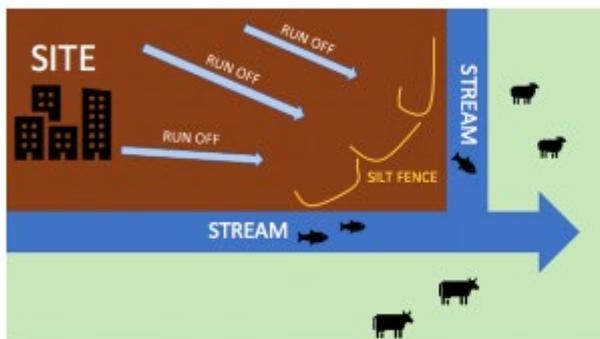
EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information Silt Fence

Dimensions: 100 metres x 0.9 metres (single roll)
Dry Weight p/m: 110 g/m² (9.9 kg single roll)
Permeability: 7 (l/m² /sec)
Material used: tear resistant polypropylene geotextile, PFSC timber stakes (cable ties or staples/ nails to fix)

Function: creates a temporary fence to provide a pooling function that allows silt to drop from suspension

Disposal: all materials fully reusable or recyclable



Shorter J shaped runs of silt fence typically provide more effective pollution control than longer runs



Silt Fence can be used as a temporary measure to prevent muddy water escaping from construction sites

10 TIPS for successful Silt Fence deployments:

- Fence posts should be spaced a maximum of 1.5m apart
- Silt Fence should be trenched a minimum of 20cm into the ground and compacted
- Shorter 'J shaped' installations of Silt Fence act like mini-retention areas and are typically more effective than longer runs (as shown in the diagram above)
- Longer runs of silt fence will concentrate water in the lowest point, where the fence can become weakened and water can undercut or overflow the fence avoid these where possible
- Water flowing around the edges of silt fence can cause erosion and add to the pollution loading from site
- The lower part of the end of each run of silt fence should ideally be above the top of the middle section of the run
- Removal of accumulated silt and regular inspection are key maintenance activity for silt fence. A named individual should be responsible for this action on site
- Silt fences are not designed to handle continuous high volume flows and will not be an effective stand-alone control in these circumstances
- Factors such as soil type, slope angle and slope length are key factors in determining how much silt fence is needed on site
- If ground conditions are clayey Silt Fence alone is unlikely to be an effective pollution control

for technical support and sales of
Silt Fence contact frog environmental

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Wales: Uanwrda, Dyfed SA19 8NA
 Midlands: The Byre, Blakenhall Park, Barton Under
 Needwood, Staffordshire, DE13 8AJ



EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT MATTING



product information sheet

SiltMat
silt capture mat



SiltMat is a fully biodegradable mat that captures and prevents sediment resuspension.

The mats can be placed in natural or artificial channels, ditches or directly on land to trap suspended sediments.

SiltMat can be orientated sideways or lengthways and fits into all channel types.

SiltMats are used to manage sediment release to watercourses from construction sites and for capturing silts suspended by in channel or works on river banks.

Applications

- Silt control from construction sites
- Silt control from river or bank works
- Deployed in rivers, streams and ditches
- Deployed in Silt Capture Channels
- Used in forestry and agricultural applications

SiltMat is proven in the field to reduce downstream levels of suspended solids

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information SiltMat

Dimensions: 2 x 1 x 0.12 metres
Dry Weight: 12kg per mat
Material used: coir (80%) jute (20%)
Function: Captures and prevents resuspension of silt

Performance: Single mat captures up to 40kg of silt
Disposal: Fully biodegradable, with correct permissions used mats can be disposed ofland.



four step guide to using SiltMats

Use our reference table (below) to judge optimal placement. As a rule of thumb, SiltMat is best placed in areas where stream energy is reduced and natural deposition takes place.

SiltMat is unfolded and orientated to cover the width of the channel. The edges of silt mat can be overlaid without gaps. Mats are staked in place or weighted with local material.

SiltMat will trap large amounts of sediment. Stakes or weights are removed and the mats rolled up ready for disposal.

With correct permission SiltMat can be seeded and left on site, creating an environmental enhancement and avoiding disposal costs.

Reference table showing the distance that different particle sizes travel at differing water velocities

Particle Size	Water Speed (m/s)				
	0.2	0.4	0.6	0.8	1
Fine Gravel	20 cm	40 cm	60 cm	80 cm	1 m
Sand	70 cm	1.4 m	2.1 m	2.8 m	3.5 m
Fine Sand	8 m	17 m	25 m	33 m	40 m
Silt	228 m	456 m	683 m	911 m	1139 m

for technical support and sales of
Silt Wattle contact **frog environmental**
 0345 057 4040
info@frogenvironmental.co.uk
www.frogenvironmental.co.uk
 @frogenv

Wales: Llanwrda, Dyfed SA19 8NA
 Midlands: The Byre, Blakenhall Park, Barton Under
 Needwood, Staffordshire, DE13 8AJ



EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

FLOCCULANT TREATED SILT MATTING



product information sheet
Floc Mat™
water treatment mat



Floc Mat™ is a versatile silt control device

A mat created to treat and capture fine silts and suspended particles in construction site run off.

The main function of the mat is to flocculate very fine particles, making them easier to separate from water.

Floc Mats can be laid flat out in dispersion fields, used with Silt Wattles or silt fence and deployed in the frog environmental Silt Capture Channel as part of a versatile water treatment process to remove silt from construction site run off.

Applications

- In a Silt Capture Channel
- With Silt Wattles and SiltMats
- In site ditches and low flow channels
- In combination with silt fence
- On natural dispersion fields
- In combination with dewatering bags and silt socks

- Floc Mat™ is a fully biodegradable water treatment and silt capture mat that treats muddy water and helps prevent silt pollution
- They are a cost effective way of treating water in ditches and channels, without the need for pumps – saving energy and CO₂

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

Technical information

FlocMat™

Dimensions: 2x1 x 0.10m

Variants: FM1 (30g/m²), FM2 (100g/m²)
FMO(untreated)

Active ingredient: Water Lynx™

Dry Weight: 12 kg per mat

Material used: coir fibres, coir netting, coir rope, anionic flocculant, water

Function: Water treatment – aids solid water separation. Can be used to segregate low flow channel to in bankside works.

Performance: Single mat captures up to 50kg of silt in live test

Disposal: Fully biodegradable, suitable for re-use on site (with correct permit).

Waste classification and disposal legislation must be followed at all times. Always liaise with the regulator before deploying a product containing flocculant. If in doubt contact frog environmental on 0345 0574040 for further information and advice.



Close up FlocMat showing accretion of silt



Deployed in Silt Capture Channels with Silt Wattles

100% sustainably sourced natural fibres are used to create Floc Mat, this ensures the mats are biodegradable and suitable for use as backfill material once used, reducing waste disposal costs. Floc Mat is available in treated and untreated forms. The fibres of the treated version of Floc Mat are coated with Water Lynx™, a non-hazardous, non-toxic, synthetic anionic polymer which contains no coagulants, cations or metals such as Al and Fe that are ecotoxic.

When deployed in a Silt Capture Channel the Floc Mat provides a safe, low carbon and easy solution to support the removal of suspended solids and associated pollutants from construction site run off.



Deployed to treat muddy excavation water

for technical support and sales of
Silt Wattle contact frog environmental

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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

SILT WATTLE



product information sheet

Silt Wattle
silt control sausage



Silt Wattles are a versatile silt control device.

They are deployed on building sites to control movement of suspended silt and in ditches, channels and streams to slow the flow and naturally capture silt.

Silt Wattles are often deployed with frog environmental SiltMats and FlocMats as part of a silt pollution prevention strategy.

Applications

- Silt Wattles can be used to reduce silt release into watercourses from construction sites and deployed directly in channel to reduce movement of suspended silts.
- The tough exterior netting means they can be left for months on site with out degradation, whilst the biodegradable treated wood fibre continues to slow the flow and trap silt particles.
- Silt Wattles mould to the shape of the river bed or ground and can be joined end on end or pyramided to help clean dirty water.
- Wattles are highly versatile and can be weighted or staked in position depending on bed/ground conditions and flows.
- Silt Wattles can be joined end of end to create temp low flow channel and protect rivers from pollution arising from bank works.

Silt Wattles are a versatile product suitable for use in a wide range of silt control applications on construction sites and in river works

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

FILTER SOCKS

wildlife specialist biodegradables **geotextiles** agrotextiles accessories

Hy-Tex Pro-Tex Dewatering Socks for Pumped Sediment Control

- Ideal for small dewatering jobs.
- Traps sediment and oil.



Pro-Tex Dewatering Socks control pollution caused when pumping dirty water from excavations, and offers an economical alternative to traditional dewatering bags or filtration products.

These easy to use and popular sediment filters bags are ideal for projects with small budgets and minor pollution problems to control of sediment and oil sheen from pumped water.

Designed to attach directly to the discharge pipe, they quickly filter water to help prevent unwanted sediment, silt, debris or pollutants leaving the site in run-off.

The socks have been designed to control pollution caused by pumping dirty water from excavations, trenches, lift shafts, bunds and the like, by filtering out sediment from contaminated water down to 90 micron, while the fabric the socks are constructed from has an inherent ability to absorb hydrocarbons too.

Advantages

The main advantage of using an Oil & Sediment filter is that it removes hydrocarbons and sediment from pumping activities.

It provides an alternative solution that delivers a considerable cost saving and is user friendly. Furthermore it reduces site time over existing methods such as hiring a vacuum tanker. If you wish to carry out street works with a minimal disruption to the public, this is the ideal solution.

Other benefits include:

- Simple set-up with built in tie
- Hydrocarbon detection strip to identify oil pollution
- Lightweight and compact
- Very easy to empty



OIL DETECTION INDICATOR

A light blue paper oil detection strip is attached to each bag



If strip turns **DARK BLUE**
OIL PRESENT

Stop pumping

Contact your Environmental Manager

Product: Pro-Tex Dewatering Sediment Bag. Premium Pipe Sock.

Application: Oil and Sediment Filter

Effective Pore Size: 90 micron

Sediment Capacity: Approx 18kg

Permeability: 72 litres/m²/sec

Tensile Strength: 19 kN/m

CBR Puncture Strength: 2,900N

Material: UV stabilised, continuous filament, non-woven, needle punched polypropylene fabric.

Bag Size: Approx 1.00 x 0.30m lay flat

Additional Features: Tying cord and hydrocarbon detection strip

EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

FILTER BAGS

wildlife specialist biodegradables **geotextiles** agrotextiles accessories

Hy-Tex Ultra Dewatering Bags for Pumped Sediment Control



The Environment Agency
 "Working at construction and demolition sites: PPG6 Pollution Prevention Guidelines"
 "Poor management of silt and silty water is a major cause of serious pollution incidents from construction sites. Silt for these purposes is a fine inert sediment derived from soil and rocks. Silt pollution can: damage and kill aquatic life by smothering and suffocating; reduce water quality; cause flooding by blocking culverts and channels..."
 "You must not discharge any silty water to a drain or watercourse without prior treatment to settle or remove suspended solids. If you've identified that you will be generating silty water, identify suitable means to treat the water before discharge; examples include: lagoons, settlement tanks, silt traps grassy areas that slow water and allow solids to settle..."
 "You must have prior permission from the local sewerage provider if you intend to discharge settled water to the foul sewer because this will be regarded as a trade effluent.
 You must have prior permission from [the Environment Agency] if you need to discharge anything to a watercourse. In Scotland if you comply with certain conditions, a discharge will be covered by a General Binding Rule and you will not need to contact SEPA."

Hy-Tex Ultra Dewatering Bags provide an effective way to collect harmful sediments from dirty water pumped out of excavation works (such as foundations, pipe line construction, water, sewer and utility trenches, waterways and lakes) that would otherwise pollute the surrounding environment.

It is a legal requirement to prevent silty water from leaving site untreated, and a finable offence if you do not take appropriate pollution control measures. The Environment Agency Pollution Prevention Guidelines PPG6 (See side panel), in summary, require that the majority of suspended solids (gravel, sand, and silt) must be removed from site water before it is discharged into a drain, sewer or watercourse.

Traditionally settlement methods (such as straw bale structures or settlement ponds/tanks) are often ineffective, rely on slow water movement, long settlement times, expensive and time consuming tank maintenance and large works areas.

Ultra Dewatering Bags are an efficient, practical, quick, simple and cost effective alternative solution to manage this ongoing environmental problem of removing suspended solid pollutants from pumped water on construction sites.

Sediment-laden water is simply pumped into the high quality filter bags, which trap the solids inside and allow filtered water to flow freely out through the geotextile fabric to disperse into the surrounding ground or another collection point.

Ultra Dewatering Bags can also be used for gravity feed applications such as outfall pipes from site drainage or lagoons.

The silt filter bags provide a passive non-mechanical solution, without the use of excessive or specialist machinery (other than possible lifting equipment when full), and do not require a large work area.

The sediment bags are also light, compact and easy to store, with minimal cleaning up required - when full just dispose of the bag and replace with another bag.

The Ultra Dewatering Bags detain both oil and sediment, offering a combination of benefits not available in alternative products. They can also be used to contain contaminated sediment whilst treatments are applied (such as flocculants or absorbents).

The standard 1.80 x 1.80m Ultra Dewatering bags has the capacity to trap near 1 tonne of silt and cope with flow rates up to 2,730 l/min, while the larger 3.05 x 4.55m bags can trap over 4 tonnes of silt and cope with flow rates up to 6,818 l/min.

Property	ASTM Test	Value
Material		Non-woven polypropylene geotextile
Grab Tensile Strength	D 4632	912 N (205 lb)
Elongation	D 4632	50%
Trapezoid Tear	D 4533	378 N (85 lb)
Puncture Resistance	D 4833	578 N (130 lbs)
Mullen Burst	D 3786	2,758 kpa (400 psi)
Permittivity	D 4491	1.4 sec ⁻¹
Pore Size	D 4751	180 micron (80 US sieve no)
UV Stability	D 4355	70% strength retained after 500hr
Weight	D 5261	272 g/m ² (8 oz/yd ²)
Flow Rate	D 4491	3,660 l/min/m ² (90 gal/min/ft ²)

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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS

wildlife specialist biodegradables **geotextiles** agrotextiles accessories

Hy-Tex Ultra Dewatering Bags for Pumped Sediment Control



Usage Guidelines

Ideally position the Ultra Dewatering Bag on a slope, so incoming water flows downhill through the bag, and, as a precaution, install Terrastop Premium silt fence down slope of the bags to control any potential run-off pollution.

The bag is fitted with a collar which fits around delivery hoses or connectors. Strap the neck of the Ultra Dewatering Bag tightly to the discharge hose using the attached tying cord.

To increase filtration efficiency place the bag on an aggregate, or a layer of Hy-Pave tiles, to maximize water flow through the under surface of the bag.

Plan ahead for removal, if the filled bags are to be lifted for disposal then place suitable lifting straps under bag prior to pumping, alternatively you can roll the bags into a digger bucket.

Regularly check the bags. The Ultra Dewatering Bag is full when it no longer can efficiently filter sediment or pass water at a reasonable rate.

Flow rates will vary depending on the size of the Ultra Dewatering Bag, the type and amount of sediment discharged into the bag, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies.

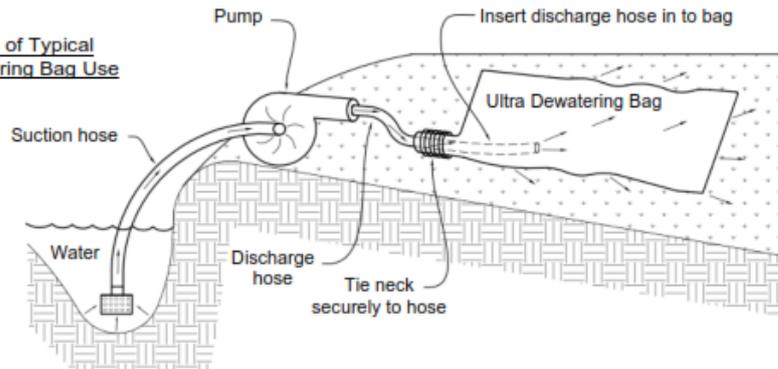
Under most circumstances Ultra Dewatering Bags will accommodate flow rates of up to 2,730 l/min for the 1.80 x 1.80m bags and 6,816 l/min for the 3.05 x 4.55m bags.

Use of excessive flow rates, or overfilling Ultra Dewatering Bags with sediment, may cause ruptures of the bags or failure of the hose attachment straps.

Dispose of the Ultra Dewatering Bag as directed by the site engineer. Normally allow the bags to dry in place then either cut open, spread and landscape on site or remove and dispose of the filled bags (Heavy lifting machinery may be required).



Illustration of Typical Ultra Dewatering Bag Use



Size	Code	Surface Area	Max Flow Rate	Max Pump Size	Sediment Capacity	Oil Capacity
1.80 x 1.80 m (6 x 6 ft)	9724	6.68 m ² (72 ft ²)	2,730 l/min (500 gal/min)	10 cm (4 inch)	0.51 m ³ / 980 kg (18 ft ³ / 2,160 lbs)	14 l (3.7 gal)
3.05 x 4.55 m (10 x 15 ft)	9725	27.87 m ² (300 ft ²)	6,818 l/min (1,500 gal/min)	15 cm (6 inch)	4.20 m ³ / 4,082 kg (150 ft ³ / 9,000 lbs)	57 l (15.1 gal)

Notes:

Flow/Dewatering rates will vary according to soil type (Sand typically dewateres at the fastest rate, while clay dewateres at the slowest). Clay may also blind over the fabric in some instances, significantly reducing flow.

Max flow rate is a cautious figure based on a significantly de-rating of the clean fabric flow rate of approx 3,660 l/min/m² (90 gal/min/ft²) to allow for pump pressure build up due to silt accumulation.

Sediment capacity is calculated using wet sand weight of approx 1,920kg/m³ (120 lbs/ft³) and a bag fill height of approx 150mm

Oil capacity is estimated at low flow conditions with approx 2.09 l/m² (0.5 gal/ft²) absorption capacity

All data stated and the recommendations made herein are offered free of charge and are accurate to the best of our knowledge. Hy-Tex (UK) Ltd assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. Hy-Tex disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, material, or information furnished herewith. Final determination of the use of any information or material, or how it is useful, and whether the use infringes any patents is the sole responsibility of the user.

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EXAMPLE MANUFACTURERS AND PRODUCT SHEETS



Siltbuster Siltstoppa Bags

Siltstoppa Bags provide a low cost solution for the dewatering of sludges and slurry.

Pre-conditioned (floculated) slurry is pumped into the Siltstoppa Bag and allowed to dewater. The water released from the sludge bleeds through the geotextile fabric whilst the trapped solids remain in the bag.

Siltstoppa De-watering Bags are available individually, to sit on a suitable slab or drainage area or can be supplied as a complete treatment solution including as required sludge conditioning unit, and roll-on/roll-off (RORO) container.

When the bag is full and the trapped solids have dewatered, the Siltstoppa bag can either be split open on-site and the dewatered solids removed by means of an excavator (or similar equipment), or the full RORO container can be transported for off-site disposal.

Siltbuster Siltstoppa Bags Specs

Separation Method	Geotextile Membrane
Height	Expands until full
Length	6.5m
Width	2.1m
Dry Weight	Size Dependent
Materials	Sludges and Slurries
Material Colour	Black
Bag Capacity	6m ³
Operating Range	Material Dependent

Siltbuster Siltstoppa Skip

Siltstoppa De-Watering Bags have been conveniently sized to fit an industry standard roll on roll off (RORO) Siltstoppa skip. The RORO dewatering skip provides a secure and environmentally acceptable means of bunding a Siltbuster Siltstoppa Dewatering Bag.

When the skip is full with either single or multiple bags (stacked up on top of each other), the skip and its contents can be transported to a Waste Management Facility for disposal of the dewatered sludge/slurry contained within the Siltstoppa Bags.

The Siltstoppa Skip comes complete with an integral sump, allowing easy removal of the water which escapes from the dewatering sludge/slurry.

Siltbuster Siltstoppa Skip Specs

Separation Method	Geotextile Membrane
Height	1.2m
Length	6.1m
Width	2.6m
Dry Weight	2.0 tonne
Material	Floculated Particles
Operating Capacity	1 Bag
Lifting Method	RORO Hooklift
Operating Range	Material Dependent



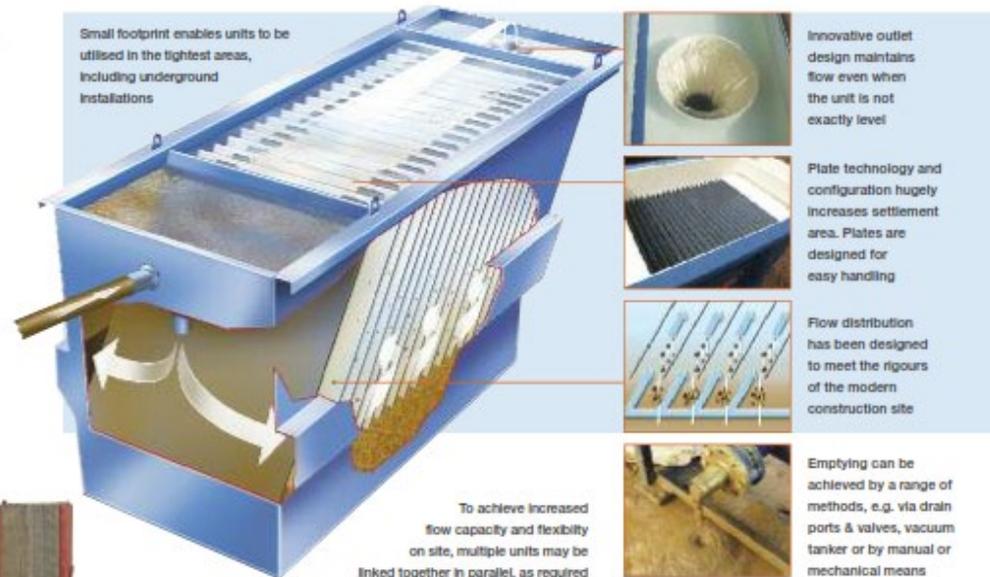
SETTLEMENT TANKS



Gravity Settlement ▶ Siltbuster Settlement Units & Water Clarifiers

Siltbuster is the UK's leading provider of mobile settlement units and Lamella Clarifiers. Each unit in the extensive range is specifically designed to remove suspended solids and settleable matter from silt and solids laden surface run-off and groundwater.

Effective gravity based solid/liquid separation requires the largest possible settlement area and optimum hydraulic flow. Siltbuster Clarifiers utilise lamella plate technology to maintain ideal settlement conditions within each unit, thereby, ensuring maximum particle settlement and minimum unit footprint.



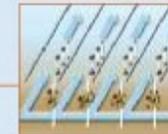
Small footprint enables units to be utilised in the tightest areas, including underground installations



Innovative outlet design maintains flow even when the unit is not exactly level



Plate technology and configuration hugely increases settlement area. Plates are designed for easy handling



Flow distribution has been designed to meet the rigours of the modern construction site



Emptying can be achieved by a range of methods, e.g. via drain ports & valves, vacuum tanker or by manual or mechanical means

To achieve increased flow capacity and flexibility on site, multiple units may be linked together in parallel, as required

Siltbuster mobile clarifiers are robust; skid-mounted; compact and lightweight, making them simple to transport, install and operate. They are ideal for sites with limited access, restricted spaces and temporary projects. Hopper bottomed units can be fitted (on request) with an automatic sludge removal system making their operation virtually maintenance-free.

Typical applications

Construction

- ▶ Pumping & de-watering
- ▶ Groundwater treatment
- ▶ Site run-off treatment
- ▶ Drilling, piling & coffer dams
- ▶ In-river & near-river works
- ▶ De-silting & dredging
- ▶ Roads, pipelines & other linear projects
- ▶ Plant, vehicle & wheel washing
- ▶ Site water management

Silt Management

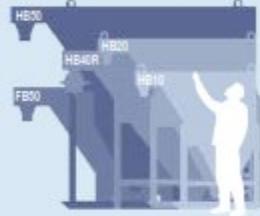
www.siltbuster.com



Silt
Management

The Siltbuster Mobile Range
Siltbuster offers a range of various sized units to provide customers with flexibility and the opportunity to hire or purchase a tailored, yet off the shelf, solution.

The Mobile Range, Size Comparison



FB50	HB10	HB20	HB40R	HB50
Flat-bottomed, skid-mounted unit. The Construction Industry's favourite	Hopper-bottomed, skid-mounted unit	Enlarged version of HB10. Increased flow rate and sludge storage. Batch or continuous sludge draw-off	Hopper-bottomed, skid-mounted unit	Performance of the FB50 but with twin hoppers for larger capacity, primary thickening applications and batch or continuous sludge draw-off
Height: 1.9m	Height: 2.1m	Height: 2.6m	Height: 3.1m	Height: 3.1m
Length: 3.7m	Length: 1.9m	Length: 2.5m	Length: 3m	Length: 3.7m
Width: 1.45m	Width: 0.9m	Width: 1.2m	Width: 2.2m	Width: 1.7m
Effective Settlement Area: 50m ²	Effective Settlement Area: 10m ²	Effective Settlement Area: 20m ²	Effective Settlement Area: 40m ²	Effective Settlement Area: 50m ²
Dry Weight: 1,900kg	Dry Weight: 510kg	Dry Weight: 1,120kg	Dry Weight: 2,480kg	Dry Weight: 2,370kg
Inlet: 4" bauer	Inlet: 2" bauer	Inlet: 3" bauer	Inlet: 4" bauer	Inlet: 4" bauer
Outlet: 6" bauer	Outlet: 3" bauer	Outlet: 4" bauer	Outlet: 6" bauer	Outlet: 6" bauer
Typical Operating Capacity: 1-50m ³ /hr	Typical Operating Capacity: 1-10m ³ /hr	Typical Operating Capacity: 1-20m ³ /hr	Typical Operating Capacity: 1-40m ³ /hr	Typical Operating Capacity: 1-50m ³ /hr

The benefits

- ▶ Readily transportable, fast and simple to setup, easy to operate.
- ▶ Small footprint units with large settlement area
- ▶ Unique design enables rapid particle settlement and water clarification
- ▶ Up to 20 times more efficient than conventional settlement tanks and lagoons of the same plan area
- ▶ Choice of unit sizes and capabilities to suit most applications
- ▶ Units can be used individually or linked to accommodate a wide range of flows, pump sizes and particle characteristics



Options & Process Add-ons

Total Water Treatment Solutions

Siltbuster Clarifiers can be configured as single or multiple units for basic gravity separation and discharge-to-sewer applications. They can also be supplied as part of a complete, tailored, packaged treatment solution – including ancillary equipment, such as:

- ▶ Lids, covers, walkways & access platforms
- ▶ Flow splitter valves, flow meters & flanged ports
- ▶ Automatic, flow proportional, single or multi-stage chemical pre-treatment
- ▶ Fully containerised dosing systems
- ▶ Flash mixers
- ▶ Pipe flocculators or mixing/aging tanks
- ▶ Automatic desludging systems
- ▶ Sludge pumps & sludge storage tanks
- ▶ De-watering systems



For hire, sales or more details call Siltbuster on 01600 772256



Process Add-ons

► Chemical Dosing, Pre-treatment & Reaction Systems

Siltbuster believes that, wherever possible, the use of chemicals to treat excess site water should be avoided. However, there are some types of waste water, contaminants and effluent which still require the use of chemicals to increase the particle settlement rate, so as to enable their removal. This can be due to either the presence of very fine particles; clay; colloidal matter; colour or simply the soil's own interparticle electrical bonds which need to be interrupted in order for settlement to occur.

In such cases, chemical dosing is unavoidable. Consequently, Siltbuster has developed an extensive range of chemical dosing systems to compliment its award-winning settlement units.



Treatment Systems

Flocculant Blocks

Basically, a flocculant in a solid form. When immersed in water the solid dissolves, releasing the chemicals, causing a reaction.

Single-Stage & Multi-Stage Dosing Systems

Siltbuster's Single-Stage dosing systems range from a single dosing pump linked to a drum of coagulant or acid/alkali for pH adjustment, through to an IBC based flocculant batch makeup system and associated pumped dosing. The dosing rate is fully controllable and can be linked to flow rate and chemicals can be added to mixing/reaction tanks, in-line or via pipefloculators. For more complex dosing regimes requiring similar levels of accuracy, Siltbuster offers Multi-stage dosing systems, including staged coagulant and flocculant dosing, often with an intermediate stage for pH adjustment.

Chemical Reaction Systems

The reaction rate of treatment chemicals, dictates the system required.

Mixing Tanks

Siltbuster can supply mixing tanks, ranging from 1m³ to 30m³ capacity.

Pipefloculators

For faster reacting chemicals, various pipefloculators are available.



Containerised Integrated Dosing Units

Siltbuster can provide secure, self-contained, in-line dosing units which enable the controlled, flow-proportional, multi-stage addition of treatment chemicals. For flows up to 150 m³/hr, the 'plug & play' systems come pre-installed in a 10ft (3m), 20ft (6m) or 40ft (12m) shipping container, as required.

Options include:

- Bunded chemical storage
- Flow-proportional dosing systems
- Reaction/aging tanks and pipefloculators
- Control panels and datalogging
- Insulation, lighting and heating
- Integrated Lamella or DAF Units (subject to model and size).
- Automatic monitoring of feed and discharge water



Full Treatment Packages

Siltbuster's in-house laboratory can test a wide range of chemicals to identify the treatment regime most suited to your needs. A sample of the untreated water, your flowrate and the required discharge limits are all that is needed.

Silt Management

www.siltbuster.com

APPENDIX F

EXAMPLE CHECKLISTS

SITE INSPECTION CHECKLIST
SITE: Garlick's Arch, Burntcommon, Surrey

Name of person undertaking inspection:

Date:

Current weather conditions:

Description	Comments	Action	Initial
<p>1) What is the current condition of the gully protection measures within the active areas of the site?</p> <p><i>Note any gullies requiring maintenance measures</i></p>			
<p>2) Are site roads clean and relatively free of mud? Is the frequency of visits by the road sweeper adequate?</p> <p><i>Consider whether additional visits should be scheduled.</i></p>			
<p>3) Are there currently unsurfaced areas being trafficked which may be causing silt to enter the site drainage?</p> <p><i>Note if additional measures are required to reduce the run-off from these unsurfaced areas.</i></p>			
<p>5) Are control measures in place to prevent silt run-off from unsurfaced areas and soil stockpiles?</p> <p><i>Note if the control measures are adequate and whether the increased runoff requires an increase in the frequency of inspection of any control measures.</i></p>			

<p>6) What is the current condition of water within the two on-site surface watercourses?</p> <p><i>Note any discolouration of the water or obvious sign of sediment within the water.</i></p>			
<p>7) What is the current water condition of the attenuation basin and swale?</p> <p><i>Note any discolouration of the water or obvious sign of sediment within the water.</i></p>			
<p>8) Is any off-site run-off occurring?</p> <p><i>Note whether any run-off is occurring – considered most likely to occur at the southern and western boundaries.</i></p> <p><i>Note any control measures in place.</i></p>			
<p>9) Is there any dewatering of excavations taking place on site?</p> <p><i>Note what activities are taking part and their location.</i></p> <p><i>Note any control measures in place.</i></p>			

Notes and actions to be taken:

Completed by	Name	Signature	Date
Site Manager			

MONITORING POINT INSPECTION RECORD
SITE: Garlick's Arch, Burntcommon, Surrey

Name of person undertaking inspection:

Date:

Current weather conditions:

Monitoring Location	Monitoring Location Rationale	Inspection Record	Action required	Initial
Monitoring of the following primary monitoring locations (as shown on Figure 3 – depicted by purple monitoring symbols) on a daily basis during periods of rainfall , and at a suitable frequency during periods of dry weather				
Monitoring Location MP1:	Monitor the water quality and sediment-contamination of the drainage (retention) basins.			
Monitoring Location MP2:	Monitor the water quality and sediment-contamination of the surface watercourse.			
Monitoring Location MP3:	Monitor surface water and sediment run-off / deposition across the site's infrastructure (roads, drainage, gulleys etc).			

Completed by	Name	Signature	Date
Site Manager			