BAT Assessment – SC Johnson Professional Limited

The table below reviews compliance of the facility with the Manufacture of Organic Fine Chemicals (OFC) BAT Reference document, published by the European IPPC Bureau in August 2006. As the activities carried out on site are primarily blending of consumer surface and hand cleaning products at ambient temperatures and pressures, several sections as indicated do not apply.

BAT Clause	BAT Requirement	Applicable to this process?	Does the Operator comply?
5.1 Prevention and minimisation of environmental impact 5.1.1 Prevention of environmental impact 5.1.1.1 Integration of environmental, health and safety considerations into process development	BAT is to provide an auditable trail for the integration of environmental, health and safety considerations into process development (see Section 4.1.2).	Yes	The process plant present on site was designed with the specific product production processes in mind. As such, environmental considerations including water use, clean in place systems, effluent reduction and lack of air emissions from process vessels is built into the design.
	BAT is to develop new processes as follows (see Section 4.1.1): a) to improve process design to maximise the incorporation of all the input materials used into the final product (see, e.g. Sections 4.1.4.3 and 4.1.4.8) b) to use substances that possess little or no toxicity to human health and the environment. Substances should be chosen in order to minimise the potential for accidents, releases, explosions and fires (e.g for solvent selection, see Section 4.1.3). c) to avoid the use of auxiliary substances (e.g. solvents, separation agents, etc. see e.g. Section 4.1.4.2) d) to minimise energy requirements in recognition of the associated environmental and economic impacts.	Yes	Yes. The finished products are consumer cleaning and hygiene products. Therefore, the final products are to be in a form which has as low impact to the environment and human health as possible. Input materials in their raw state may pose but the designed storage and pumping systems mitigate risk of release to the environment or human contact. Reactions take place at ambient temperatures and pressures. Auxiliary substances are not used.

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	Reactions at ambient temperatures and pressures should be preferred e) to use renewable feedstock rather than depleting, wherever technically and economically practicable f) to avoid unnecessary derivatisation (e.g. blocking or protection groups) g) to apply catalytic reagents, which are typically superior to stoichiometric reagents (see, e.g. Sections 4.1.4.4 and 4.1.4.5)		
5.1.1.2 Process safety and prevention of runaway reactions 5.1.1.2.1 Safety assessment	BAT is to carry out a structured safety assessment for normal operation and to take into account effects due to deviations of the chemical process and deviations in the operation of the plant (see Section 4.1.6). In order to ensure that a process can be controlled adequately, BAT is to apply one or a combination of the following techniques (without ranking, see Section 4.1.6.1): a) organisational measures b) concepts involving control engineering techniques c) reaction stoppers (e.g. neutralisation, quenching) d) emergency cooling e) pressure resistant construction f) pressure relief.	Yes	Yes - Due to the nature gelling processes taking place, the potential for runaway reactions is not present. The reactions are undertaken at ambient temperature and pressure so no emergency reaction stopping, or relief is required.
5.1.1.2.2 Handling and storage of hazardous substances	BAT is to establish and implement procedures and technical measures to limit risks from the handling and storage of hazardous substances (for an example, see Section 4.2.30).	Yes	Yes. Technical procedures are in place for dry ingredients. Liquid ingredients are stored in bulk tanks and delivered to the process vessels through fixed pipework.

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	BAT is to provide sufficient and adequate training for operators who handle hazardous substances (for an example, see Section 4.2.29).	Yes	Yes. All operators handling, transporting and using hazardous substances are appropriately trained and records relating to competence are retained.
5.1.2 Minimisation of environmental impact 5.1.2.1 Plant design	BAT is to design new plants in such a way that emissions are minimised by applying techniques including the following (see Sections 4.2.1, 4.2.3, 4.2.14, 4.2.15, 4.2.21): a) using closed and sealed equipment b) closing the production building and ventilating it mechanically c) using inert gas blanketing for process equipment where VOCs are handled d) connecting reactors to one or more condensers for solvent recovery e) connecting condensers to the recovery/abatement system f) using gravity flow instead of pumps (pumps can be an important source of fugitive emissions) g) enabling the segregation and selective treatment of waste water streams h) enabling a high degree of automation by application of a modern process control system in order to ensure a stable and efficient operation.	Yes	Yes. All production systems such as mixing vessels and transfer pipework are appropriately closed. The production building is closed and mechanically ventilated. No inert gas blanketing condensers or solvent recovery are required due to the absence of VOCs in the production process. All waste water streams are related to vessel cleaning so are directed to the on-site effluent storage tanks. The processes are controlled by modern process control system.

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5.1.2.2 Ground protection and water retention options	BAT is to design, build, operate and maintain facilities, where substances (usually liquids) which represent a potential risk of contamination of ground and groundwater are handled, in such a way that spill potential is minimised. Facilities have to be sealed, stable and sufficiently resistant against possible mechanical, thermal or chemical stress (see Section 4.2.27). BAT is to enable leakages to be quickly and reliably recognised (see Section 4.2.27). BAT is to provide sufficient retention volumes to safely retain spills and leaking substances in order to enable treatment or disposal (see Section 4.2.27). BAT is to provide sufficient retention volume to safely retain fire fighting water and contaminated surface water (see Section 4.2.28). BAT is to apply all the following techniques (see also Section 4.2.27): a) carrying out loading and unloading only in designated areas protected against leakage run-off b) storing and collecting materials awaiting disposal in designated areas protected against leakage run-off c) fitting all pump sumps or other treatment plant chambers from which spillage might occur with high liquid level alarms or regularly supervising pump sumps by personnel instead d) establishing programmes for testing and inspecting tanks and pipelines including flanges and valves e) providing spill control equipment, such as containment booms and suitable absorbent material f)	Yes	Yes. All storage vessels for liquids are located in secondary containment appropriate to the nature and volume of the materials stored. Transfer pipework is similarly sealed and sufficiently resistant to the materials contained within. There is no underground pipework, allowing any potential leaks to be observed. All process and storage vessels and pipework are under a system of planned and preventative maintenance. All secondary containment is of sufficient volume to allow proper retention and subsequent controlled disposal. Loading and unloading is carried out in areas where any spills or leaks can be retained within the yard area and pumped to storage vessels if required. Spill containment equipment is present within process areas and also available during deliveries.

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	testing and demonstrating the integrity of bunds g) equipping tanks with overfill prevention.		All storage vessels are fitted with overfill protection. Bund inspection and tests are undertaken to demonstrate their integrity.
5.1.2.3 Minimisation of VOC emissions 5.1.2.3.1 Enclosure of sources	BAT is to contain and enclose sources and to close any openings in order to minimise uncontrolled emissions (see Section 4.2.14).	No	Not applicable. No significant VOCs are used in the process.
5.1.2.3.2 Drying in closed circuits	BAT is to carry out drying by using closed circuits, including condensers for solvent recovery (see Section 4.2.14).	No	Not applicable. No significant VOCs are used in the process.
5.1.2.3.3 Equipment cleaning using solvents	BAT is to keep equipment closed for rinsing and cleaning with solvents (see Section 4.2.14).	No	Not applicable. No significant VOCs are used in the cleaning processes. Water-based Clean In Place (CIP) system present.
5.1.2.3.4 Recirculation of process vents	BAT is to use recirculation of process vapours where purity requirements allow this (see Section 4.2.14).	No	Not applicable. No significant VOCs are used in the cleaning
5.1.2.4 Minimisation of exhaust gas volume flows and loads 5.1.2.4.1 Closure of openings	BAT is to close any unnecessary openings in order to prevent air being sucked to the gas collection system via the process equipment (see Sections 4.2.14 and 4.3.5.17).	No	Not applicable. No gas collection system is required for this process. These are carried out at ambient temperature and pressure and all ingredients used for the gelling reactions are consumed.

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5.1.2.4.2 Testing the airtightness of process equipment	BAT is to ensure the airtightness of process equipment, especially of vessels (see Section 4.2.16).	No	Not applicable. Process equipment is not required to be air tight.
5.1.2.4.3 Inertisation	BAT is to apply shock inertisation instead of continuous inertisation (see Section 4.2.17).	No	Not applicable. No inerting required for this gelling reaction.
5.1.2.4.4 Minimisation of exhaust gas volume flows from distillations	BAT is to minimise the exhaust gas volume flows from distillations by optimising the layout of the condenser (see Section 4.2.20).	No	Not applicable. No distillations carried out.
5.1.2.4.5 Liquid additions into vessels	BAT is to carry out liquid addition to vessels as bottom feed or with dip-leg, unless reaction chemistry and/or safety considerations make it impractical (see Sections 4.2.15, 4.2.18). In such cases, the addition of liquid as top feed with a pipe directed to the wall reduces splashing and hence, the organic load in the displaced gas. If both solids and an organic liquid are added to a vessel, BAT is to use solids as a blanket in circumstances where the density difference promotes the reduction of the organic load in the displaced gas, unless reaction chemistry and/or safety considerations make it impractical (see Section 4.2.18).	Yes	Yes. The majority of ingredients are not excessively volatile. Solid and liquid ingredients are added to prevent splashing and displacement.
5.1.2.4.6 Minimisation of peak emission concentrations	BAT is to minimise the accumulation of peak loads and flows and related emission concentration peaks by, e.g. a) optimisation of the production matrix (see Section 4.3.5.17) b) application of smoothing filters (see Section 4.3.5.16 and also Section 4.3.5.13).	Yes	Yes. Emissions are controlled through design of the reaction process and that the majority of additions to reaction vessels are simple blending operations.

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5.1.2.5 Minimisation of volume and load of waste water streams 5.1.2.5.1 Mother liquors with high salt content	BAT is to avoid mother liquors with high salt content or to enable the work-up of mother liquors by the application of alternative separation techniques (see Section 4.2.24), e.g. a) membrane processes b) solvent-based processes c) reactive extraction d) or to omit intermediate isolation.	No	Not applicable. Mother liquors are not produced. Processes on site are limited to blending where some reactions take place within the finished product.
5.1.2.5.2 Countercurrent product washing	BAT is to apply countercurrent product washing where the production scale justifies the introduction of the technique (see Section 4.2.22).	No	Not applicable. No product washing takes place.
5.1.2.5.3 Water-free vacuum generation	BAT is to apply water-free vacuum generation (see Sections 4.2.5, 4.2.6 and 4.2.7).	No	Not applicable. No vacuums are used.
5.1.2.5.4 Determination of the completion of reactions	For batch processes, BAT is to establish clear procedures for the determination of the desired end point of the reaction (for an example, see Section 4.2.23).	Yes	Yes. Quality control processes determine viscosity of finished product. Product recipe determines correct proportions of reagents, and mixing parameters. Products are for use by consumers so product safety is paramount.
5.1.2.5.5 Indirect cooling	BAT is to apply indirect cooling (see Section 4.2.9).	No	Not applicable. Cooling of the process is not required.
5.1.2.5.6 Cleaning	BAT is to apply a pre-rinsing step prior to rinsing/cleaning of equipment to minimise organic loads in wash-waters (see Section 4.2.12).	Yes	Yes. Clean in place system is automated to ensure pre-cleaning of the process vessels before main clean.

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5.1.2.6 Minimisation of energy consumption	BAT is to assess the options and to optimise the energy consumption (for examples, see Sections 4.2.11 and 4.2.20).	Yes	Yes. The process was designed with the current products and processes in mind, equipment was energy efficient as required at the time of installation. Energy use across the site is monitored and trended against production.
5.2 Management and treatment of waste streams 5.2.1 Mass balances and process waste stream analysis 5.2.1.1.1 Mass balances	BAT is to establish mass balances for VOCs (including CHCs), TOC or COD, AOX or EOX and heavy metals on a yearly basis (see Sections 4.3.1.4, 4.3.1.5 and 4.3.1.6).	Yes	Yes. VOCs are not used in the process. COD is limited by trade effluent consent to 250 kg per day. Heavy metals are not used in the process as ingredients or outputs. The trade effluent consent for the site does not specify any parameters for heavy metals.
5.2.1.1.2 Waste stream analysis	BAT is to carry out a detailed waste stream analysis in order to identify the origin of the waste stream and a basic data set to enable management and suitable treatment of exhaust gases, waste water streams and solid residues (see Section 4.3.1.1).	Yes	Yes. Waste data tracked monthly to ensure waste generation against production meets targets. All suitable treatment processes are in place for the limited exhaust gases (dust only), waste water streams and solid residues. These data are spreadsheeted to show trends.
5.2.1.1.3 Assessment of waste water streams	BAT is to assess at least the parameters given in Table 5.1 for waste water streams, unless the parameter can be	Yes	Yes. The standard list is analysed for under the trade effluent consent, except for Bioeliminability and

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	seen as irrelevant from a scientific point of view (see Section 4.3.1.2). [TABLE TEXT]		Biological inhibition, including nitrification as these are not relevant. No monitoring for any substances under the "where it is expected" table are undertaken as these are not expected given the ingredients used.
5.2.1.1.4 Monitoring of emissions to air	For emissions to air, BAT is to monitor the emission profile which reflects the operational mode of the production process (see Section 4.3.1.8). In the case of a non-oxidative abatement/recovery system, BAT is to apply a continuous monitoring system (e.g. FID), where exhaust gases from various processes are treated in a central recovery/abatement system (see Section 4.3.1.8). BAT is to individually monitor substances with ecotoxicological potential if such substances are released (see Section 4.3.1.8).		Yes. Sole emission to air from the process is a filter baghouse plant in the yard taking air extracted from the powder pre-weigh station and general process area extraction. Dust monitoring undertaken pre- and post-bag filter plant. No solvent abatement is required due to absence of VOCs in the process.
5.2.1.1.5 Assessment of individual volume flows	BAT is to assess individual exhaust gas volume flows from process equipment to recovery/abatement systems (see Section 4.3.1.7).	Yes	No applicable separate exhaust gas flows. Main extraction from pre-weigh station. All other input air from general production area which is not dusty. System designed precisely for this process and location.
5.2.2 Re-use of solvents	BAT is to re-use solvents as far as purity requirements (e.g. requirements according to cGMP) allow, by: a) using the solvent from previous batches of a production	No	Not applicable. No solvent use in the process.

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	campaign for future batches as far as purity requirements allow (see Section 4.3.4) b) collecting spent solvents for on-site or off-site purification and re-use (for an example, see Section 4.3.3) c) collecting spent solvents for on-site or off-site utilisation of the calorific value (see Section 4.3.5.7).		
5.2.3 Treatment of exhaust gases 5.2.3.1 Selection of VOC recovery/abatement techniques and achievable emission levels 5.2.3.1.1 Selection of VOC and recovery abatement techniques	BAT is to select VOC recovery and abatement techniques according to the flow scheme in Figure 5.1.	No	Not applicable. No solvent use in the process.
5.2.3.1.2 Non-oxidative VOC recovery and abatement techniques	BAT is to reduce emissions to the levels given in Table 5.2 where non-oxidative VOC recovery or abatement techniques are applied (see Sections 4.3.5.6, 4.3.5.11, 4.3.5.14, 4.3.5.17, 4.3.5.18).	No	Not applicable. No solvent use in the process.
5.2.3.1.3 VOC abatement by thermal oxidation/incineration and catalytic oxidation	BAT is to reduce VOC emissions to the levels given in Table 5.3 where thermal oxidation/incineration or catalytic oxidation are applied (see Sections 4.3.5.7, 4.3.5.8, 4.3.5.18).	No	Not applicable. No solvent use in the process.

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5.2.3.2 Recovery/abatement of NOX 5.2.3.2.1 NOX from thermal oxidation/incineration or catalytic oxidation	For thermal oxidation/incineration or catalytic oxidation, BAT is to achieve the NOX emission levels given in Table 5.5 and, where necessary, to apply a DeNOX system (e.g. SCR or SNCR) or two stage combustion to achieve such levels (see Sections 4.3.5.7 and 4.3.5.19).	No	Not applicable. No relevant abatement plant installed or required.
5.2.3.2.2 NOX from chemical processes	For exhaust gases from chemical production processes, BAT is to achieve the NOX emission levels given in Table 5.5 and, where necessary to apply treatment techniques such as scrubbing or scrubber cascades with scrubber media such as H2O and/or H2O2 to achieve such levels (see Section 4.3.5.1).	No	Not applicable. NOx is not released from the blending and reaction stages.
5.2.3.3 Recovery/abatement of HCl, Cl2 and HBr/Br2	BAT is to achieve HCl emission levels of 0.2 – 7.5 mg/m3 or 0.001 – 0.08 kg/hour and, where necessary, to apply of one or more scrubbers using scrubbing media such as H2O or NaOH in order to achieve such levels (see Section 4.3.5.3). BAT is to achieve Cl2 emission levels of 0.1 – 1 mg/m3 and, where necessary, to apply techniques such as absorption of the excess chlorine (see Section 4.3.5.5) and/or scrubbing with scrubbing media such as NaHSO3 in order to achieve such levels (see Section 4.3.5.2). BAT is to achieve HBr emission levels <1 mg/m3 and, where necessary, to apply scrubbing with scrubbing	No	Not applicable. HCl, Cl2 and HBr/Br2 not in the emissions to air.

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	media such as H2O or NaOH in order to achieve such levels (see Sections 1.1.1, 4.3.5.4).		
5.2.3.4 NH3 emission levels 5.2.3.4.1 Removal of NH3 from exhaust gases	BAT is to achieve NH3 emission levels of 0.1 – 10 mg/m3 or 0.001 – 0.1 kg/hour and, where necessary, to apply scrubbing with scrubbing media such as H2O or acid in order to achieve such levels (see Section 4.3.5.20).	No	Not applicable. NH3 not in the emissions to air.
5.2.3.4.2 NH3 slip from DeNOX	BAT is to achieve NH3 slip levels from SCR or SNCR of <2 mg/m3 or <0.02 kg/hour (see Section 4.3.5.7)	No	Not applicable. NH3 not in the emissions to air.
5.2.3.5 Removal of SOx from exhaust gases	BAT is to achieve SOx emission levels of 1 – 15 mg/m3 or 0.001 – 0.1 kg/hour and, where necessary, to apply scrubbing with scrubbing media such as H2O or NaOH in order to achieve such levels (see Section 4.3.5.21).	No	Not applicable. SOx not in the emissions to air.
5.2.3.6 Removal of particulates from exhaust gases	BAT is to achieve particulate emission levels of 0.05 – 5 mg/m3 or 0.001 – 0.1 kg/hour and, where necessary, to apply techniques such as bag filters, fabric filters, cyclones, scrubbing, or wet electrostatic precipitation (WESP) in order to achieve such levels (see Section 4.3.5.22).	Yes	Yes. Dust monitoring post-filter on the bag house shows dust levels of 0.12 mg/m3 which is well below (2.4%) the BAT limit of 5 mg/m3.
5.2.3.7 Removal of free cyanides from exhaust gases	BAT is to remove free cyanides from exhaust gases, and to achieve a waste gas emission level of 1 mg/m3 or 3 g/hour as HCN (see Section 4.3.6.2).	No	Not applicable. Cyanides not in the emissions to air.
5.2.4 Management and treatment of waste water streams	BAT is to segregate and pretreat or dispose of mother liquors from halogenations and sulphochlorinations (see Sections 4.3.2.5, 4.3.2.10).	No	Not applicable. No such processes undertaken on site.

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5.2.4.1 Typical waste water streams for segregation, pretreatment or disposal 5.2.4.1.1 Mother liquors from halogenation and sulphochlorination			
5.2.4.1.2 Waste water streams containing biologically active substances	BAT is to pretreat waste water streams containing biologically active substances at levels which could pose a risk either to a subsequent waste water treatment or to the receiving environment after discharge (see Sections 4.3.2.6, 4.3.7.5, 4.3.7.9, 4.3.8.13 and 4.3.8.18).	No	Not applicable. No biologically active substances wituin the wastewater stream.
5.2.4.1.3 Spent acids from sulphonations or nitrations	BAT is to segregate and collect separately spent acids, e.g. from sulphonations or nitrations for on-site or off-site recovery or to apply BAT given in 5.2.4.2 (see Sections 4.3.2.6, 4.3.2.8).	No	Not applicable. No such processes undertaken on site.
5.2.4.2 Treatment of waste water streams with relevant refractory organic load 5.2.4.2.1 Relevant refractory organic loading	For the purposes of pretreatment, BAT is to classify organic loading as follows: Refractory organic loading is not relevant if the waste water stream shows a bioeliminability of greater than about 80 – 90 % (see Sections 4.3.7.6, 4.3.7.7, 4.3.7.8). In cases with lower bioeliminability, the refractory organic loading is not relevant if it is lower than the range of	No	Not applicable. No refractory organic loading present in the wastewater stream.

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	about 7.5 – 40 kg TOC per batch or per day (see Sections 4.3.7.10, 4.3.7.12 and 4.3.7.13).		
5.2.4.2.2 Segregation and pretreatment	BAT is to segregate and pretreat waste water streams containing relevant refractory organic loadings according to the criteria given in Section 5.2.4.2.1.	No	Not applicable. No refractory organic loading present in the wastewater stream.
5.2.4.2.3 Overall COD elimination	For the segregated waste water streams carrying a relevant refractory organic load according to Section 5.2.4.2.1, BAT is to achieve overall COD elimination rates for the combination of pretreatment and biological treatment of >95 % (see Section 4.3.8.9).	No	Not applicable. No refractory organic loading present in the wastewater stream.
5.2.4.3 Removal of solvents from waste water streams	BAT is to recover solvents from waste water streams for on-site or off-site re-use, using techniques such as stripping, distillation/rectification, extraction or combinations of such techniques, where the costs for biological treatment and purchase of fresh solvents are higher than the costs for recovery and purification (see Section 4.3.7.18). BAT is to recover solvents from waste water streams in order to use the calorific value if the energy balance shows that overall natural fuel can be substituted (see Section 4.3.5.7).	No	Not applicable. No solvents within the wastewater stream.
5.2.4.4 Removal of halogenated compounds from waste water streams	BAT is to remove purgeable CHCs from waste water streams, e.g. by stripping, rectification or extraction and to achieve sum concentrations <1 mg/l in the outlet from pretreatment or to achieve sum concentrations of <0.1 mg/l in the inlet to the on-site biological WWTP or in the	No	Not applicable. No CHCs within the wastewater stream.

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5.2.4.4.1 Removal of purgeable chlorinated hydrocarbons	inlet to the municipal sewerage system (see Sections 4.3.7.18, 4.3.7.19, 4.3.7.20).		
5.2.4.4.2 Pretreatment of waste water streams containing AOX	BAT is to pretreat waste water streams with significant AOX loads and to achieve the AOX levels given in Table 5.6 in the inlet to the on-site biological WWTP or in the inlet to the municipal sewerage system (see Section 4.3.7.14). *[Table removed for brevity]*	No	Not applicable. No AOX within the wastewater stream.
5.2.4.5 Pretreatment of waste water streams containing heavy metals	BAT is to pretreat waste water streams containing significant levels of heavy metals or heavy metal compounds from processes where they are used deliberately and to achieve the heavy metal concentrations given in Table 5.7 in the inlet to the on-site biological WWTP or in the inlet to the municipal sewerage system (see Section 4.3.7.22).	No	Not applicable – No such deliberate use of heavy metals or metal compounds within site processes. Furthermore, no on-site biological wastewater treatment plant present on site. Heavy metals are not parameters permitted within the site Trade Effluent Consent.
5.2.4.6 Destruction of free cyanides	BAT is to recondition waste water streams containing free cyanides in order to substitute raw materials where technically possible (see Section 4.3.6.2). BAT is to: a) pretreat waste water streams containing significant loads of cyanides and to achieve a cyanide level of 1 mg/l or lower in the treated waste water stream (see Section 4.3.6.2) or to b) enable safe degradation in a biological WWTP (see Section 4.3.6.2 under Applicability).	No	Not applicable. No wastewater streams containing free cyanides.

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5.2.4.7 Biological waste water treatment	After the application of BAT given in Sections 5.2.4.1, 5.2.4.2, 5.2.4.3, 5.2.4.4 and 5.2.4.5 (management and treatment of waste water streams), BAT is to treat effluents containing a relevant organic load, such as waste water streams from production processes, rinsing and cleaning water, in a biological WWTP (see Sections 4.3.8.6 and 4.3.8.10).	No	Not applicable – No on-site biological wastewater treatment plant present on site.
5.2.4.7.1 On-site and joint treatment	BAT is to ensure that the elimination in a joint waste water treatment is overall not poorer than in the case of on-site treatment. This is realised by regular degradability/bioeliminability testing (see Section 4.3.8.5).	No	Not applicable – No on-site biological wastewater treatment plant present on site.
5.2.4.7.2 Elimination rates and emission levels	BAT is to take full advantage of the biological degradation potential of the total effluent and to achieve BOD elimination rates above 99 % and yearly average BOD emission levels of 1 – 18 mg/l. The levels relate to the effluent after biological treatment without dilution, e.g. by mixing with cooling water (see Section 4.3.8.11). BAT is to achieve the emission levels given in Table 5.8. *[Table removed for brevity]*	No	Not applicable – No on-site biological wastewater treatment plant present on site.
5.2.4.8 Monitoring of the total effluent	BAT is to regularly monitor the total effluent to and from the biological WWTP measuring at least the parameters given in Table 5.1. (see Section 4.3.8.21).	No	Not applicable – No on-site biological wastewater treatment plant present on site.
5.2.4.8.1 Biomonitoring	BAT is to carry out regular biomonitoring of the total effluent after the biological WWTP where substances with ecotoxicological potential are handled or produced with or	No	Not applicable – No on-site biological wastewater treatment plant present on site. No known substances with

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	without intention (for examples, see Sections 4.3.8.18 and 4.3.8.19).		ecotoxicological potential are handled or produced.
5.2.4.8.2 Online toxicity monitoring	BAT is to apply online toxicity monitoring in combination with online TOC measurement if residual acute toxicity is identified as a concern, for examples see Sections 4.3.8.7 and 4.3.8.20.	No	Not applicable – No on-site biological wastewater treatment plant present on site.
5.3 Environmental management	BAT is to implement and adhere to an Environmental Management System (EMS) that incorporates, as appropriate to individual circumstances, the following features: (see Chapter 4) • definition of an environmental policy for the installation by top management (commitment of the top management is regarded as a precondition for a successful application of other features of the EMS) • planning and establishing the necessary procedures • implementation of the procedures, paying particular attention to – structure and responsibility – training, awareness and competence – communication – employee involvement – documentation – efficient process control – maintenance programme	Yes	Yes. The Operator maintains an Environmental Management System which is externally certified to ISO 14001:2015. This management system meets the requirements of BAT with relevant procedural controls on competence, process control, maintenance, monitoring, and review.

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	– emergency preparedness and response – safeguarding compliance with environmental legislation. • checking performance and taking corrective action, paying particular attention to – monitoring and measurement (see also the Reference document on Monitoring of Emissions) – corrective and preventive action – maintenance of records – independent (where practicable) internal auditing in order to determine whether or not the environmental management system conforms to planned arrangements and has been properly implemented and maintained. • review by top management.		

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