



EnerSys Ltd Environmental Permitting Regulations

Permit Number EPR/NP3030BJ

Improvement Programme Requirement IC17

EnerSys Ltd Newport
Stephenson Street, Newport,
South Wales
NP19 4XJ

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Scope

The purpose of this report is to comply with NRW requirement IC17 under the Environmental Permitting Regulation Permit Number EPR/NP3030BJ that has been granted to EnerSys Ltd's lead acid battery manufacturing site based at Stephenson Street, Newport, South Wales.

Requirements

To comply with the requirement IC17 of EPR NP3030BJ the operator (EnerSys Ltd) shall submit, for approval by Natural Resources Wales, a report setting out progress to achieving the BAT thereafter) Conclusions and BAT-AEL's where BAT is currently not achieved but will be achieved by 30th June 2020. The report shall include, but not be limited to, the following:

1. Current performance against the BAT Conclusions and BAT-AEL.
2. Methodology for reaching the AELs.
3. Associated targets / timelines for reaching compliance by 30th June 2020.

The report shall address all of the relevant BAT Conclusions.

BAT 1

1.1.1 Environmental Management System

In order to improve the overall environmental performance, BAT is to implement and adhere to an environmental management system (EMS) that incorporates all of the following features: EN 30.6.2016 Official Journal of the European Union L 174/35

(a) commitment of the management, including senior management; (b) definition of an environmental policy that includes the continuous improvement of the installation by the management; (c) planning and establishing the necessary procedures, objectives and targets, in conjunction with financial planning and investment;

(d) implementation of procedures paying particular attention to: (i) structure and responsibility, (ii) recruitment, training, awareness and competence, (iii) communication, (iv) employee involvement, (v) documentation, (vi) effective process control, (vii) maintenance programmes, (viii) emergency preparedness and response, (ix) safeguarding compliance with environmental legislation;

(e) checking performance and taking corrective action, paying particular attention to: (i) monitoring and measurement (see also Reference Report on Monitoring of emissions to Air and Water from IED installations-ROM), (ii) corrective and preventive action, (iii) maintenance of records, (iv) independent (where practicable) internal or external auditing in order to determine whether or not the EMS conforms to planned arrangements and has been properly implemented and maintained;

(f) review of the EMS and its continuing suitability, adequacy and effectiveness by senior management; (g) following the development of cleaner technologies;

(h) consideration for the environmental impacts from the eventual decommissioning of the installation at the stage of designing a new plant, and throughout its operating life; (i) application of sectoral benchmarking on a regular basis. The establishment and implementation of an action plan on diffuse dust emissions (see BAT 6) and the application of a maintenance management system which especially addresses the performance of dust abatement systems (see BAT 4) are also a part of the EMS.



EnerSys Ltd has an ISO14001 management system, recertified in September 2019. Auditing body is National Standards Authority of Ireland. File Number 14.4123. Compliance.

BAT 2

1.1.2 Energy Management

In order to use energy efficiently, BAT is to use a combination of the techniques given below:

-  (a) *Energy efficiency management system (e.g. ISO 50001).*

EnerSys Ltd has employed and worked alongside RUMM energy management consultants for the past 8 years. EnerSys Ltd has achieved and maintains on-going compliance to ESOS since 2015. EnerSys Ltd identifies energy efficiencies and delivers energy savings through the implementation of an internal energy management plan. EnerSys Ltd gained accreditation to ESOS II in December 2019 and is actively engaged with external consultants in SECR Reporting.
-  (b) *Regenerative or recuperative burners.*

Not used onsite.
-  (c) *Heat recovery (e.g. steam, hot water, hot air) from waste process heat.*

Not used onsite.
-  (d) *Regenerative thermal oxidiser.*

Not Applicable.
-  (e) *Preheat the furnace charge, combustion air or fuel using the heat recovered from hot gases from the melting stage.*

Not Applicable.
-  (f) *Raise the temperature of the leaching liquors using steam or hot water from waste heat recovery.*

Not Applicable.
-  (g) *Use hot gases from the launder as preheated combustion air.*

Not Applicable.
-  (h) *Use oxygen-enriched air or pure oxygen in the burners to reduce energy consumption by allowing autogenous smelting or the complete combustion of carbonaceous material.*

Not Applicable.
-  (i) *Dry concentrates and wet raw materials at low temperatures.*

Only applicable when drying is performed. Ovens used efficiently.
-  (j) *Recover the chemical energy content of the carbon monoxide produced in an electric or shaft/blast furnace by using the exhaust gases as a fuel, after the removal of metals, in other production processes or to produce steam/hot water or electricity.*

Not Applicable.

-  (k) *Recirculate the flue-gas back through an oxy-fuel burner to recover the energy contained in the total organic carbon present.*
Not Applicable
-  (l) *Suitable insulation for high temperature equipment such as steam and hot water pipes.*

Where possible, suitable insulation used for high temperature equipment across the site. Surveys are undertaken and where applicable suitable action plans are put in place to ensure continued compliance.
-  (m) *Use the heat generated from the production of sulphuric acid from sulphur dioxide to preheat gas directed to the sulphuric acid plant or to generate steam and/or hot water.*
Not Applicable.
-  (n) *Use high efficiency electric motors equipped with variable-frequency drive, for equipment such as fans.*

VSDs used where appropriate.
-  (o) *Use control systems that automatically activate the air extraction system or adjust the extraction rate depending on actual emissions.*
Not used on-site.

EnerSys Ltd Newport manages energy consumption through compliance with a, i & n.

a: RUMM energy management consultants programme, has run for 7 years and now extended to December 2019. ESOS achieved December 2015. continuation of ESOS programme looking at reducing energy consumption with seventy sub meters installed on site to monitor and trend energy performance. ESOS II activities currently being undertaken.

i: when drying lead plates, the ovens are used efficiently with programmes set by product type and size. Oven burners are being replaced to more energy efficient types and automatically shut off when programme is completed.

n: Compliance - variable speed drives are used on motors wherever possible. When new motors are purchased, they must be type IE3.

BAT 3

1.1.3 Process Control

In order to improve overall environmental performance, BAT is to ensure stable process operation by using a process control system together with a combination of the techniques given below.

-  (a) *Inspect and select input materials according to the process and the abatement techniques applied*

EnerSys Ltd Inspects and select materials according to the process and abatement techniques applied. As can be seen onsite EnerSys Ltd adopts a combination of Baghouses, HEPA Filters and wet scrubbers for the processes that are undertaken onsite.

-  (b) *Good mixing of the feed materials to achieve optimum conversion efficiency and reduce emissions and rejects*

Lead ingots are stored undercover to prevent fugitive emission release and to ensure process control through the charging of damp/wet charge. Chips from our perforating presses are also recovered in our process thus minimising the impact to the environment. The lead pots are partially enclosed with ventilation leading to abatement equipment ensuring that emissions are captured at source. Dross is recovered from the pots and placed in designated bins. These are fully covered and transported to the designated waste management area. These are then sent via a licenced waste carrier to the smelter for recovery of the lead.

-  (c) *Feed weighing and metering systems*

Feed weighing and metering systems have been installed and are used onsite at the EnerSys Ltd Plant.

-  (d) *Processors to control material feed rate, critical process parameters and conditions including the alarm, combustion conditions and gas additions*

Processors are used to control the material feed rate, critical process parameters and conditions including the alarm, combustion conditions and gas additions.

-  (e) *On-line monitoring of the furnace temperature, furnace pressure and gas flow*

EnerSys Ltd conducts online monitoring of the furnace temperature, through investigation it has been determined that the pressure of the furnace cannot be monitored, due to the design of the system the furnace pressure is atmospheric. Furthermore, EnerSys Ltd have engaged with an external contractor to explore the potential of implementing an online based system to conduct measurements of gas flow, gas pressure and pot temperature of the furnaces. Due to the equipment and

methods of operation employed at the site, it was determined that there are no systems in the market that could carry out the full parameters of monitoring required under BAT as a result, EnerSys Ltd is continuing to work in partnership with external contractors and Birmingham University to explore the possibility of designing and implement a bespoke cloud-based system that will incorporate the BAT 3, 1.1.3(e) conclusions.

-  (f) *Monitor the critical process parameters of the air emission abatement plant such as gas temperature, reagent metering, pressure drop, ESP current and voltage, scrubbing liquid flow and pH and gaseous components (e.g. O₂, CO, VOC).*

Baghouses are inspected and serviced accordingly by a third party. Daily TPM's are undertaken by the Operations team such as daily pressure readings. These are then logged onto a specific spreadsheet (specified ranges taken from the manufacturer) where trends and performance are analysed thus allowing preventive actions to be taken. Re wet scrubbers, daily TPM' also completed tracking Dp and water level. The water is automatically measured by 2 probes that will adjust accordingly. The TPM also requires a visual inspection of the water level. The waste water is pumped directly to the ETP for treatment prior to discharging (pH taken at the ETP and not at the scrubber for this reason).

Monitoring of the critical process parameters of air emission abatement plant is being carried out via an outside contractor (Anchem). PCME has been installed on the oxide mills which is capable of providing half hourly data. All gas burners are regularly serviced with report submitted on the efficiency of gas burners which includes the ovens and melting pots. ESP current and voltage is measured on the concast process and flow meters are located on scrubbing packs onsite, with all wastewater going to the ETP.

-  (g) *Control dust and mercury in the exhaust gas before transfer to the sulphuric acid plant for plants including sulphuric acid or liquid SO₂ production.*

Not Applicable.

-  (h) *On-line monitoring of vibrations to detect blockages and possible equipment failure.*

Not Applicable - All EnerSys Ltd.'s abatement equipment is monitored using differential pressure as an indication of blockages in the equipment, Magnehelic gauges are used to measure this, the readings are taken daily and recorded as part of the TPM procedure, if outside the normal operating parameters this is reported immediately to Maintenance and Health and safety depts. Some processes use pre-set highly visible chevrons to indicate whether flow is adequate for the process in question. The abatement equipment filtration and ducting are on a planned maintenance schedule and is completed by Competent external contractors.

-  (i) *On-line monitoring of the current, voltage and electrical contact temperatures in electrolytic processes.*
Not Applicable
-  (j) *Temperature monitoring and control at melting and smelting furnaces to prevent the generation of metal and metal oxide fumes through overheating.*

All furnaces are controlled via thermocouple feedback with alarms for overtemperature to stop the creation of oxide fumes. MCM107 Cominco casting process, MCM129 Strip mill process, MCM177 Concast process.
-  (k) *Processor to control the reagents feeding and the performance of the wastewater treatment plant, through on-line monitoring of temperature, turbidity, pH, conductivity and flow.*

Online control and automated control measures are adopted for the chemical dosing operation for the effluent treatment plant. This information is documented within EnerSys Ltd Environmental Control Method (ECM003). Current online logging and monitoring of data for permitted contaminants, sulphates, pH, flow rate and volume is carried out via V-Notch instrumentation, the monitoring of turbidity is carried out via an external lab which is reported back to site.

The ETP is operated by batch release, the treated water is sent to 3 holding tanks. These are sampled and tested by our internal laboratory. Once the results are below the AEL's the batch is released via the V-notch. If not, then the water is pumped back to the ETP and re-treated and so on.

The V-notch flow is certified by MCERTs.

BAT 4

1.1.4 Diffuse Emissions

-  *In order to reduce channelled dust and metal emissions to air, BAT is to apply a maintenance management system which especially addresses the performance of dust abatement systems as part of the environmental management system (see BAT 1).*

Environmental Monitoring Procedure OPS424 details the maintenance arrangements for the abatement systems. Electronic Maintenance Management System is called E-Maint and controls the allocation of tasks for Maintenance on abatement.

BAT 5

1.1.4.1 Diffuse Emissions



In order to prevent or, where this is not practicable, to reduce diffuse emissions to air and water, BAT is to collect diffuse emissions as much as possible nearest to the source and treat them.

EnerSys Ltd employs policies and procedures to prevent and/or reduce diffuse emissions to air and water (e.g. OPS335, OPS425). In order to prevent or, where this is not practicable, reduce diffuse emissions to air and water and ground EnerSys Ltd has implemented a fugitive emissions report that identifies the release point, source, substance(s), emission source, control measures, any issues and risk assessment. EnerSys Ltd identifies and collect diffuse emissions as much as possible nearest to the source and treat them. The fugitive emission report is reviewed externally by the NRW. The fugitive emission report is reviewed periodically to identify new and/or assess existing sources of diffuse emissions.

BAT 6

1.1.4.1 Diffuse Emissions

In order to prevent or, where this is not practicable, to reduce diffuse dust emissions to air, BAT is to set up and implement an action plan on diffuse dust emissions, as part of the environmental management system (see BAT 1), that incorporates both of the following measures:



(a) Identify the most relevant diffuse dust emission sources (using e.g. EN 15445);



(b) Define and implement appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.

Needs to be included in EMS. Cond 1.1.1. 3.2.1 Emissions of substances not controlled by emission limits (excluding odour) shall not cause pollution. The operator shall not be taken to have breached this condition if appropriate measures, including, but not limited to, those specified in any approved emissions management plan, have been taken to prevent or where that is not practicable, to minimise, those emissions.

EnerSys Ltd identifies the most relevant diffuse dust emission sources through the implementation of a fugitive emission report. Please Refer to BAT5 1.1.4.1 diffuse emissions.

BAT 7

1.1.4.2 Diffuse Emissions from the Storage, Handling and Transport of Raw Materials

In order to prevent diffuse emissions from the storage of raw materials, BAT is to use a combination of the techniques given below. EN L 174/38 Official Journal of the European Union 30.6.2016.

- (a) *Identify the most relevant diffuse dust emission sources;*

The most relevant diffuse dust emission sources have been identified across the facility.

- (b) *Define and implement appropriate actions and techniques to prevent or reduce diffuse emissions over a given time frame.*

EnerSys Ltd Adopts and implements appropriate working practices, techniques, procedures to prevent or reduce diffuse emissions which are reviewed throughout the business. and incorporates best practices across the organisation.

- (c) *Sealed packaging of dust-forming materials or secondary materials that contain water-soluble organic compounds.*

Sealed packaging is used for dust-forming materials and secondary materials that contain water-soluble organic compounds. Furthermore, where required bespoke sealed containers are used to store dust forming waste materials prior to disposal.

- (d) *Covered bays for storing material which has been pelletised or agglomerated.*

Covered bays for storage are located opposite the technical centre and behind Cell 1B.

- (e) *Use water sprays and fog sprays with or without additives such as latex for dust-forming materials.*

Water sprays are used within the pasting area of the site.

- (f) *Dust/gas extraction devices placed at the transfer and tipping points for dust-forming materials*

Dust extraction devices, in the form of local exhaust ventilation, placed at the transfer and tipping points for dust forming materials.

- (g) *Certified pressure vessels for storing chlorine gas or mixtures that contain chlorine*
Not Applicable.

- (h) *Tank construction materials that are resistant to the contained materials*

Construction materials are taken into consideration when constructing tanks onsite ensuring that the materials used in construction are resistant to the contained

materials. For example, polyethylene is used as the material for the manufacture of tanks for acid.

- (i) *Reliable leak detection systems and display of tank's level, with an alarm to prevent overfills*

EnerSys Ltd have engaged the NRW and have invested in a new acid dilution plant. As part of the install the new acid tanks have been fitted and commissioned. This newly installed acid tanks are in accordance with BAT 7 – 1.1.4.2, (i). existing waste acid tanks have secondary and tertiary bunding a visual display and an alarm system to prevent overfilling. Any new tanks installed onsite shall be in accordance to BAT 7 – 1.1.4.2, (i).

Finally, with regards to powders, powders are stored within silos, therefore are out of the scope of BAT 7 - 1.1.4.2, (i).

- (j) *Store reactive materials in double-walled tanks or tanks placed in chemical-resistant bunds of the same capacity and use a storage area that is impermeable and resistant to the material stored*

Reactive materials such as sulphuric acid and/or caustic soda are stored in either double-walled tanks or tanks placed in chemical-resistant bunds of the same capacity. Reactive materials are stored in areas that are impermeable and resistant to the materials stored.

- (k) *Design storage areas so that — any leaks from tanks and delivery systems are intercepted and contained in bunds that have a capacity capable of containing at least the volume of the largest storage tank within the bund; — delivery points are within the bund to collect any spilled material*

EnerSys Ltd applies secondary and/or tertiary containment measures when designing storage areas so that leaks are intercepted and contained within bunds. EnerSys Ltd ensures that the bunding has the capacity capable of containing at least the volume of the largest storage tank within the bund. It is of note that where bespoke/fixed bunding is not present and/or unsuitable, EnerSys Ltd implements portable bunding.

- (l) *Use inert gas blanketing for the storage of materials that react with air.*
Not Applicable.

- (m) *Collect and treat emissions from storage with an abatement system designed to treat the compounds stored. Collect and treat before discharge any water that washes dust away.*

Segregated surface and foul water systems, onsite Effluent Treatment Plant treats contaminated (foul) water and is tested prior to release into the environment.

- (n) *Regular cleaning of the storage area and, when needed, moistening with water.*

Regular cleaning carried out of the storage area moistening (dampening) carried out within Cell 1B.

-  (o) *Place the longitudinal axis of the heap parallel to the prevailing wind direction in the case of outdoor storage.*
Not Applicable.
-  (p) *Protective planting, windbreak fences or upwind mounts to lower the wind velocity in the case of outdoor storage.*
Not Applicable.
-  (q) *One heap instead of several where feasible in the case of outdoor storage*
Not Applicable.
-  (r) *Use oil and solid interceptors for the drainage of open outdoor storage areas. Use of concreted areas that have kerbs or other containment devices for the storage of material that can release oil, such as swarf.*

EnerSys Ltd has made use of oil and solid interceptors for the drainage of open/outdoor storage areas. The use of concreted areas with containment devices have been employed for the storage of material that can release oil, such as swarf. i.e. Lead chips, from Cell 1A.

BAT 8

1.1.4.2 Diffuse Emissions from the Storage, Handling and Transport of Raw Materials

In order to prevent diffuse emissions from the handling and transport of raw materials, BAT is to use a combination of the techniques given below. EN 30.6.2016 Official Journal of the European Union L 174/39

-  (a) *Enclosed conveyors or pneumatic systems to transfer and handle dust-forming concentrates and fluxes and fine-grained material.*

EnerSys Newport uses enclosed pipework for the transportation of oxides

-  (b) *Covered conveyors to handle non-dust-forming solid materials*

EnerSys transfer solid lead ingots via conveyors onsite. However, due to the age and operation of some plant and equipment within the facility the use of covered conveyors is not currently possible. It has been documented within the site's legal compliance register that in the future when replacing the existing plant and equipment the business will use covered conveyors to handle non-dust-forming solid materials.

-  (c) *Extraction of dust from delivery points, silo vents, pneumatic transfer systems and conveyor transfer points, and connection to a filtration system (for dust-forming materials)*

Extraction of dust from delivery points e.g. silo vents have been connected to a filtration system for receiving pneumatic transfer of dust forming materials (lead oxide).

- (d) *Closed bags or drums to handle materials with dispersible or water-soluble components*

Closed bags or drums are used onsite to handle materials with dispersible or water-soluble components.

- (e) *Suitable containers to handle pelletised materials*
Not Applicable

- (f) *Sprinkling to moisten the materials at handling points*
Not Applicable

- (g) *Minimise transport distances*

The site has been designed and set up to minimise transport distances across the site.

- (h) *Reduce the drop height of conveyor belts, mechanical shovels or grabs*

Where possible EnerSys Ltd have reduced the drop height of conveyor belts, mechanical shovels and grab

- (i) *Adjust the speed of open belt conveyors (< 3,5 m/s)*

EnerSys Ltd have adjusted the speed of open belt conveyors to <3,5 m/s.

- (j) *Minimise the speed of descent or free fall height of the materials*

Where possible EnerSys Ltd minimises the speed of descent or free fall height of the materials.

- (k) *Place transfer conveyors and pipelines in safe, open areas above ground so that leaks can be detected quickly and damage from vehicles and other equipment can be prevented. If buried pipelines are used for non-hazardous materials, document and mark their course and adopt safe excavation systems*

EnerSys Ltd places transfer conveyors and pipelines in safe, open areas and where possible above ground so that leaks can be detected quickly and damage from vehicles and other equipment can be prevented, if buried pipelines are used for non-hazardous materials, EnerSys Ltd has documented and marked their course ensuring safe excavations can be carried out.

- (l) *Automatic resealing of delivery connections for handling liquid and liquefied gas*

EnerSys Ltd employs automatic resealing of delivery connections for the handling liquid. There is no liquified gas present onsite.

-  (m) *Back-vent displaced gases to the delivery vehicle to reduce emissions of VOC*
Not Applicable
-  (n) *Wash wheels and chassis of vehicles used to deliver or handle dusty materials*

All FLT's are cleaned on a weekly basis as part of EnerSys Lead in Blood production policy.
-  (o) *Use planned campaigns for road sweeping.*

Monthly road sweeping undertaken onsite via an external contractor.
-  (p) *Segregate incompatible materials (e.g. oxidising agents and organic materials)*

Chemicals are segregated and stored in different locations with no incompatible materials being stored together (i.e. alkalis separated from acids). All flammable materials are stored within flam cabinets and not with incompatible materials. Chemical storage is a check that is carried out as a line item on internal audits that are conducted on a monthly basis. Continuation of internal audits to identify if the correct segregation of incompatible materials is being carried out.
-  (q) *Minimise material transfers between processes*

EnerSys Ltd continues to minimise material transfer between processes.

BAT 9

1.1.4.3 Diffuse Emissions from Metal Production

-  (a) *Thermal or mechanical pre-treatment of secondary raw material to minimise organic contamination of the furnace feed*
Not Applicable
-  (b) *Use a closed furnace with a properly designed dedusting system or seal the furnace and other process units with an adequate vent system.*
Not Applicable
-  (c) *Use a secondary hood for furnace operations such as charging and tapping*
Not Applicable
-  (d) *Dust or fume collection where dusty material transfers take place (e.g. furnace charging and tapping points, covered launders)*
Not Applicable
-  (e) *Optimise the design and operation of hooding and ductwork to capture fumes arising from the feed port and from hot metal, matte or slag tapping and transfers in covered launders*
Not Applicable

-  (f) *Furnace/reactor enclosures such as 'house-in-house' or 'doghouse' for tapping and charging operations*
Not Applicable
-  (g) *Optimise the off-gas flow from the furnace through computerised fluid dynamics studies and tracers*
Not Applicable
-  (h) *Charging systems for semi-closed furnaces to add raw materials in small amounts*
Not Applicable
-  (i) *Treat the collected emissions in an adequate abatement system*
Not Applicable

EnerSys Ltd does not have an off-gas collection and treatment process so BAT 9 is not applicable.

BAT 10

1.1.5 Monitoring of Emissions to Air

BAT is to monitor the stack emissions to air with at least the frequency given below and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

Dust

Where the parameter is dust with regard to lead, the relevant BATS are 94, 96 and 97. Minimum monitoring frequency is stated as continuous under EN 13284-2 but referred to as annual in lead BATS as in row below

Lead

Where the parameter is lead and its compounds expressed as Pb the BATS are 94,95,96 and 97. Monitoring frequency is once per year under EN14385.

Permit Condition

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2 and S3.3.

3.1.2 The limits given in schedule 3 shall not be exceeded.

-  Point source emissions are detailed on the permit NP3030BJ. Under the permit mills (A1, A2, A3 and A63) are monitored for lead on a monthly basis to BS EN 14385:2004 (see table below for the figures for May).

All other stacks are monitored once per quarter to the same standard referred above. Continuous monitors (PCME) are in place on the Mills.
Total dust testing to be completed in Q3/2020.

Date of Monitoring	Emission Point	Sample No	Substance to be monitored	Periodic monitoring Result	Emission limit value
11/05/2020	A1	96333/1	Total lead (as Pb)	N/A *	1.00 mg/Nm ³
11/05/2020	A2	96333/2		N/A *	1.00 mg/Nm ³
04/05/2020	A3	96333/3		0.01 mg/Nm ³	1.00 mg/Nm ³
01/05/2020	A63	96333/63		0.01 mg/Nm ³	1.00 mg/Nm ³

* - Oxide Mills A1 & A2 could not be tested during this monthly testing regime due to it not running during the monitoring visits.

BAT 11

1.1.1.6 Mercury Emissions

In order to reduce mercury emissions to air (other than those that are routed to the sulphuric acid plant) from a pyrometallurgical process, BAT is to use one or both of the techniques given below. EN 30.6.2016 Official Journal of the European Union L 174/45. THE BAT AEL RANGE IS 0.01 to 0.05.

- (a) *Use raw materials with a low mercury content, including by cooperating with providers in order to remove mercury from secondary materials. Techniques are given in Section 1.10.*
- (b) *Use adsorbents (e.g. activated carbon, selenium) in combination with dust filtration.*

Permit Condition

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2 and S3.3.

3.1.2 The limits given in schedule 3 shall not be exceeded. BAT AEL limit of 0.05 will be used unless current limit is less.



EnerSys Ltd actively ensures that Mercury is not in raw materials (see table below for material specifications – maximum allowable concentration of metals within incoming lead raw materials).

Material Specifications -maximum allowable concentration of metals within incoming lead raw materials				
ELEMENT		LEAD INGOT	2TS LEAD	RED LEAD
UNIT		ALL ARE IN PPM		
PROCESS/EXTRACTS		MELTING, CASTING A6, A8,A11	COS, CELL 2, A9	A1,A2,A3,A63, A10,A13 MILLS, PASTING
MERCURY	Hg	N/A	N/A	N/A
CADMIUM	Cd	10.0	10.0	30.00
NICKEL	Ni	10.0	10.0	1.00
COPPER	Cu	30.0	30.0	10.00
COBALT	Co	10.0	N/A	2.00
ARSENIC	As	10.0	10.0	5.00
ZINC	Zn	10.0	10.0	5.00

BAT 12

1.1.7 Sulphur Dioxide Emissions

In order to reduce emissions of SO₂ from off-gases with a high SO₂ content and to avoid the generation of waste from the flue-gas cleaning system, BAT is to recover sulphur by producing sulphuric acid or liquid SO₂.

Permit Condition

NRW Comment - Not thought to be applicable to any site in Wales



Not Applicable - Process is not completed at EnerSys Ltd therefore BAT 12 is not applicable

BAT 13

1.1.8 NO_x Emissions

In order to prevent NO_x emissions to air from a pyrometallurgical process, BAT is to use one of the techniques given below:

- (a) Low-NO_x burners.*
- (b) Oxy-fuel burners.*
- (c) Flue-gas recirculation (back through the burner to reduce the temperature of the flame) in the case of oxy-fuel burners*

(1) Descriptions of the techniques are given in Section 1.10.

Permit Condition

NRW Comment (2019) - Only applicable to 1 site in Wales



Not Applicable - Process is not completed at EnerSys Ltd therefore BAT 13 is not applicable.

BAT 14

1.1.9 Emissions to Water Including Monitoring

In order to prevent or reduce the generation of wastewater, BAT is to use one or a combination of the techniques given below. EN L 174/46 Official Journal of the European Union 30.6.2016

-  (a) *Measure the amount of fresh water used and the amount of wastewater discharged.*

EnerSys Ltd measures the amount of fresh water used onsite and the amount of wastewater discharged off site. These figures are reported annually to NRW.

-  (b) *Reuse wastewater from cleaning operations (including anode and cathode rinse water) and spills in the same process.*

EnerSys Ltd cannot comply with BAT due to the contaminants found to be present within the recovered water.

-  *Reuse weak acid streams generated in a wet ESP and wet scrubbers*

EnerSys Ltd cannot comply with BAT. Wet scrubber effluent is not currently being used due to contaminated water impacting the quality of the product.

-  (c) *Reuse wastewater from slag granulation*
Not Applicable

-  (d) *Reuse surface run-off water*

EnerSys Ltd cannot comply with BAT. Possibility of reusing surface run-off water has been investigated and deemed unsuitable.

-  (e) *Use a closed-circuit cooling system*

Applicability may be restricted when a low temperature is required for process reasons

-  (f) *Reuse treated water from the wastewater treatment plant*

EnerSys Ltd cannot comply with BAT. The reuse of treated water from the wastewater treatment plant has been investigated. However, the quality of the water was insufficient to manufacture a good quality product.

Permit Condition

3.1.1 There shall be no point source emissions to water, air or land except from the sources and emission points listed in schedule 3 tables S3.1, S3.2 and S3.3.

3.1.2 The limits given in schedule 3 shall not be exceeded. The table needs to reflect the frequency and standards (If greater) The limits will be done under the sub sector BAT.

BAT 15

In order to prevent the contamination of water and to reduce emissions to water, BAT is to segregate uncontaminated wastewater streams from wastewater streams requiring treatment.



Compliance - Surface, foul and process are segregated.

Permit Conditions

1.1.1 and 2.3.1(operating techniques).

BAT 16

BAT is to use ISO 5667 for water sampling and to monitor the emissions to water at the point where the emission leaves the installation at least once per month⁽¹⁾ and in accordance with EN standards. If EN standards are not available, BAT is to use ISO, national or other international standards that ensure the provision of data of an equivalent scientific quality.

(Please refer to table in guidance document)

*BAT is to monitor for lead in accordance with EN ISO 11885, 15586 and 17294-2
BAT associated emission levels for direct emissions to a receiving water body from the production of lead is Arsenic <0.1, Cadmium <0.1, Cobalt <0.1, Copper <0.2, Mercury <0.05, Nickel <0.5, Lead <0.5, Zinc <1. All in mg/l and daily average.*



EnerSys Ltd is compliant as waste process water is not discharged to surface water. It is released to Welsh Water sewer and tested every week at an external laboratory in accordance with permit requirements. Welsh Water also complete their own independent testing every month and all this compliance data is available. The waste process water effluent is treated at the Nash wastewater treatment works prior to discharge into a tributary of the River Usk. The treatment works has a treatment factor for lead of 82% sewer system.

BAT 17

In order to reduce emissions to water, BAT is to treat the leakages from the storage of liquids and the wastewater from non-ferrous metals production, including from the washing stage in the Waelz kiln process, and to remove metals and sulphates by using a combination of the techniques given below:

- (a) Chemical precipitation.*
- (b) Sedimentation.*
- (c) Filtration.*
- (d) Flotation.*
- (e) Ultrafiltration*
Not Applicable.
- (f) Activated carbon filtration*
Not Applicable.
- (g) Reverse osmosis*

Not Applicable.

- Compliance - For points all leaks from liquid storage will be dealt with by physical bunding (secondary or tertiary) and then removed by specialist waste removal companies.

BAT 18

1.1.10 Noise

In order to reduce noise emissions, BAT is to use one or a combination of the techniques given below:

- (a) Use embankments to screen the source of noise.*
- (b) Enclose noisy plants or components in sound-absorbing structures.*
- (c) Use anti-vibration supports and interconnections for equipment.*
- (d) Orientation of noise-emitting machinery.*
- (e) Change the frequency of the sound.*

- BAT 18 – Compliance. The site is not classed as noisy and does not cause noise pollution outside the site boundaries. Noise emissions are reduced through the use of b and c - sound absorbing structures, anti-vibration supports and interconnections for equipment.

Permit Conditions

3.4.1 Emissions from the activities shall be free from noise and vibration at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved noise and vibration management plan to prevent or where that is not practicable to minimise the noise and vibration.

BAT 19

1.1.11 Odour

In order to reduce odour emissions, BAT is to use one or a combination of the techniques given below:

- (a) Appropriate storage and handling of odorous materials*
- (b) Minimise the use of odorous materials*
- (c) Careful design, operation and maintenance of any equipment that could generate odour emissions*
- (d) Afterburner or filtration techniques, including biofilters Applicable only in limited cases (e.g. in the impregnation stage during speciality production in the carbon and graphite sector)*



The site does not use large volumes of odorous materials and they do not cause odours outside the site boundaries. EnerSys Ltd complies through a and b.

Permit Conditions

3.3.1 Emissions from the activities shall be free from odour at levels likely to cause pollution outside the site, as perceived by an authorised officer of Natural Resources Wales, unless the operator has used appropriate measures, including, but not limited to, those specified in any approved odour management plan, to prevent or where that is not practicable to minimise the odour.

BAT 90

*In order to prevent or reduce diffuse emissions from preparation (such as metering, mixing, blending, crushing, cutting, screening) of primary and secondary materials (**excluding batteries**), BAT is to use one or a combination of the techniques given below:*



- (a) Enclosed conveyor or pneumatic transfer system for dusty material.*
Not Applicable.



- (b) Enclosed equipment. When dusty materials are used the emissions are collected and sent to an abatement system.*
Not Applicable.



- (c) Mixing of raw materials carried out in an enclosed building.*
Not Applicable.



- (d) Dust suppression systems such as water sprays*
Not Applicable.



- (e) Pelletisation of raw materials*
Not Applicable.

Not applicable – EnerSys Ltd is a battery manufacturer BAT 90 excludes batteries.

BAT 91

In order to prevent or reduce diffuse emissions from material pre-treatment (such as drying, dismantling, sintering, briquetting, pelletising and battery crushing, screening and classifying) in primary lead and secondary lead and/or tin production, BAT is to use one or both of the techniques given below:

- (a) *Enclosed conveyor or pneumatic transfer system for dusty material*

Enclosed conveyor or pneumatic transfer systems for dusty materials have been implemented throughout the site. (i.e. robotics).

- (b) *Enclosed equipment. When dusty materials are used the emissions are collected and sent to an abatement system*

When dusty materials are used the emissions are collected and sent to an abatement system. EnerSys Ltd have installed both wet and dry scrubber systems within the Stephenson Street facility. With regards to the oxide mill, and drying ovens, all oxide mills and drying ovens have built in filter systems (oxide mills utilise: bag houses and absolute filters, drying ovens utilise: small and large panel filters).

BAT 92

In order to prevent or reduce diffuse emissions from charging, smelting and tapping operations in lead and/or tin production, and from pre-decoppering operations in primary lead production, BAT is to use an appropriate combination of the techniques given below:

- (a) *Encapsulated charging system with an air extraction system.*

All equipment involved with charging operations in lead and/or tin operations have extraction hoods and wherever possible, charging systems have been encapsulated within the air extraction system for the facility (i.e. Concast). However, due to the age, size and/or locations of existing equipment retrofitting encapsulating charging systems is currently unachievable. It has been documented within the sites legal compliance register that in the future when replacing existing plant and equipment the business will install systems with encapsulated air extraction.

- (b) *Sealed or enclosed furnaces with door sealing⁽¹⁾ for processes with a discontinuous feed and output.*

Sealed or enclosed furnaces with door sealing for processes with a discontinuous feed and output have been installed wherever possible within the facility to meet the requirements of BAT (i.e. Concast). However, due to age, and/or locations of existing equipment retrofitting sealed or enclosed furnaces with door sealing for processes with discontinuous feed and output is currently unachievable. It has been documented within the site's legal compliance register that in the future when replacing existing plant and equipment the business will upgrade existing equipment to incorporate door sealing for processes with a discontinuous feed and output.

- (c) *Operate furnace and gas routes under negative pressure and at a sufficient gas extraction rate to prevent pressurisation.*

Applicable on the Concast, Strip Mill, Cominco.

- (d) *Capture hood/enclosures at charging and tapping points.*

Capture hoods are present on existing equipment (i.e. Concast). However, through assessment of existing plant and equipment it has been determined that due to the current age of the equipment it is not possible to retrofit capture hoods/enclosures on the Strip Mill and Cominco. It has been documented within the sites legal compliance register that in the future when replacing existing plant and equipment the business will install fully encapsulated air extraction systems when upgrading/replacing the Strip Mill and Cominco at their end of life.

- (e) *Enclosed building.*

EnerSys Ltd has implemented and ensures that all activities associated with charging, smelting and tapping operations in lead production takes place within an enclosed building.

- (f) *Complete hood coverage with an air extraction system.*

EnerSys Ltd have complete hood coverage within air extraction systems to prevent or reduce diffuse emissions from charging, smelting and tapping operations in lead and/or tin production where practical to do so. However due to the age and location of some plant equipment (i.e. the strip mill) installation of complete hood coverage with an air extraction is proving difficult.

Where complete hood coverage is not currently present (strip mill) EnerSys Ltd have engaged with specialist contractors to design, build and install complete hood coverage with an air extraction system. To date the contractors have reviewed the area and have designed a bespoke system to install onsite.

Proposed system drawings have been delivered from the designers and requests for quotations for installation have been sent to preferred contractors. It is of note that due to the Global Pandemic (COVID19) and following UK governmental guidance the installation of the system has been delayed forecasted for completion in early 2021.

- (g) *Maintain furnace sealing.*

Only Applicable on the Concast, Strip Mill and Cominco

- (h) *Maintain the temperature in the furnace at the lowest required level.*

Only Applicable on the Concast, Strip Mill and Cominco

- (i) *Apply a hood at the tapping point, ladles and drossing area with an air extraction system.*

EnerSys Ltd have hoods present at the tapping point, ladles and drossing area that extract the air to prevent or reduce diffuse emissions from charging, smelting and tapping operations in lead and/or tin production where practicable to do so. However, due to the age and location of some plant and equipment (i.e. the strip mill) installation of hood extraction on the existing system is not possible. Currently EnerSys Ltd is currently engaged with external contractors who are designing a bespoke system that include the installation of motorised dampers which are capable of channelling maximum extraction to desired point at the push of a button, This removing the need for complete hood coverage of the area.

- (j) *Pre-treatment of dusty raw material such as palletisation.*

Applicable only when the process and the furnace can use pelletised material.

- (k) *Apply a doghouse for ladles during tapping.*

It has been determined through review that EnerSys Ltd do not tap its furnace(s) due to the design of the furnace. As a result, the application of a doghouse for ladles during tapping has been deemed as being non applicable. Instead of tapping EnerSys Ltd pours the material through a spout onto the mould. Furthermore, as discussed previously EnerSys Ltd is currently engaged with external contractors who are in the process of designing a bespoke system that include the installation of motorised dampers which are capable of channelling maximum extraction to desired point at the push of a button.

- (l) *An air extraction system for charging and tapping area connected to a filtration system.*

All Lead melting processes have extraction over the melting pot, lead is loaded via ingot feeders or chip system into extracted pots

- EnerSys Ltd ensures compliance through the use of d, e and h. d capture hoods are in place on all charging points e: operations are carried out in enclosed buildings, h: furnace temperatures are maintained at the lowest required temperatures.

BAT 93

In order to prevent or reduce diffuse emissions from re-melting, refining and casting in primary and secondary lead and/or tin production, BAT is to use a combination of the techniques given below:

-  (a) *Hood on the crucible furnace or kettle with an air extraction system*

Only applicable on the Concast, Strip Mill, Cominco and Lead Reclaim

-  (b) *Lids to close the kettle during the refining reactions and addition of chemicals*
Not Applicable

-  (c) *Hood with air extraction system at launders and tapping points*

Extraction at strip mill tapping and drossing points, EnerSys Ltd has engaged with an external contractor to look at a system to enable extraction velocity to be increased when required at push of button. Investigation into hood extraction however due to existing equipment in that area it is not feasible at this time due to the size and location of existing plant and equipment. However, going forward when replacing and upgrading existing equipment will look to comply with BAT. Furthermore, the Cominco pot has mechanical auto-drosser enclosed and the bath has local extraction over drossing point. Additionally, the Concast has local extraction over drossing points.

-  (d) *Temperature control of the melt*
Compliance - Only applicable on the Concast, Strip Mill, Cominco and Lead Reclaim.

-  (e) *Closed mechanical skimmers for removal of dusty dross/residues*

Where possible Bespoke auto-drosser has been installed. Where auto-drossers has not been installed on existing plant and equipment closed mechanical skimmers are currently not applicable.

On investigation of installing closed mechanical skimmers on existing plant and equipment Manufacturer of the smelters and auto-drossers have been contacted. Discussions have been undertaken regarding the processes conducted within EnerSys Ltd facility and it was determined through onsite meetings and with the manufacturer that the systems that the manufacturer offer are not suitable for the facilities processes.

Furthermore, due to space constraints and limited space available around the current plant and equipment installed onsite installation of closed mechanical skimmers are not suitable for the concast and strip mill processes.

BAT 94

In order to reduce dust and metal emissions to air from raw material preparation (such as reception, handling, storage, metering, mixing, blending, drying, crushing, cutting and screening) in primary and secondary lead/or and tin production, BAT is to use a bag filter.

BAT-associated emission levels for dust emissions to air from raw material preparation in primary and secondary lead and/or tin production the associated monitoring is in BAT 10.

Dust $\leq 5\text{mg/Nm}^3$ as a daily average or as an average over the sampling period



In order to reduce dust and metal emissions to air from raw material preparation (such as reception handling and storage), EnerSys Ltd has installed appropriate abatement equipment which is used on channelled dust emissions. Oxide mills have bag filters and absolute filters EnerSys Ltd also has wet scrubber systems onsite. The abatement equipment is made up of 3 bag house filters (filter bags) 2 cartridge filter bag houses and 2 wet scrubbers). Point source emissions are on the permit. Under the permit mills (A1, A2, A3 and A63) are monitored for lead every month (see table below for the figures for June). All other stacks are monitored once per quarter, Continuous monitors are in place on the Mills, with dust being monitored annually in compliance with permit requirements.

Re total dust, Initial dust testing results taken in 2020 are $<5\text{mg/m}^3$, see table below.

Date of Sampling	Process/Equipment	Stack ref	Result mg/m^3	Limit mg/m^3	Compliance
05/02/2020	Mill 1	A1	0.52	5	Yes
05/02/2020	Mill 2	A2	0.45	5	Yes
04/05/2020	Mill 3	A3	0.16	5	Yes
11/05/2020	Grey Oxide Blower	A4	0.56	5	Yes
04/05/2020	Strip Mill (Wet)	A6	0.63	5	Yes
10/02/2020	Cominco (Wet)	A8	2.29	5	Yes
05/05/2020	Cell 2 APE	A9	0.39	5	Yes
06/05/2020	Cell 2 Fume	A10	0.15	5	Yes
07/05/2020	Lead Reclaim	A11	0.22	5	Yes
11/05/2020	Chip Handling	A12	0.17	5	Yes
05/05/2020	Pasting	A13	0.43	5	Yes
01/05/2020	Mill 4	A63	0.28	5	Yes

Further sampling being planned quarterly in 2020 to gain baseline information and annually thereafter meeting the requirement of EnerSys Ltd Environmental Permit (NP3030BJ) Requirement

BAT 95

In order to reduce dust and metal emissions to air from battery preparation (crushing, screening and classifying), BAT is to use a bag filter or a wet scrubber. BAT-associated emission levels for dust emissions to air from battery preparation (crushing, screening and classifying) $Dust \leq 5 \text{ mg/Nm}^3$ as an average over the sampling period. The associated monitoring is in BAT10.



Not Applicable - no battery preparation on site.

BAT 96

In order to reduce dust and metal emissions to air (other than those that are routed to the sulphuric acid or liquid SO₂ plant) from charging, smelting and tapping in primary and secondary lead and/or tin production, BAT is to use a bag filter. BAT-associated emission levels for dust and lead emissions to air (other than those that are routed to the sulphuric acid or liquid SO₂ plant) from charging, smelting and tapping in primary and secondary lead and/or tin production.

Dust $2\text{--}4\text{mg/Nm}^3$ (1) (2)

Pb $\leq 1 \text{ mg/Nm}^3$ (3)

(1) As a daily average or as an average over the sampling period.

(2) Dust emissions are expected to be towards the lower end of the range when emissions are above the following levels: 1 mg/Nm^3 for copper, 0.05 mg/Nm^3 for arsenic, 0.05 mg/Nm^3 for cadmium.

(3) As an average over the sampling period.



Emissions are in compliance - Pb $<1\text{mg/Nm}^3$ and Particulate $<5\text{mg/Nm}^3$ on testing completed so far. This is achieved via wet scrubbers on the three casting processes. Results are submitted to NRW quarterly. Quarterly stack testing for lead carried out by AnChem. Alarms (PCME) are present on the oxide mills and EnerSys Ltd monitors the pressure differential on the scrubber systems and bag houses via the TPM process. See the table below for the figures for 2020 Calendar Year (CY).

Date of Monitoring	Emission Point	Sample No	Substance to be monitored	Periodic monitoring Result mg/m ³	Annual Average mg/m ³	Emission limit value
05/02/2020	A1	95519/1	Total lead (as Pb)	0.02	0.04	1.00 mg/Nm ³
05/02/2020	A2	95519/2		0.02	0.12	1.00 mg/Nm ³
04/05/2020	A3	96333/3		0.01	0.07	1.00 mg/Nm ³
11/05/2020	A4	96333/4		0.03	0.25	0.75 mg/Nm ³
01/05/2020	A6	96333/6		0.04	0.04	1.00 mg/Nm ³
06/02/2020	A8	95519/8		0.21	0.21	1.00 mg/Nm ³
05/05/2020	A9	96333/9		0.02	0.05	0.75 mg/Nm ³
06/05/2020	A10	96333/10		<0.01	0.03	1.00 mg/Nm ³
07/05/2020	A11	96333/11		0.01	0.04	1.00 mg/Nm ³
07/05/2020	A12	96333/12		0.01	0.27	0.75 mg/Nm ³
05/05/2020	A13	96333/13		0.01	0.03	1.00 mg/Nm ³
01/05/2020	A63	96333/63		0.01	0.03	1.00 mg/Nm ³

BAT 97

In order to reduce dust and metal emissions to air from re-melting, refining and casting in primary and secondary lead and/or tin production, BAT is to use the techniques given below:



- (a) *For pyrometallurgical processes: maintain the temperature of the melt bath at the lowest possible level according to the process stage in combination with a bag filter.*

EnerSys Ltd maintains the temperature of the melt bath at the lowest possible level according to the process stage in combination with a bag filter.



- (b) *For hydrometallurgical processes: use a wet scrubber*
Not Applicable

BAT-associated emission levels for dust and lead emissions to air from re-melting, refining and casting in primary and secondary lead and/or tin production
Dust 2-4mg/Nm³⁽¹⁾⁽²⁾
Pb ≤ 1 mg/Nm³⁽³⁾

-  (1) As a daily average or as an average over the sampling period.
-  (2) Dust emissions are expected to be towards the lower end of the range when emissions are above the following levels: 1 mg/Nm³ for copper, 1 mg/Nm³ for antimony, 0.05 mg/Nm³ for arsenic, 0.05 mg/Nm³ for cadmium.
-  (3) As an average over the sampling period

Pb and dust emissions comply, see table in BAT 94/96 for evidence.

BAT 98

In order to reduce emissions of organic compounds to air from the raw material drying and smelting process in secondary lead and/or tin production, BAT is to use one or a combination of the techniques given below. (Descriptions of the techniques are given in Section 1.10.)

-  (a) *Select and feed the raw materials according to the furnace and the abatement techniques used*
Not Applicable
-  (b) *Optimise combustion conditions to reduce the emissions of organic compounds*
Not Applicable
-  (c) *Afterburner or regenerative thermal oxidiser*
Not Applicable - no raw material drying or smelting processes on site.
-  *BAT-associated emission levels for TVOC emissions to air from the raw material drying and smelting process in secondary lead and/or tin production TVOC 10-40 mg/Nm³. As a daily average or as an average over the sampling period. The associated monitoring is in BAT 10.*
Not Applicable

BAT 99

In order to reduce PCDD/F emissions to air from the smelting of secondary lead and/or tin raw materials, BAT is to use one or a combination of the techniques given below:

-  (a) *Select and feed the raw materials according to the furnace and the abatement techniques used.*
Not Applicable
-  (b) *Use charging systems, for a semi-closed furnace, to give small additions of raw material⁽¹⁾.*
Not Applicable
-  (c) *Internal burner system for melting furnaces⁽¹⁾.*
Not Applicable

- ☐ (d) Afterburner or regenerative thermal oxidiser⁽¹⁾.
Not Applicable
- ☐ (e) Avoid exhaust systems with a high dust build-up at temperatures > 250 °C⁽¹⁾.
Not Applicable
- ☐ (f) Rapid quenching⁽¹⁾.
Not Applicable
- ☐ (g) Injection of adsorption agent in combination with efficient dust collection system⁽¹⁾.
Not Applicable
- ☐ (h) Use of efficient dust collection system.
Not Applicable
- ☐ (i) Use of oxygen injection in the upper zone of the furnace.
Not Applicable
- ☐ (j) Optimise combustion conditions to reduce the emissions of organic compounds⁽¹⁾
Not Applicable

BAT-associated emission levels for PCDD/F emissions to air from the smelting of secondary lead and/or tin raw materials. Parameter BAT-AEL (ng I-TEQ/Nm³)⁽¹⁾
PCDD/F ≤ 0,1⁽¹⁾ As an average over a sampling period of at least six hours.

BAT 100

In order to prevent or reduce SO₂ emissions to air (other than those that are routed to the sulphuric acid or liquid SO₂ plant) from charging, smelting and tapping in primary and secondary lead and/or tin production, BAT is to use one or a combination of the techniques given below:

- ☐ (a) Alkaline leaching of raw materials that contain sulphur in the form of sulphate. An alkali salt solution is used to remove sulphates from secondary materials prior to smelting.
Not Applicable
- ☐ (b) Dry or semi-dry scrubber.
Not Applicable
- ☐ (c) Wet scrubber
Not Applicable
- ☐ (d) Fixation of sulphur in the smelt phase. The fixation of sulphur in the smelt phase is achieved by adding iron and soda (Na₂CO₃) in the smelters which react with the sulphur contained in the raw materials to form N₂S-FeS slag.
BAT-associated emission levels: See below:

BAT-associated emission levels for SO₂ emissions to air (other than those that are routed to the sulphuric acid or liquid SO₂ plant) from charging, smelting and tapping in primary and secondary lead and/or tin production. SO₂ 50-350mg/Nm³. As a daily average or as an average over the sampling period. When wet scrubbers are not applicable, the upper end of the range is 500 mg/Nm³.

Not Applicable.

SO₂ emissions from charging, smelting and tapping operations are not applicable as these processes are not carried out at EnerSys Ltd.

BAT 101

1.4.2 Soil and groundwater protection



In order to prevent the contamination of soil and groundwater from battery storage, crushing, screening and classifying operations, BAT is to use an acid-resistant floor surface and a system for the collection of acid spillages.

Crushing, screening and classifying operations are not carried out at EnerSys Ltd. Batteries are stored as finished product, batteries are fully sealed units, storage area has no clean or foul drainage systems internally. Operators are trained in spill response procedures. Spill kits provided on forklift trucks and localised spill kits

BAT 102

1.4.3 Wastewater generation and treatment



In order to prevent the generation of wastewater from the alkaline leaching process, BAT is to reuse the water from the sodium sulphate crystallisation of the alkali salt solution

Not Applicable as there is no alkaline leaching process at EnerSys Ltd.

BAT 103

1.4.3 Wastewater generation and treatment



In order to reduce emissions to water from battery preparation when the acid mist is sent to the wastewater treatment plant, BAT is to operate an adequately designed wastewater treatment plant to abate the pollutants contained in this stream.

Not Applicable as EnerSys Ltd has no battery preparation process which results in acid mist going to a wastewater treatment plant. When EnerSys Ltd generates acid mist (Battery Formation), the acid is not sent to the onsite wastewater treatment plant. The acid mist is collected and is disposed of via licenced waste contractor.

BAT 104

1.4.4 Waste

In order to reduce the quantities of waste sent for disposal from primary lead production, BAT is to organise operations on site so as to facilitate process residues reuse or, failing that, process residues recycling, by using one or a combination of the techniques given below:

- ☐ (a) *Reuse of the dust from the dust removal system in the lead production process.*
Not Applicable
- ☐ (b) *Se and Te recovery from wet or dry gas cleaning dust/ sludge*
Not Applicable.
- ☐ (c) *Ag, Au, Bi, Sb and Cu recovery from the refining dross*
Not Applicable.
- ☐ (d) *Recovery of metals from the wastewater treatment sludge*
Not Applicable
- ☐ (e) *Addition of flux materials that make the slag more suitable for external use*
Not Applicable.

BAT 104 is not applicable as at EnerSys Ltd lead waste streams are not sent for disposal but to a smelter for reprocessing.

BAT 105

1.4.4 Waste

- ☐ *In order to allow the recovery of the polypropylene and polyethylene content of the lead battery, BAT is to separate it from the batteries prior to smelting.*

Not Applicable - no smelting takes place on site.

BAT 106

1.4.4 Waste

In order to reuse or recover the sulphuric acid collected from the battery recovery process, BAT is to organise operations on site so as to facilitate its internal or external reuse or recycling, including one or a combination of the techniques given below:

- ☐ (a) *Reuse as a pickling agent.*
Not Applicable.
- ☐ (b) *Reuse as raw material in a chemical plant.*
Not Applicable.
- ☐ (c) *Regeneration of the acid by cracking.*
Not Applicable.

- ☐ (d) *Production of gypsum.*
Not Applicable.
- ☐ (e) *Production of sodium sulphate.*
Not Applicable.

BAT 106

1.4.4 Waste

In order to reduce the quantities of waste sent for disposal from secondary lead and/or tin production, BAT is to organise operations on site so as to facilitate process residues reuse or, failing that, process residues recycling, including by using one or a combination of the techniques given below:

- ☒ (a) *Reuse the residues in the smelting process to recover lead and other metals.*

Lead waste from the perforating process and other offcuts/scrap material is recovered directly by placing them back into the melting pots as a material. Furthermore, EnerSys Ltd recover and/or reuse residues from other processes such as lead produced in pasting and lead dross from processing.
- ☐ (b) *Treat the residues and the wastes in dedicated plants for material recovery.*
Not Applicable.
- ☐ (c) *Treat the residues and the wastes so that they can be used for other application.*
Not Applicable.