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| **Food, Drink and Milk Industries BREF (December 2019) – assessment of BAT** |
| **BAT Ref.** | **Indicative BAT Requirement** | **Compliance Level** |
| 1 | BAT is to implement and adhere to an Environmental Management System (EMS) that incorporates, the requirements as set out in Section 17.1.1 of the BREF. | The Installation has ISO14001 certified environmental management system (EMS) and an ISO50001 certified energy management system (EnMS). These were certified in May 2021 and June 2022, respectively. The new manufacturing activities will be incorporated in to these management systems, as required.These management systems are considered to address the indicative general BAT requirements. |
| 2 | Establish, maintain and regularly review an inventory of water, energy and raw materials consumption as well as waste water and waste gas streams as part of the EMS. | In accordance with the requirements of the Installation’s EMS, water, energy and raw material consumption and wastewater volumes discharged to sewer, are regularly reviewed.Thorntons maintain an inventory of energy consumption via the Carbon Desktop system which is subject to regular review.Thorntons prepares an annual Water Mass Balance for the facility which addresses water consumption for key areas of the facility.The new manufacturing activities will be incorporated in to these management systems, as required, to enable the monitoring and review of water, energy and raw material consumption, and the generation of waste water and waste gas streams associated with these new activities. |
| 3 | Emissions to water – monitor key process parameters at key locations e.g., at the point where the emissions leave the Installation. | Process effluent from the proposed activities is discharged under consent to municipal sewer following initial settlement and pH adjustment, if required, on site. The proposed manufacturing activities will not significantly change the composition of the waste water treated on site. The effluent quality is monitored prior to discharge to sewer in accordance with the requirements of the discharge consent and in accordance with the current Environmental Permit for the Installation. Specifically, the effluent monitoring regime comprises: * Weekly effluent flow measurement from the installed continuous flow meter.
* Regular (at least 4 times per week) visual and operational checks of the effluent system by Thorntons, including checking the effluent pH.
* The appointed water treatment company samples and arranges for analysis by a third-party laboratory of a monthly sample of the treated effluent. Analysis is undertaken for suspended solids, COD, phosphorous and pH, in accordance with the requirements of the effluent discharge consent.
* Severn Trent Water Limited samples the treated effluent approximately 1 - 3 times a week, the samples being analysed for COD, suspended solids and pH.

Uncontaminated surface water is discharged to surface water via a separate surface water drainage system. There are no proposed changes to surface water drainage arrangements. |
| 4 | Monitor emissions to water with at least the frequency given below and in accordance with EN standards … or other international standards… | See BAT 3. |
| 5 | Monitor channelled emissions to air with at least the frequency as detailed in the BREF. | BAT 5 does not apply to this manufacturing activity (i.e. confectionary manufacture).Point source emissions to air associated with proposed changes will include :* 2 natural gas fired boilers serving the hazelnut roaster (each being 1.01MWth) one of which will be a duty standby, therefore only one boiler will operate at any one time) (2 new emission points to air).
* Buhler oven (FCE manufacturing process) (O.4MWth) - two new emission points to air; and
* Steam hazelnut roaster – six new emission points to air.

In accordance with the Medium Combustion Plant Directive (MPCD) 2015, the Buhler oven is excluded medium combustion plant, however combustion emissions from the 2 natural gas-fired steam raising boilers will be required to meet the MCPD emission limit value (ELV) as stated in as stated in Table 1, Part 2 of Annex II of the MCPD for nitrogen oxides (NOx) for new medium combustion plant of **100mg/m3**.The new combustion plant will be monitored in accordance with the requirements of the MPCD, specifically Annex III. NOx emissions monitoring will be undertaken within 4 months of issue of the varied environmental permit, and every three years (which is relevant for MCP with a rated thermal input equal to or greater than 1 MW and less than or equal to 20 MW). |
| 6 | Energy efficiency – to improve energy efficiency, BAT is to use one or a combination of the techniques as described in the BREF. | The Installation has implemented environmental and energy management systems as detailed in BAT 1.Thorntons also maintains an inventory of energy consumption via the Carbon Desktop system which is subject to regular review. These management systems and inventory of energy consumption are considered to address the requirements of BAT 6 with respect to an energy efficiency plan.Refer to energy efficiency BAT assessment below for the techniques to be used for energy efficiency associated with the proposed changes. |
| 7 | Reduce water consumption and the volume of wastewater discharged using one or a combination of the techniques as detailed in the BREF. | As part of the EMS, water consumption and wastewater generation are monitored and regularly reviewed. Thorntons maintain an inventory of energy consumption via the Carbon Desktop system which is subject to regular review.Techniques that will be used for the proposed changes to reduce water consumption, and the volume of wastewater discharged at the facility, will include:* Clean in place (CIP) systems which recycle cleaning water and optimise the dosing of cleaning chemicals;
* The use of optimised water hoses and nozzles to enable the adjustment of water pressure;
* Dry cleaning will completed prior to wet cleaning of process lines.
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| 8 | Prevent or reduce the use of harmful substances using one of a combination of the techniques as detailed in the BREF. | Cleaning chemicals in use at the facility are approved for use in food manufacturing processes. The chemicals currently in use at the site will be used for the cleaning of the proposed manufacturing and process areas for FCE and Nutella; the proposed changes will not result in the introduction of new cleaning chemicals to the permitted Installation. CIP systems will be installed on the new process, where required. All chemicals used on site are subject to a Control of Substances Hazardous to Health assessment (COSHH), this includes assessment of the potential environmental hazards. Thorntons ensures that all hazardous chemicals are stored appropriately to minimise the risk of release to the environment. |
| 9 | In order to prevent emissions of ozone-depleting substances and of substances with a high global warming potential from cooling and freezing, BAT is to use refrigerants without ozone depletion potential and with a low global warming potential. | Not applicable.The proposed changes will not result in the addition of refrigerants. |
| 10 | To increase resource efficiency BAT is to use one or a combination of the techniques as detailed in the BREF such as anaerobic digestion of biodegradable residues, use or separation of residues, etc. | Waste streams are segregated at the facility. All waste generated at the site is either sent for recycling, anaerobic digestion, animal feed or used for energy related purposes. No waste is disposed of to landfill. Wastes generated as a result of the proposed changes will be managed in the manner. |
| 11 | To prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for wastewater. | Process effluent is subject to simple screening to trap fats and greases, settlement in a final settlement chamber and pH adjustment, if required, prior to consented discharge. An inspection chamber (Flume Chamber) is provided for the sampling of treated effluent prior to the point of discharge into the municipal sewer. The settlement chamber and Flume Chamber will provide buffer storage capacity to enable the adjustment of the effluent quality if required to prior to consented discharge to sewer.The proposed changes are estimated to generate an additional 6,740m3 of wastewater annually (circa 28.9m3/day) which will be discharged to sewer via the effluent treatment system, based on:* Nutella – circa 6,600m3 annually (based on 240 days production per year equates to circa 27.5m3/day); and
* FCE - circa 140 m3 annually (based on 170 days production per year equates to circa 1.4m3/day).

Currently the Installation is discharging on average 130m3/day. The volume of treated wastewater which will be discharged to sewer via emission point FW1 will not exceed the consented maximum discharge limit of 350m3/24-hour period.Additionally, buffer capacity of the wastewater treatment system is not considered necessary as a result of the proposed changes. |
| 12 | To reduce emissions to water, BAT is to use an appropriate combination of techniques detailed in the BREF. | Refer to BAT 3.The BAT AELs for the discharge of direct emissions to a receiving water body do not apply. Only clean uncontaminated surface water runoff is discharged to surface water. The proposed manufacturing activities do not make any changes to the discharge of surface water from the Installation.  |
| 13 | To prevent or reduce noise, BAT is to set up, implement and regularly review a noise management plan as part of the EMS that includes the elements as detailed in the BREF. | BAT 13 is only applicable to cases where a noise nuisance at sensitive receptors is expected and/or has been substantiated.The facility does not have a history of complaints from nearby residents or businesses, with only 1 complaint being raised several years ago regarding an externally located chiller unit, which was addressed by the installation of an acoustic barrier.Results from the noise assessment, as submitted with this environmental permit variation application, which focussed on additional HGV movements as the main potential source of additional noise concluded that the proposed changes will not result in a noise nuisance at identified sensitive noise receptors. The development of a noise management plan associated with the proposed changes is not considered necessary; the EMS will address any requirements with respect to noise.The be production activities will be undertaken within the existing production buildings with the external storage in bulk tanks of some raw material. New production equipment will be designed in accordance with European noise standards with respect to noise generation. The new equipment will be subject to regular preventative maintenance in accordance with the manufacturer’s requirements.  |
| 14 | To prevent or reduce noise emissions, BAT is to use one or a combination of the techniques detailed in the BREF. | Refer to BAT 13The proposed new production activities will be undertaken within the existing production buildings. All proposed production equipment will be designed in accordance with European noise standards; the equipment will subject to regular preventative maintenance in accordance with the manufacturer’s requirements.  |
| 15 | To prevent or reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan as part of the EMS that includes the elements as detailed in the BREF (BAT 14 is only applicable to cases where odour nuisance at sensitive receptors is expected and/or has been substantiated). | Results from odour assessment….The proposed activities undertaken at the facility will not inherently generate significant odours. Thorntons ensures the implementation of good working practices and the correct use and maintenance of plant to minimise potential for odours.To date odour complaints have not been received by the facility; the EMS will address any requirements with respect to odour. |

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| **Reference Document on Best Available Techniques for Energy Efficiency, February 2009 – Assessment of BAT** |
| **BAT Ref.** | **BAT** | **Indicative BAT Requirement** | **Compliance Level** |
| 1 | **Energy management System** | BAT is to implement an Energy Management System.Continuously minimise the environmental impact of an installation by planning actions and investment on an integrated basis… considering the cost benefits and cross media effects. | The Installation has an EnMS certified to the ISO 50001 standard. This was re-certified in June 2022. The Environmental and Energy Manager has received all necessary training to deliver the standard. |
| 2 | Budget guidelines for energy and environment are fulfilled on an annual basis, including a full capex plan for improvements. Thorntons has in place an energy efficiency strategy for utilities and plant equipment and provides training on energy and environment across site to support a behavioural campaign. |
| 3 | Identify aspects of an installation that influence energy efficiency by carrying out an audit. | In accordance with the EnMS, energy audits include these aspects. |
| 4 | When carrying out and audit, ensure that the audit identifies the following aspects:* Energy use and its component systems and processes;
* Energy using equipment and type and quantity of energy used in the installation;
* Possibilities to minimise energy use; and
* Possibilities to use alternative sources or use of energy that is more efficient.
 | In accordance with the EnMS, energy audits include these aspects. |
| 5 | Use tools or methodologies to assist with identifying and quantifying energy optimisation. | Group Energy Management procedures defines the tools. A copy of this procedure can be reviewed at the Thornton’s facility on request. |
| 6 | Identify opportunities to optimise energy recovery… | In accordance with the EnMS, energy audits include the consideration of opportunities to optimise energy recovery. |
| 7 | Optimise energy efficiency by taking a systems approach to energy management. | Refer to BAT 1. |
| 8 | Establish energy efficiency indicators by:* identifying suitable energy efficiency indicators for the installation, and where necessary individual processes, systems, units and measure change over time;
* Identifying and recording appropriate boundaries associated with the indicators
* Identifying and recording factors that can cause variance in energy efficiency of the process, system, units.
 | The plant has energy efficiency KPIs in place. The Group Energy Management procedure sets out and defines methodologies for utilities monitoring. |
| 9 | BAT is to carry out… comparisons with sector, national or regional benchmarks, where validated data is available. | A monthly report is submitted to Group which allows benchmarking across all of the Ferrero plants. |
| 10 | **Energy** **efficient design (EED)** | Optimise energy efficiency when planning a new installation, unit or system or significant upgrade by considering:* Initiating EED at early design stage…
* Development/selection of energy efficient technologies
* EED should be carried out by an energy expert
* Initial mapping of energy consumption should also be addressed which parties in the project organisations influence the future energy consumption, and should optimise the energy efficiency design of the future plant.
 | Energy efficiency has been considered at the beginning of the Nutella and FCE manufacturing projects through the implementation of the internal procedure ‘Energy Aspects in Technical Projects’. All new capex projects must be signed off by the Environment and Energy, Quality, H&S and Production Managers and all projects go through an environmental and energy risk assessment procedure. |
| 11 | **Increased process integration** | Seek to optimise the use of energy between more than one process or system with the installation or with a third party. | The design of the new production activities does include the consideration the optimisation of use of energy between more than one process. The optimisation with a third party will not be possible. |
| 12 | **Managing and maintaining the impetus of energy efficiency initiatives** | Maintain the impetus of the energy efficiency programme by using a variety of techniques such as:* Implementing specific energy efficiency measures
* Accounting for energy usage based on real (metered) values…
* Creation of financial profit centres for energy efficiency
* Benchmarking
* Fresh look at existing management systems
* Using change management techniques
 | Benchmarking is carried out against other Ferrero plants through monthly reporting mechanisms.Energy sub-metering is undertaken.The EnMS includes energy KPIs which are regularly reviewed. Change management processes include the consideration of energy efficiency/optimisation. |
| 13 | **Maintaining expertise** | * Maintain expertise in energy efficiency and energy using systems by using:
* Skilled staff
* Training staff off line periodically…
* Sharing in-house resources between sites
* Use of appropriately skilled consultants
* Outsourcing specialist systems and/or functions.
 | Environment and Energy Manager has received relevant training in order to implement and audit the ISO50001 EnMS and has support from an internal audit team. Additionally, there is support from Ferrero Engineering, as and when required and support from other internal Group experts.Energy awareness training and communications is provided for operatives. Part of the Ferrero Professional Family network seeks to connect plants and facilitates the share of knowledge and best practice. |
| 14 | **Effective control of processes** | Ensure that the effective control of processes is implemented by… | Operating procedures have been developed for the Installation and staff are suitably trained in the operation and maintenance of plant and equipment to ensure optimal operation. |
| 15 | **Miantenance** | Carry out maintenance to optimise energy efficiency by… | The facility has a Preventative Maintenance Programme in place; the maintenance of proposed equipment will be undertaken in accordance with manufacturer’s requirements to ensure the efficiency, including energy efficiency, of equipment is maintained.Designated maintenance personnel undertake the required maintenance activities; where required specialist contractors will be appointed to undertake maintenance of specific equipment. Records of maintenance are retained at the facility. |
| 16 | **Monitoring and measurement** | Establish and maintain documented procedures to monitor on a regular basis key characteristics of operations and activities that can have a significant impact on energy efficiency | Implementation of Group Procedure on Energy Management incorporating energy KPIs for utilities and machinery and equipment. |
| 17 | **Combustion** | Optimise energy efficiency of combustion… | The proposed changes will involve the use of existing and new on-site steam systems. The proposed steam raising boilers serving the hazelnut steam roaster and the Buhler oven for waffle production will subject to regular maintenance and servicing in accordance with manufacturer requirements to ensure optimal operation and minimisation of combustion emissions. |
| 18 | **Steam systems** | Optimise the energy efficiency by using techniques such as … | The proposed changes will use the existing on site steam systems; the hazelnut steam roaster will be served by two new steam raising boilers (each 1.01MWth, one being a duty standby). These new boilers will be selected based energy efficiency, amongst other relevant criteria, and operated to minimise energy use. |
| 19 | **Heat recovery** | Maintain efficiency of heat exchangers by monitoring the efficiency periodically and preventing/removing fouling. | Heat exchangers will be monitored periodically for efficiency and subject to cleaning periodically to prevent/remove fouling. |
| 20 | **Cogeneration** | Seek possibilities for cogeneration inside or outside the Installation (with a third party) | Not applicable |
| 21 | **Electrical power supply** | BAT is to increase the power factor according to the requirements of the local electricity distributor by using techniques such as … | Power factor is considered when developing new plant and equipment. Equipment will be operated according to its rated voltage, and energy efficient motors will be installed. |
| 22 | BAT is to check the power supply for harmonics and apply filters if required. | Not applicable |
| 23 | BAT is to optimise the power supply efficiency by using techniques such as… | Not applicable |
| 24 | **Electric motor driven sub systems** | Optimise electric motors… | The proposed changes will be designed to include the use of high-efficiency correctly sized motors. |
| 25 | **Compressed air systems** | Optimise compressed air systems by … surveys and fixing of leaks | The leak prevention programme will be expanded to include the planned changes, as required. |
| 26 | **Pumping systems** | Optimise pumping systems | For the proposed changes pumping systems will be designed/specified to the correct sizing; oversized pumps will not be specified. All new pumps will be correctly matched to the motor duty. The pumps and motors will be subject to regular PPM. All pipework will be designed to the correct diameter for the designated activity and pipeline layouts designed to minimise the need for bends and valves.  |
| 27 | **HVAC systems** | Optimise HVAC systems using techniques such as ….. Free cooling in warehouse, programme of replacing chillers and HVAC system (AHUs) and implementing an EE strategy | Not applicable.New HVAC systems are not proposed as part of the planned changes. |
| 28 | **Lighting** | Optimise artificial lighting systems by using techniques such as… | Not applicable for the proposed changes as these will be installed on the existing site. |
| 29 | **Drying, separation and concentration processes** | Optimise drying, separation and concentration processes by using techniques such as… | Not applicable |