AN APPLICATION TO VARY ENVIRONMENTAL PERMIT NUMBER EPR/ZP3831DX IN RESPECT OF THE ASH PROCESSING PLANT AT FIDDLERS FERRY, WARRINGTON, CHESHIRE

TECHNICAL DESCRIPTION DOCUMENT

Report reference: TIC/FF/AW/5778/01/TDD
November 2025

Technical advisers on environmental issues

Baddesley Colliery Offices, Main Road, Baxterley, Atherstone, Warwickshire, CV9 2LE
Tel. (01827) 717891

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APPENDICES

Appendix TD A Copies of Technical Data Sheets for the Atritor dryers and the electrostatic separator

Appendix TD B Copies of technical performance data sheets for the gas and diesel generators

1. Introduction

1.1 MJCA is commissioned by Titan Cement UK Limited (Titan) to prepare an application to vary Environmental Permit number EPR/ZP3831DX (the APP permit) for the Ash Processing Plant (APP) at Fiddlers Ferry, Widnes Road, Cuerdley, Warrington, Cheshire, WA5 2UT (the site). The APP permit boundary is shown edged in green on Figure TD 1 and covers an area of approximately 2 hectares. An application to transfer the APP permit from Peel NRE Developments Acquisitions No.1 Limited (Peel) to Titan was submitted to the Environment Agency on 21 July 2025 and was duly made on 22 October 2025. It is assumed that the Transfer Notice will be issued prior to the determination of this application to vary the permit.

1.2 This document comprises a technical description of the proposed APP.

1.3 An enhanced pre-application advice meeting was held with the Environment Agency on 4 February 2025 to discuss the scope of the variation application and formal pre-application advice was provided by the Environment Agency in a letter dated 27 February 2025. A copy of the pre-application advice is presented at Appendix A of the application to vary the permit. This technical description document has been prepared with reference to the letter dated 27 February 2025 in which the Environment Agency advised that the following details would be required to support the application to vary the permit:

- Air Quality Modelling Assessment – Prepared by Isopleth Limited (Appendix F)
- BAT Assessment - report reference TIC/FF/AW/5778/01/BAT (Appendix D)
- Dust and Emissions Management Plan - report reference TIC/FF/AW/5778/01/DEMP (Appendix I)
- Environmental Risk Assessment - report reference TIC/FF/AW/5778/01/ERA (Appendix H)
- H1 Risk Assessment using EA Tool (Appendix E)
- Process flow information – Section 2 and Figure TD 2 of this report
- Air emissions monitoring requirements – See Table 1a and 1b of this report.

2. Description of the proposed activities

2.1 Titan are proposing to install new plant and equipment at the APP to facilitate the storage and processing of Coal Derived Fly Ash (CDFA) at the site consistent generally with the activity which is already permitted to be undertaken at the site under Activity reference S5.4 A(1)(b)(iii) of the Environmental Permitting (England and Wales) Regulations 2016 (as amended) (EPR 2016). There are no proposed changes to the permit boundary, the waste types accepted at the site or the maximum annual throughput of the plant which will remain at 500,000 tonnes per year. An overview of the process is presented in the flow diagram shown on Figure TD 2 and is discussed below.

2.2 CDFA is currently permitted to be extracted from Fiddlers Ferry Ash Lagoons A, B and D pursuant to Environmental Permit number EPR/BR6791IJ (the Lagoon permit) operated currently by Peel. The Lagoon permit authorises the treatment of CDFA by crushing, screening or other physical grading. The Lagoon permit boundary is shown in red on Figure TD 1.

2.3 Environmental Permit number EP25/7 was issued to Titan on 9 September 2025 by Warrington Borough Council for the grading and screening of designated mineral comprising CDFA stockpiled in Fiddlers Ferry Area E. The Area E permit boundary is shown in blue on Figure TD 1.

2.4 CDFA, which will naturally be damp prior to processing in the APP, will be transferred from the ash lagoons and from Area E to the APP using open topped trucks travelling on existing Fiddlers Ferry Power Station site roadways. The vehicle access route to the APP is shown on Figures TD 3a and 3b[1]. Figures TD 4a and 4b show an illustrative site layout of the APP. Infrastructure coloured grey on Figures TD 4a and 4b are existing infrastructure and proposed new buildings and infrastructure are shown on Figures TD 4a and 4b in blue. The APP permit area currently comprises an existing processing building (the larger of the two grey buildings shown on Figures TD 4a and 4b) which houses CDFA processing equipment together with a smaller existing storage shed to the south (the smaller of the two grey buildings shown on

[1] Note – the differences between Figure 3a and Figure 3b and between Figure 4a and Figure 4b are explained in paragraph 2.11 in relation to two different Scenarios for the plant set up.

Figures TD 4a and 4b) which is connected to the processing building by raised pipework/a conveyor. Three storage silos are located external to the buildings. New buildings and two additional silos will be constructed in later phases of the development as shown in blue on Figures TD 4a and 4b.

2.5 CDFA will be stockpiled in the existing shed to the south of the processing building and in the proposed extensions to the storage building located to the north and northeast of the existing building prior to treatment in the processing building. Storage inside a building will provide a barrier to emissions of particulate matter, albeit that the CDFA will naturally be damp prior to processing hence is unlikely to comprise a significant source of emissions of particulate matter. The moisture content of the CDFA will vary seasonally depending on ambient temperature and local rainfall. Prior to the extension of the storage buildings, CDFA will be transferred to the processing building either via an enclosed conveyor or will be transported by loading shovel into the processing building.

2.6 The first stage of the process is drying using Atritor Dryer Pulverisers, which deagglomerate the material and dry it in one process using streams of warm air. Details of the Dryer Pulverisers are presented on the Atritor website[2] and the operation of the plant is summarised below. A technical data sheet for the Atritor Dryer Pulverisers is presented at Appendix TD A to this report. CFDA is conveyed via an open conveyor inside the processing building to a hopper which feeds the Atritor Dryer Pulverisers. The air is heated using natural gas as consented in the current APP permit. The heater for each drying unit will have a capacity of 4 megawatts. It is planned that up to six drying units will be installed. The dryers will be installed in stages to eventually achieve the maximum throughput of 500,000tpa. The Environment Agency confirmed in the pre-application advice that as the Atritor Dryer Pulverisers use direct heat for the drying of minerals, the MCPD (medium combustion plant directive) does not apply. Air emissions from the heater and exhausts from the dryers will be fed into six new 0.8m diameter stacks at an approximate height of 17.6m above ground (1m above the roof height) as shown protruding from the roof of the processing building on Figures TD 4a and 4b, with 1 stack serving each individual dryer. Table S3.1 of the permit specifies the emission limits for point source emissions

[2] https://atritor.com/products/dryer-pulveriser/

to air from the dryer vent which were agreed with the Environment Agency pursuant to pre-operational condition PO2 of the permit. The Environment Agency agreed in Compliance Assessment Report (CAR) form reference ZP3831DX/0312340 dated August 2018 an emission limit for particulate matter (dust) of 30mg/Nm^3 for the vent stack associated with the dryer, and agreed that no emission limits were applicable for oxides of nitrogen or carbon monoxide. An extract from the CAR form is copied below:

> The pre-operational conditions are completed, a proposed monitoring regime has been provided by the operator for PO2, dated 04 December 2017. The proposed emission limit values and monitoring Schedule contained within it are accepted. The following parameters will be monitored by periodic monitoring on an annual basis from emission point A1 (dryer): particulate matter, oxides of nitrogen and carbon monoxide. Particulate matter will have a limit set of 30mg/m3. No limit will be set for oxides of nitrogen or carbon monoxide as the impacts were determined following assessment to be insignificant and there are limited controls on the dryer burner. The proposed annual monitoring regime will confirm that the unit continues to perform at the anticipated standard and subject of the assessment. Reporting reference conditions are agreed as: corrected to dry air at a temperature of 273k, pressure 101.3kPa and oxygen content of 16%.

2.7 Fabric filters will be installed to abate the emissions of particulate matter (dust) from the vent stacks associated with the Atritor Dryer Pulverisers. The fabric filter will comprise a porous woven fabric through which the hot air will pass, and the dust particles will be collected by the filter. The fabric filter will be selected based on the characteristics (including temperature) of the waste gas and will be specified to achieve a maximum emission rate of 10mg/m^3. This represents a significant reduction in the dust emission rate in comparison to the limit of 30mg/m^3 specified currently in Table S3.1 of the permit for the emissions of particulate matter from the dryer vent. As explained in the BAT assessment (Appendix D) the use of a fabric filter to abate emissions of dust comprises BAT.

2.8 An H1 air emissions screening assessment, supplemented by an air emissions dispersion modelling assessment has been carried out to demonstrate that the emissions will not have an unacceptable impact on the surrounding environment. The H1 and modelling present an assessment of the emissions based on the assumption that the APP is fully operational with all six dryers installed and operational. The H1 and the modelling assessment include consideration of the emissions of oxides of nitrogen, carbon monoxide and particulate matter based on the conservative assumption that the particle size of all particulate matter present is less than 10 microns (i.e. PM_{10}) and that the release concentration comprises the maximum

emission rate of 10mg/m^3. The H1 assessment is presented at Appendix E and the air quality modelling assessment is presented at Appendix F. Periodic stack monitoring for emissions of oxides of nitrogen, carbon monoxide and particulate matter will be undertaken by a suitably qualified specialist contractor. Details of the parameters to be monitored, emission limits and monitoring frequency are presented in Table 1a and Table 1b of this report which will comprise Table S3.1 of the APP permit following the variation of the APP permit. The Environment Agency confirmed in the pre-application advice that the silo vents do not comprise emission points hence there are no limits or monitoring requirements associated with the silo vents. As confirmed by the Environment Agency in the pre-application advice, "*Regarding the silos, the emission points would be classified as fugitive emissions. This is because there is no active emission from these points, and they are used to regulate pressure.*" The point source emission locations from the stacks associated with the Atritor Dryer Pulverisers are shown on Figures TD 3a and 3b, together with the locations of the silo vents for illustrative purposes. The Emission point references on Figures TD 3a and 3b correspond to the references in Table 1a and Table 1b.

2.9 Heat exchangers will be fitted to the warm air stream exiting the filters on the dryers and the cooling of this warm air stream results in a small proportion of the water in the air stream condensing in the exchanger. This condensed water will be collected and stored in one or more water tanks at the APP. The captured condensed water will be re-used at the site as necessary for wetting product carbon during discharge to tankers from the storage silos at the site and for dust suppression on site. Further details in respect of the management at the site of the condensed water are presented in Section 4 of the Application Report.

2.10 Once dried, the CDFA is removed from the dryer(s) via an enclosed screw conveyor and pneumatically blown through enclosed pipework into intermediate feed storage silo(s) located internal to the processing building prior to being introduced to the electrostatic separation process.

2.11 The second stage of the process is to separate the mineral and carbon materials in the dried, deagglomerated CDFA using electrostatic separators located in the processing building. Details of the separation plant are presented on the ST

Equipment and Technology website[3] and the operation of the separator is summarised below. A specification sheet for the electrostatic separators is presented at Appendix TD A. The CDFA is pneumatically blown through enclosed pipework from the intermediate feed storage silo into the electrostatic separators. The dry CDFA material is fed between two flat plate electrodes where the mineral particles are attracted to the negative plate and the carbon particles (from the unburnt coal) are attracted to the positive plate. A plastic belt cleans the electrodes and transports the two different products to the separator outlets. Up to three Atritor Dryer Pulverisers will be supported by one electrostatic separator therefore two separators will be installed in the processing building. The system is under vacuum with exhausts passed through a dust collector located inside the building which minimises the potential for dust emissions. Following separation, the mineral and carbon outputs are pneumatically blown through enclosed pipework into the storage silos located outside of the building. The external silos are fitted with high level alarms and bag filters. The mineral will be stored dry and discharged through connecting pipework directly into dry bulk tankers. The carbon will be offloaded through connecting pipework directly into bulk tankers either dry or wet (20% moisture) with water to be taken from mains supply or re-used condensed water collected during the earlier drying process, depending on customer requirements. Load out points from the existing silos are already present on site.

2.12 It was originally intended that the ash treatment process would use the mains electricity supply already in place at the site. However, due to the practicalities associated with the redevelopment of the wider area around the former Fiddlers Ferry Power Station as part of the Development Framework authorised by Warrington Borough Council, a mains electricity supply will not be available in the short term and may not be installed for several years. Accordingly, in the short term the ash treatment process will be powered by two gas fuelled generators (1.4MW capacity each). There will also be two smaller diesel fuelled generators (0.4MW capacity each) that are used infrequently for start-ups of the processing equipment, where the gas generator cannot run at such a low power. The generators will be located in a screened compound to the east of the main APP building as shown on Figures TD

[3] https://steqtech.com/

4a and 4b. Exhaust outlets from the gas fuelled generators will either feed into two of the six proposed stacks associated with the dryers as shown on Figure 4a (Scenario 1) or into two additional stacks at the roof of the building (Scenario 2) as shown on Figure TD 4b. If two additional stacks are installed, they will be to the same height (17.6m above ground, 1m above the roof) as the six dryer stacks, but with a narrower diameter (0.4m compared with 0.8m for the dryer stacks). As it is currently uncertain when the mains supply will be re-installed, a conservative assumption has been made as part of the application and associated assessments that the gas fuelled generators will be in place for the duration of the operation.

2.13 As the proposed generators will have a capacity of greater than 1 MWth and less than 50MWth, the Medium Combustion Plant (MCP) regulations apply, however, as the ash processing activity already permitted at the site falls under Section 5.4 of the EPR 2016, the installation site comprises a Chapter 2 IED installation site, hence the specified generator regulations do not apply. As the MCP is part of an existing IED installation permit, it is necessary to vary the permit to include the MCP (rather than to apply for a standalone permit for the MCP). Although based on the minimum screening distances to protected habitat sites specified in Stage 1 of the air emissions risk assessment screening in the Environment Agency guidance[4] an air emissions risk assessment to assess the risks to habitats is not required, (as the MCP is not located within 1km of a Site of Special Scientific Interest or Marine Conservation Zone or Special Area of Conservation, Special Protection Area or Ramsar wetland), the emissions from the MCP have been modelled and assessed together with the emissions from the APP in the air quality assessment presented at Appendix F of the application to vary the permit. As the final design of the generators has yet to be determined, two scenarios have been modelled in the air quality assessment as follows:

Scenario 1

2.14 The layout for Scenario 1 is shown on Figure TD 3a and Figure TD 4a including the emission point references for the point source emissions. In Scenario 1, the emissions from the natural gas fuelled generators are vented directly through two of

[4] https://www.gov.uk/guidance/medium-combustion-plant-apply-for-an-environmental-permit Published 15 July 2019. Last updated 9 July 2025. Last accessed 30 October 2025.

the APP dryer stacks, currently assumed to comprise stacks A10 and A7. The emissions from the diesel fuelled generators are vented through the individual stacks associated with each of the diesel generators (emission point reference A12 and A13 on Figure TD 3a). The emission limits and monitoring requirements for the point source emissions for Scenario 1 are presented in Table 1a.

Scenario 2

2.15 The layout for Scenario 2 is shown on Figure TD 3b and Figure TD 4b including the emission point references for the point source emissions. In Scenario 2, the emissions from the natural gas fuelled generators are vented through two additional stacks at the roof of the building A14 and A15. The emissions from the diesel fuelled generators are vented through the individual stacks associated with each of the diesel generators as for Scenario 1 (emission point reference A12 and A13 on Figure TD 3b). The emission limits and monitoring requirements for the point source emissions for Scenario 2 are presented in Table 1b.

2.16 In the air quality assessment (Appendix F) it is concluded:

> *"Detailed air quality modelling using the AERMOD 13 dispersion model has been undertaken to predict the impacts associated with the operation of the ash dryers, natural gas fuelled engines and diesel generators.*
>
> *All impacts, human and ecological, are predicted to be below limit values at locations where the Air Quality Directive and Regulations, policies and guidance in England states that they must be applied. When applying the assumptions above it can be seen that there is no realistic potential for a breach of the air quality objectives at residences (or ecological sites)."*

2.17 The air quality modelling assessment was undertaken based on emissions data for an Aggreko 1787 kVA/1430kW NGG Generator set (gas generator) and an Aggreko Stage V 600kVA diesel generator. Copies of the technical performance datasheets for gas and diesel generators are provided at Appendix TD B. The datasheets confirm that both the gas and diesel generators are MCPD compliant. The final make and

model of generators will be confirmed during the commissioning of the plant. As explained in the air quality report, the modelling of emissions from the gas fuelled generators was undertaken at the relevant Medium Combustion Plant Emission Limit Value for oxides of nitrogen (see Table 1a and Table 1b) and the procured gas generator will be selected to meet the ELV.

TABLES

Table 1a
Point source emissions to air – emission limits and monitoring requirements – Scenario 1

Emission point ref & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A1	Silo	Dust	No limit set	-	-	-
A2	Silo	Dust	No limit set	-	-	-
A3	Silo	Dust	No limit set	-	-	-
A4	Silo	Dust	No limit set	-	-	-
A5	Silo	Dust	No limit set	-	-	-
A6	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A6	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A6	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A7	Dryer Vent/ gas generator	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A7	Dryer Vent/ gas generator	Carbon monoxide	No limit	Periodic	Six monthly	EN 15058
A7	Dryer Vent/ gas generator	Oxides of nitrogen	95 mg/Nm^3 Ref 1	Periodic	Six monthly	EN 14792
A8	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A8	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A8	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A9	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A9	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A9	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A10	Dryer Vent/ gas generator	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A10	Dryer Vent/ gas generator	Carbon monoxide	No limit	Periodic	Six monthly	EN 15058
A10	Dryer Vent/ gas generator	Oxides of nitrogen	95 mg/Nm^3 Ref 1	Periodic	Six monthly	EN 14792
A11	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A11	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A11	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A12	Diesel generator	Dust	No limit set	Periodic	Every 3 years	EN 13284-1
A12	Diesel generator	Carbon monoxide	No limit set	Periodic	Every 3 years	EN 15058
A12	Diesel generator	Oxides of nitrogen	N/A Ref 2	Periodic	Every 3 years	EN 14792
A13	Diesel generator	Dust	No limit set	Periodic	Every 3 years	EN 13284-1
A13	Diesel generator	Carbon monoxide	No limit set	Periodic	Every 3 years	EN 15058
A13	Diesel generator	Oxides of nitrogen	N/A Ref 2	Periodic	Every 3 years	EN 14792

Ref 1
DIRECTIVE (EU) 2015/2193 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants. Annex II Emission Limit Values referred to in Article 6. Part 2 Emission limit values for new medium combustion plants. Table 2 Emission limit values for new engines and gas turbines

Ref 2
The diesel generators will be operating for less than 500 hours per year.
https://www.gov.uk/guidance/medium-combustion-plant-mcp-comply-with-emission-limit-values#elv-exemptions
New MCPs operating less than 500 hours per year as a 3 year rolling average are exempt from meeting MCPD ELVs.

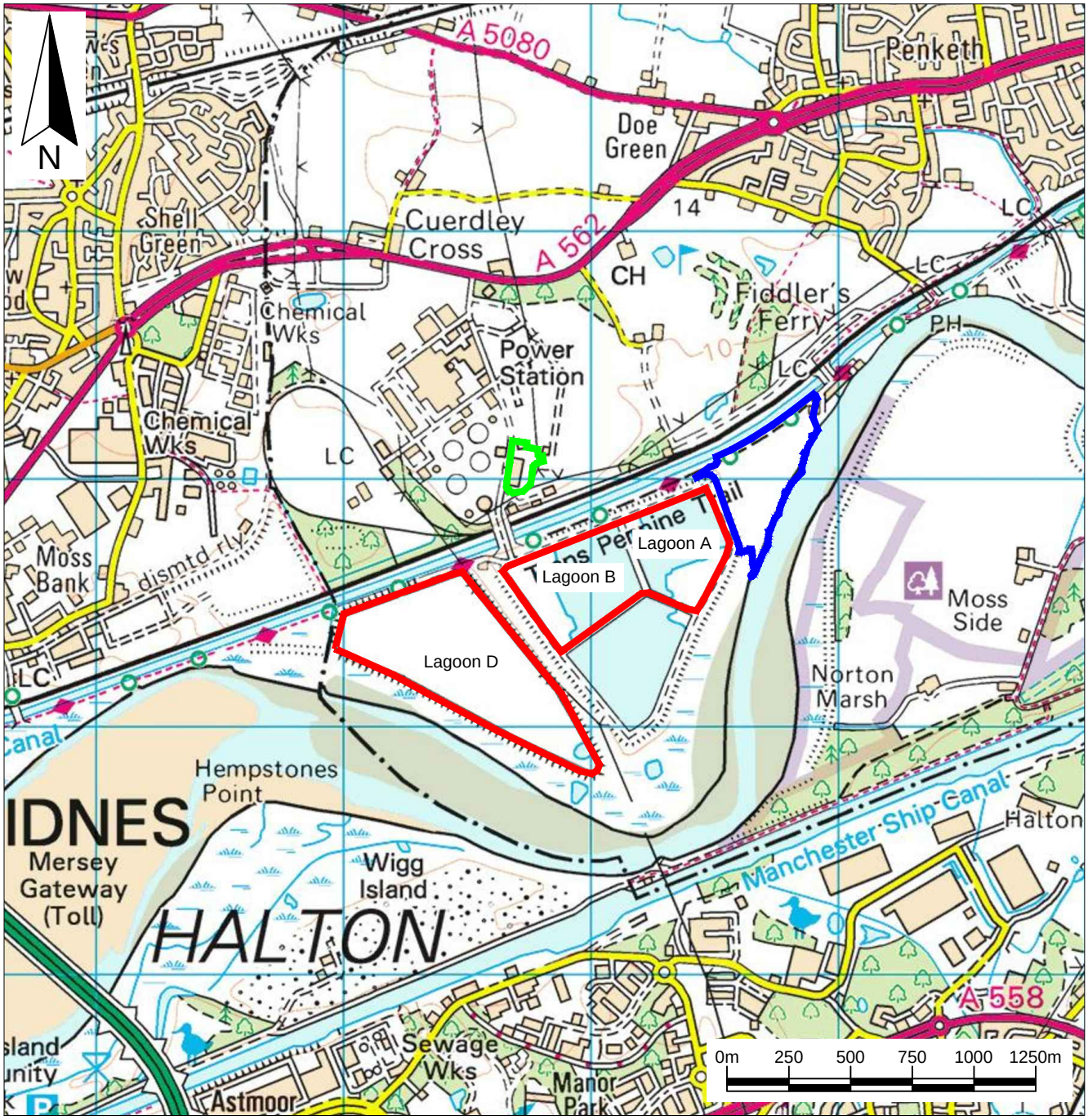
Table 1b
Point source emissions to air – emission limits and monitoring requirements – Scenario 2

Emission point ref & location	Source	Parameter	Limit (including unit)	Reference Period	Monitoring frequency	Monitoring standard or method
A1	Silo	Dust	No limit set	-	-	-
A2	Silo	Dust	No limit set	-	-	-
A3	Silo	Dust	No limit set	-	-	-
A4	Silo	Dust	No limit set	-	-	-
A5	Silo	Dust	No limit set	-	-	-
A6	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A6	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A6	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A7	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A7	Dryer Vent	Carbon monoxide	No limit	Periodic	Six monthly	EN 15058
A7	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A8	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A8	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A8	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A9	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A9	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A9	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A10	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A10	Dryer Vent	Carbon monoxide	No limit	Periodic	Six monthly	EN 15058
A10	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A11	Dryer Vent	Dust	10 mg/Nm^3	Periodic	Six monthly	EN 13284-1
A11	Dryer Vent	Carbon monoxide	No limit set	Periodic	Six monthly	EN 15058
A11	Dryer Vent	Oxides of nitrogen	No limit set	Periodic	Six monthly	EN 14792
A12	Diesel generator	Dust	No limit set	Periodic	Every 3 years	EN 13284-1
A12	Diesel generator	Carbon monoxide	No limit set	Periodic	Every 3 years	EN 15058
A12	Diesel generator	Oxides of nitrogen	N/A Ref 2	Periodic	Every 3 years	EN 14792
A13	Diesel generator	Dust	No limit set	Periodic	Every 3 years	EN 13284-1
A13	Diesel generator	Carbon monoxide	No limit set	Periodic	Every 3 years	EN 15058
A13	Diesel generator	Oxides of nitrogen	N/A Ref 2	Periodic	Every 3 years	EN 14792
A14	Gas generator	Oxides of nitrogen	95 mg/Nm^3 Ref 1	Periodic	Every 3 years	EN 14792
A14	Gas generator	Carbon monoxide	No limit set	Periodic	Every 3 years	EN 15058
A15	Gas generator	Oxides of nitrogen	95 mg/Nm^3 Ref 1	Periodic	Every 3 years	EN 14792
A15	Gas generator	Carbon monoxide	No limit set	Periodic	Every 3 years	EN 15058

Ref 1
DIRECTIVE (EU) 2015/2193 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 November 2015 on the limitation of emissions of certain pollutants into the air from medium combustion plants. Annex II Emission Limit Values referred to in Article 6. Part 2 Emission limit values for new medium combustion plants. Table 2 Emission limit values for new engines and gas turbines

Ref 2
The diesel generators will be operating for less than 500 hours per year.
https://www.gov.uk/guidance/medium-combustion-plant-mcp-comply-with-emission-limit-values#elv-exemptions
New MCPs operating less than 500 hours per year as a 3 year rolling average are exempt from meeting MCPD ELVs.

FIGURES



Key / Notes

Approximate boundary of Environmental Permit number EPR/ZP3831DX - Fiddlers Ferry Ash Processing Plant

Approximate boundary of Environmental Permit number EPR/BR6791IJ - Fiddlers Ferry Ash Lagoon (Peel NRE Development Acquisitions No.1 Limited)

Approximate boundary of Environmental Permit number EP25/7 for Area E issued to Titan on 9 September 2025 by Warrington Borough Council

Rev	Status	Drn	App	Chk	Date
	Final	KR	LRM	AW	11/11/25

Site: FIDDLERS FERRY

Client: Titan Cement UK Limited

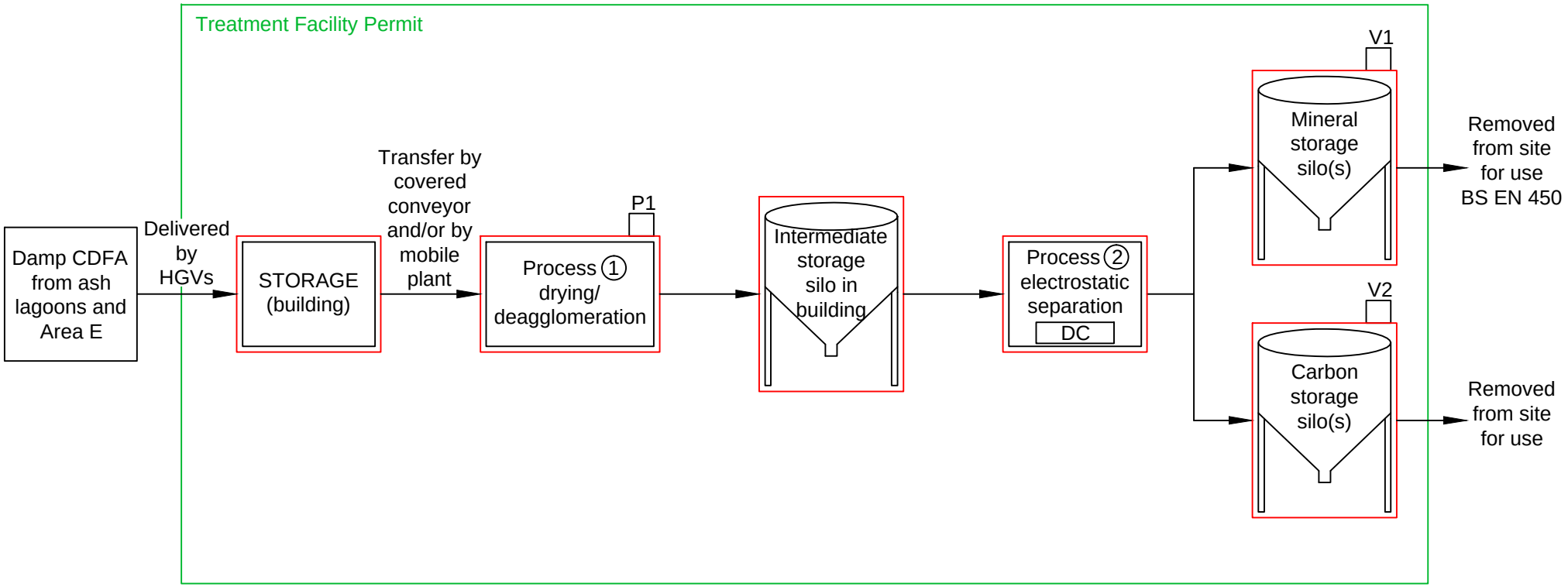
Title: Site layout

Figure TD 1

Scale: 1:25,000@A4

Drawing Ref: TIC/FF/09-25/25169

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
Warwickshire, CV9 2LE.
Telephone : 01827 717891
Fax : 01827 718507



The diagram shows a single process line, which at the final phase of project development will consist of up to 6 drying/deagglomeration units [Process 1] and 2 electrostatic separation units [Process 2] to achieve a throughput of 500,000 tpa.

Key / Notes

CDFA - Coal Derived Fly Ash

P - Emission point

P1 - Heater/dryer exhaust

DC - Dust collector

V1 - Silo vent

V2 - Silo vent

Containment silo or buildiing

Rev	Status	Drn	App	Chk	Date
	Final	KR	AW	AW	11/11/25

Site: FIDDLERS FERRY

Client: Titan Cement

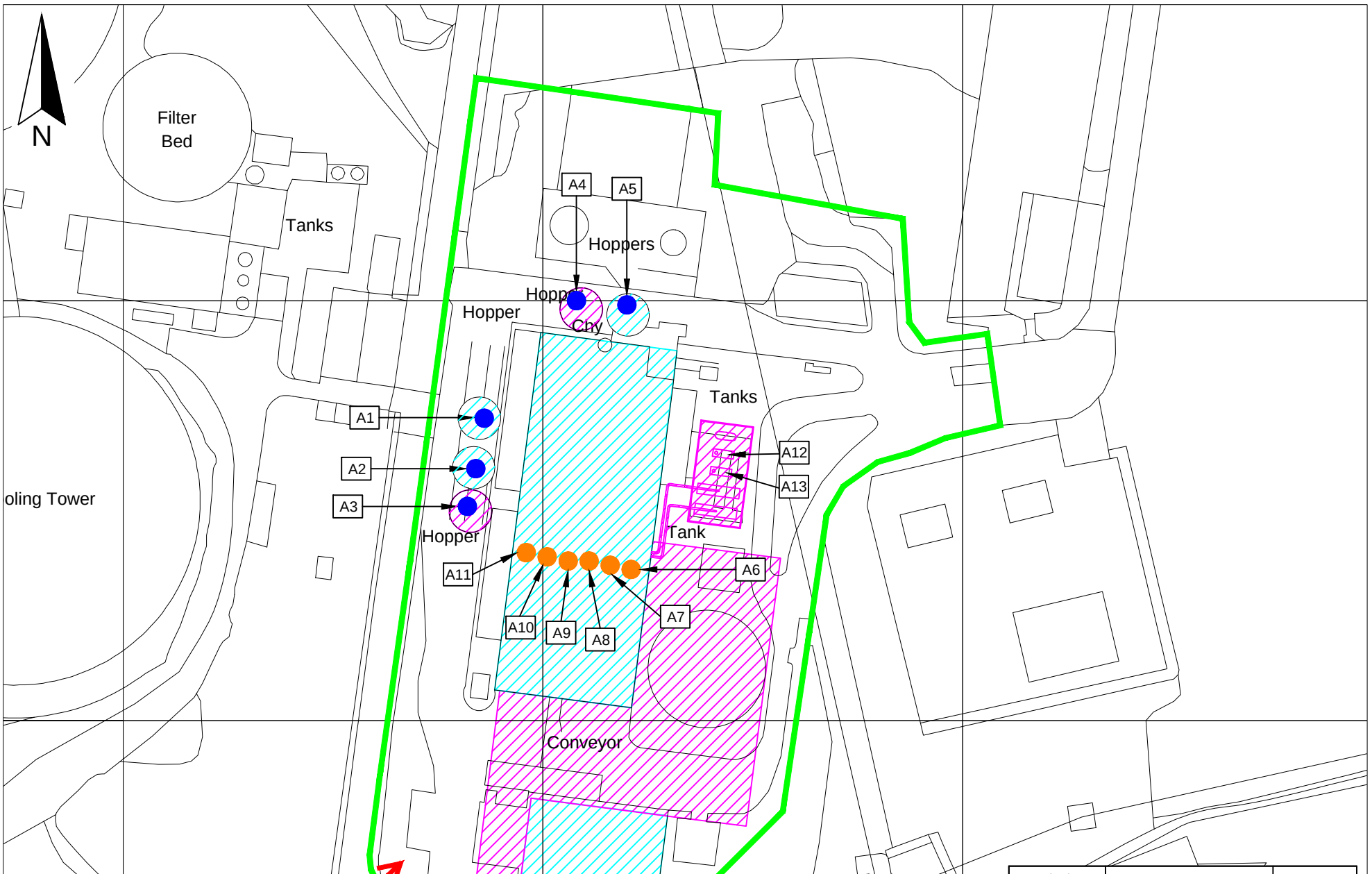
Title: Process flow diagram for the ash processing

Figure TD 2

Scale: NTS

Drawing Ref: TIC/FF/09-25/25167

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
Warwickshire, CV9 2LE.
Telephone : 01827 717891
Fax : 01827 718507



Emission point reference	Source	Note
A1	Product storage vent (Ash/Carbon)	Existing
A2	Product storage vent (Ash/Carbon)	Existing
A3	Product storage vent (Ash/Carbon)	Future
A4	Product storage vent (Ash/Carbon)	Future
A5	Product storage vent (Ash/Carbon)	Existing
A6	Dryer/Atritor stack	Future
A7	Dryer/Atritor stack	Future
A8	Dryer/Atritor stack	Future
A9	Dryer/Atritor stack	Future
A10	Dryer/Atritor stack	Future
A11	Dryer/Atritor stack	Future
A12	Diesel generator stack	Future
A13	Diesel generator stack	Future

Key / Notes

Approximate boundary of Environmental Permit EPR/ZP3831/DX/V002 (taken from RockTron drawing number FF-PL-11 included in the Enrionmental Permit)

Approximate location of existing building and infrastructure

Approximate location of proposed building and infrastructure

Approximate location of a silo or storage tank

Approximate location of stack emission points

A1 Emission points to air

Rev	Status	Drn	App	Chk	Date
	Final	KR	LRM	AW	11/11/25

Site: FIDDLERS FERRY

Client: Titan Cement

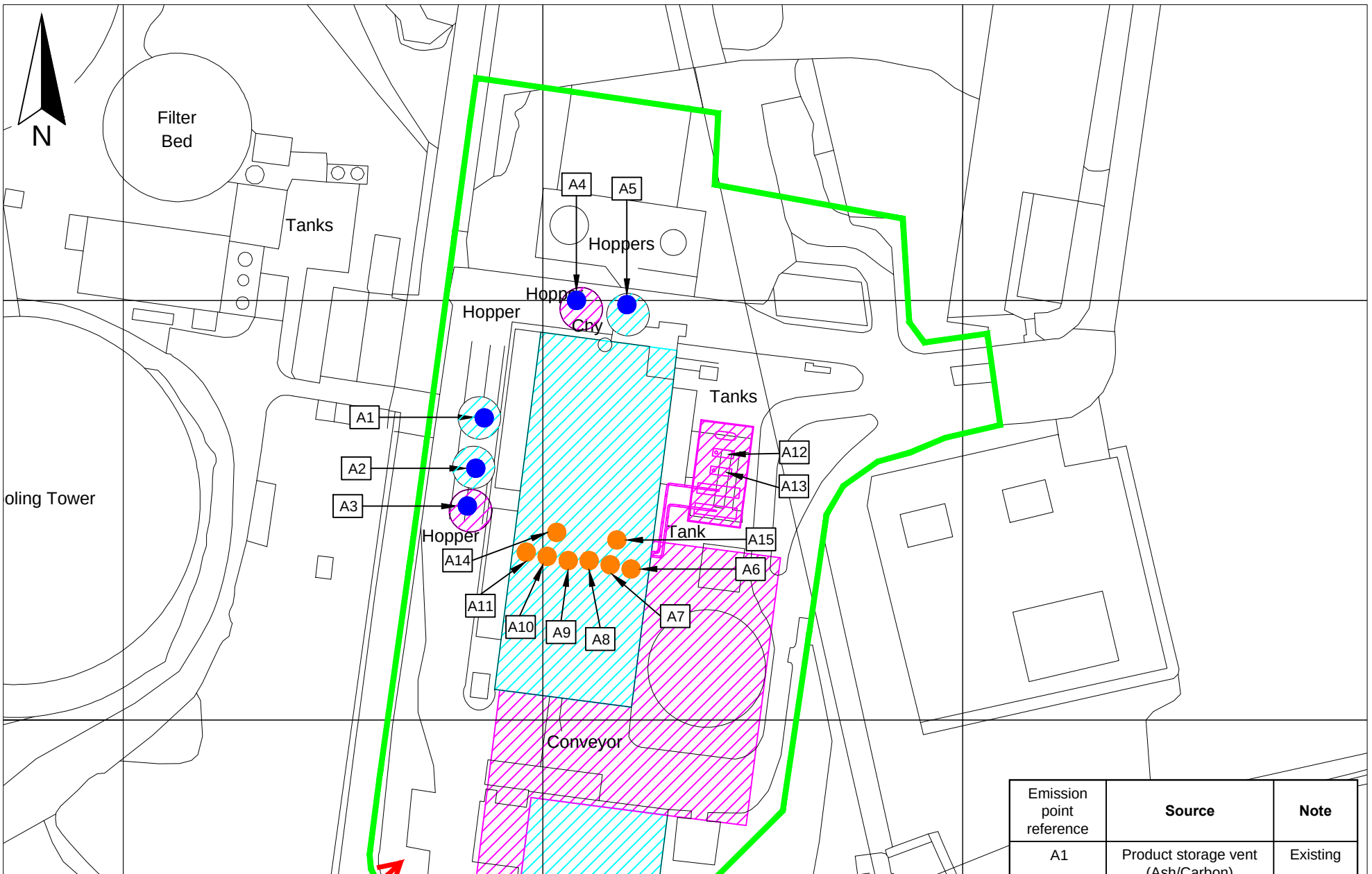
Title: The site layout and emission points - Scenario 1

Figure TD 3a

Scale: 1:1,250@A3

Drawing Ref: TIC/FF/03-25/24837

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
Warwickshire, CV9 2LE.
Telephone : 01827 717891
Fax : 01827 718507



Emission point reference	Source	Note
A1	Product storage vent (Ash/Carbon)	Existing
A2	Product storage vent (Ash/Carbon)	Existing
A3	Product storage vent (Ash/Carbon)	Future
A4	Product storage vent (Ash/Carbon)	Future
A5	Product storage vent (Ash/Carbon)	Existing
A6	Dryer/Atritor stack	Future
A7	Dryer/Atritor stack	Future
A8	Dryer/Atritor stack	Future
A9	Dryer/Atritor stack	Future
A10	Dryer/Atritor stack	Future
A11	Dryer/Atritor stack	Future
A12	Diesel generator stack	Future
A13	Diesel generator stack	Future
A14	Gas generator stack	Future
A15	Gas generator stack	Future

Key / Notes

Approximate boundary of Environmental Permit EPR/ZP3831/DX/V002 (taken from RockTron drawing number FF-PL-11 included in the Enrionmental Permit)

Approximate location of existing building and infrastructure

Approximate location of proposed building and infrastructure

Approximate location of a silo or storage tank

Approximate location of stack emission points

A1 Emission points to air

Rev	Status	Drn	App	Chk	Date
	Final	KR	LRM	AW	11/11/25

Site: FIDDLERS FERRY

Client: Titan Cement

Title: The site layout and emission points - Scenario 2

Figure TD 3b

Scale: 1:1,250@A3

Drawing Ref: TIC/FF/08-25/25106

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone,
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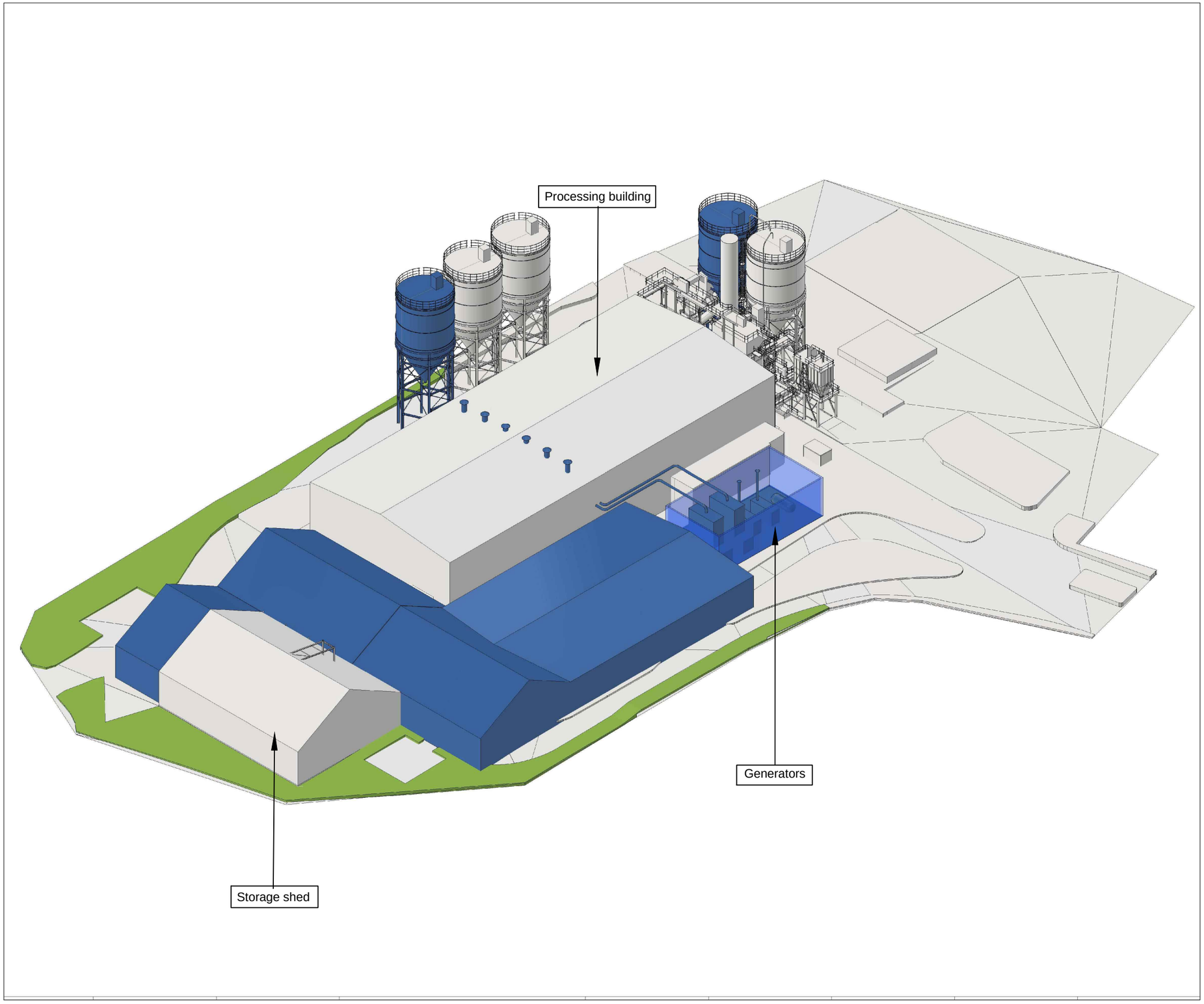

Key / Notes

Existing buildings and infrastructure

Proposed buildings and infrastructure

The details are indicative and may change subject to final design

Note:
Based on drawing reference C24003-056 P5

Rev	Status	Drn	App	Chk	Date
A	Updated image	KR	LRM	AW	11/11/25
	Draft	KR	AW	AW	16/09/25

Site
FIDDLERS FERRY

Client
Titan Cement

Title
Illustrative site layout - Scenario 1

Figure TD 4a

Scale
NTS

Drawing Ref
TIC/FF/08-25/25107revA

MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone
Warwickshire, CV9 2LE.
Telephone : 01827 717891
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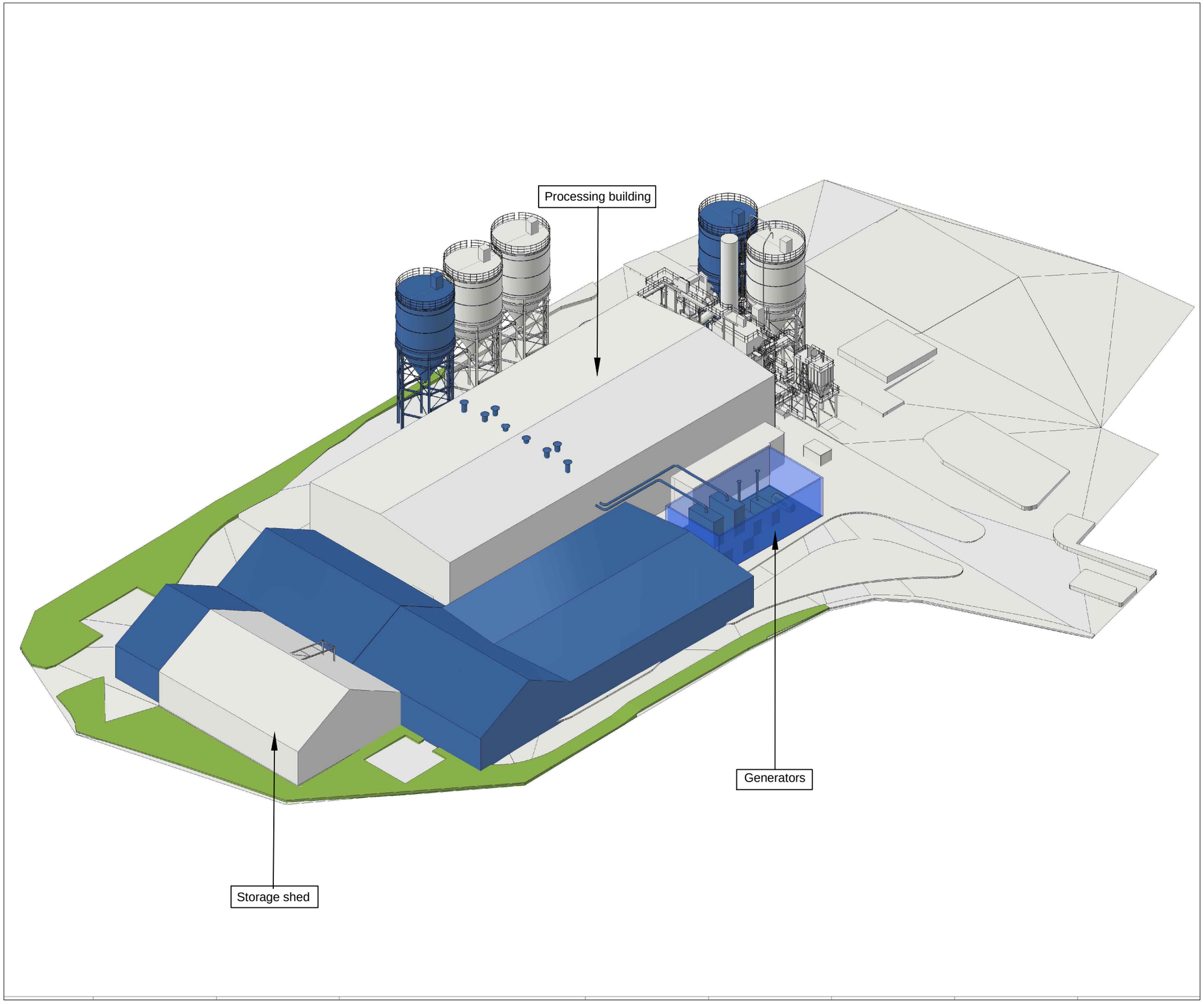


Key / Notes

Existing buildings and infrastructure

Proposed buildings and infrastructure

The details are indicative and may change subject to final design

Note:
Based on drawing reference C24003-056 P5

Rev	Status	Drn	App	Chk	Date
A	Updated image	KR	LRM	AW	11/11/25
	Draft	KR	AW	AW	16/09/25

Site
FIDDLERS FERRY

Client
Titan Cement

Title
Illustrative site layout - Scenario 2

Figure TD 4b

Scale
NTS

Drawing Ref
TIC/FF/08-25/25108revA

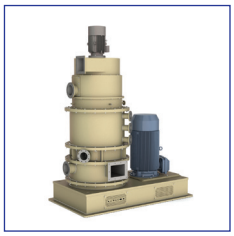
MJCA
Technical advisers on environmental issues
Baddesley Colliery Offices,
Main Road, Baxterley, Atherstone
Warwickshire, CV9 2LE.
Telephone : 01827 717891
Fax : 01827 718507

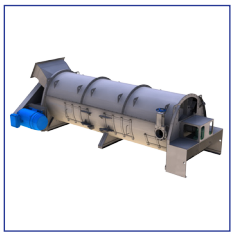
APPENDICES

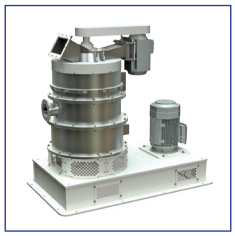
APPENDIX TD A

COPIES OF TECHNICAL DATA SHEETS FOR THE ATRITOR DRYERS AND THE ELECTROSTATIC SEPARATOR

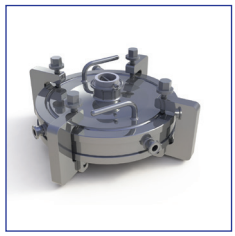
Other Equipment in the Atritor Range


Cell Mill


AST Dryer


Classifier Mill


Turbo Separator


Spiral Jet Mill

Complete Solutions

Atritor Limited has a history dating back over 90 years, and in that time the Company has gained a great deal of experience and expertise providing full process solutions to our customers. We work with our clients to understand their needs and to provide bespoke process systems.

We provide:

- Full plant design using the latest 3D and 2D software
- Detailed equipment design and specifications
- Full process control systems
- Manufacturing and supply of complete systems
- Installation, commissioning, training and service support
- Process guarantees

ATRITOR

ATRITOR LIMITED
PO Box 101
Blue Ribbon Park
Coventry
CV6 5RE
United Kingdom
Tel +44 (0) 2476 662266
Fax +44 (0) 2476 665751
Email sales@atritor.com

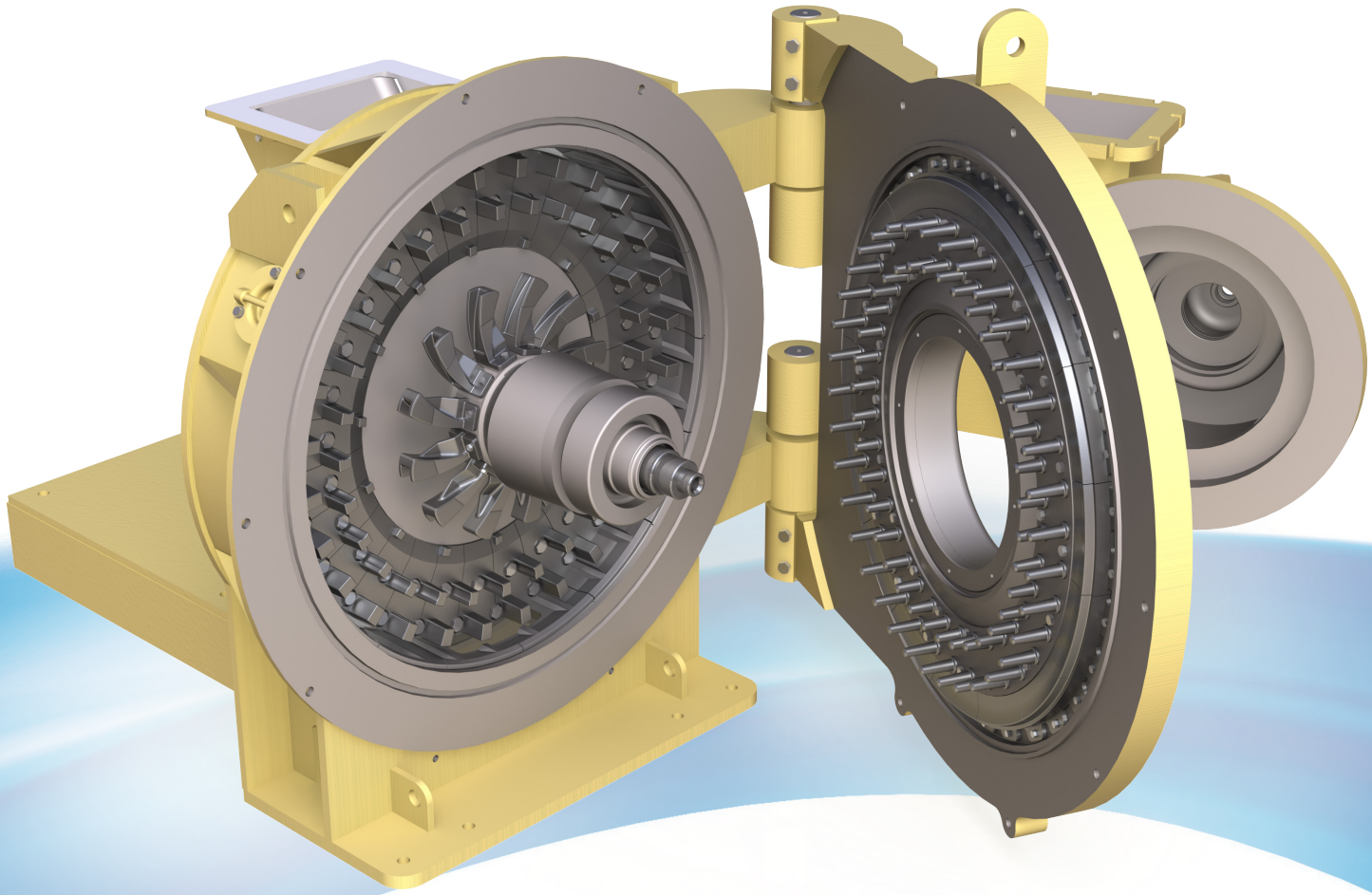
www.atritor.com

All Atritor equipment is built to the rigorous standards of ISO 9001:2008

BSI UKAS QUALITY MANAGEMENT 003

Certificate No. FM 11960

www.atritor.com



Dryer-Pulveriser

ATRITOR

The Company

Atritor Limited can trace its history back over 90 years. It is an independent company with its own UK-based manufacturing facility including an alloyed iron foundry, machine shop and assembly operation allowing Atritor complete control of the manufacture of its equipment. It has a full-scale pilot plant, engineering design office for new process and equipment design, and a full spare parts service with a significant stock of parts.

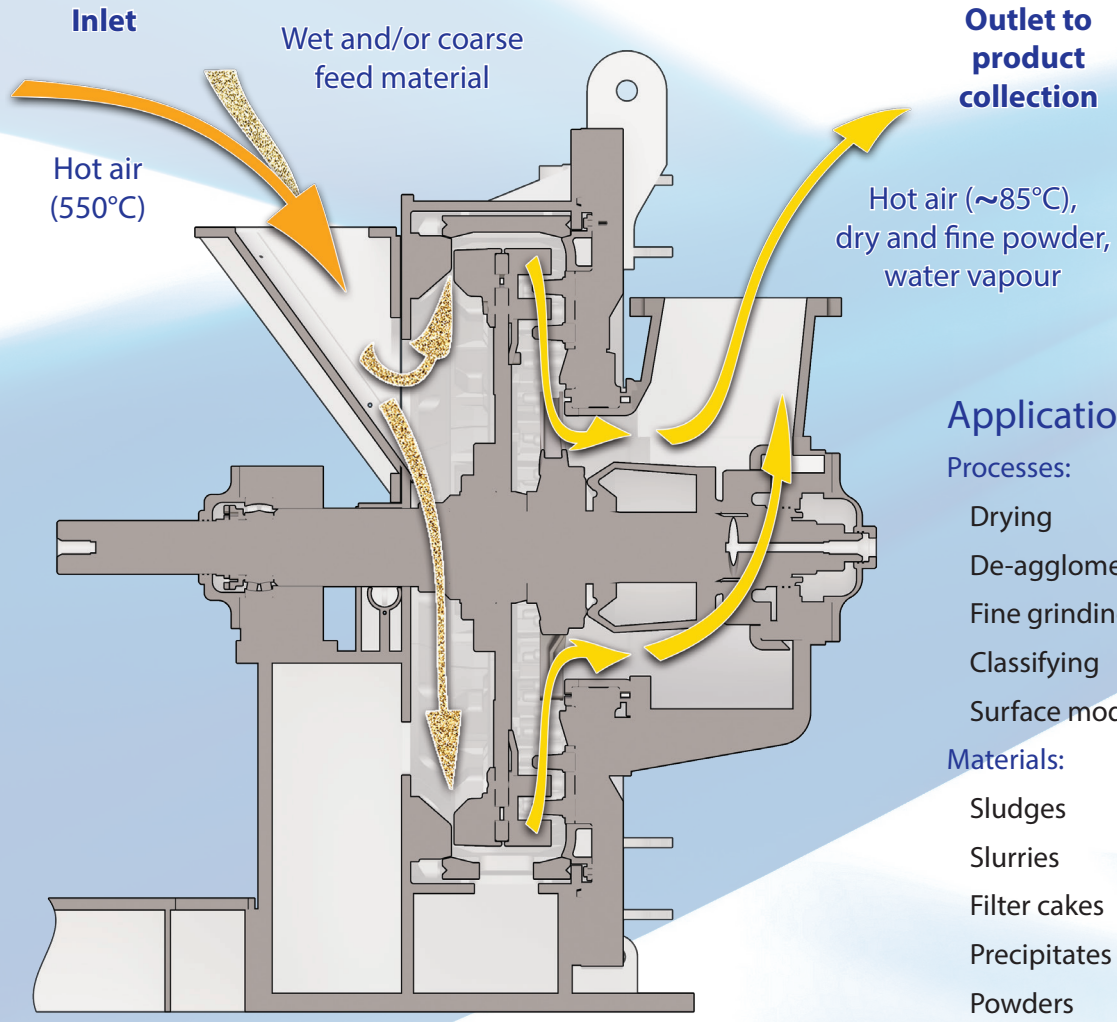
The Atritor Dryer-Pulveriser

The Atritor Dryer-Pulveriser is an air-swept mill, originally designed to produce pulverised fuels for combustion processes. It has subsequently been used for drying and milling hundreds of materials such as mineral fillers, chemical filter cakes and foodstuffs.

The Dryer-Pulveriser can accept feedstocks of up to 50mm and is available in various sizes with production capacities ranging from 250kg/h to 30t/h.

With the inlet air heated to 550°C the machine is an efficient dryer achieving water evaporation rates up to 4,200kg/h.

There are two types of Dryer-Pulveriser, the 'A'-series and the 'B'-series. The 'A'-series is built with cast iron wear resistant internals suitable for aggressive, higher wear applications. The 'B'-series has a lighter weight, fully-fabricated construction suitable for non-wearing duties, or for applications in which stainless steel contact parts are necessary.



Applications

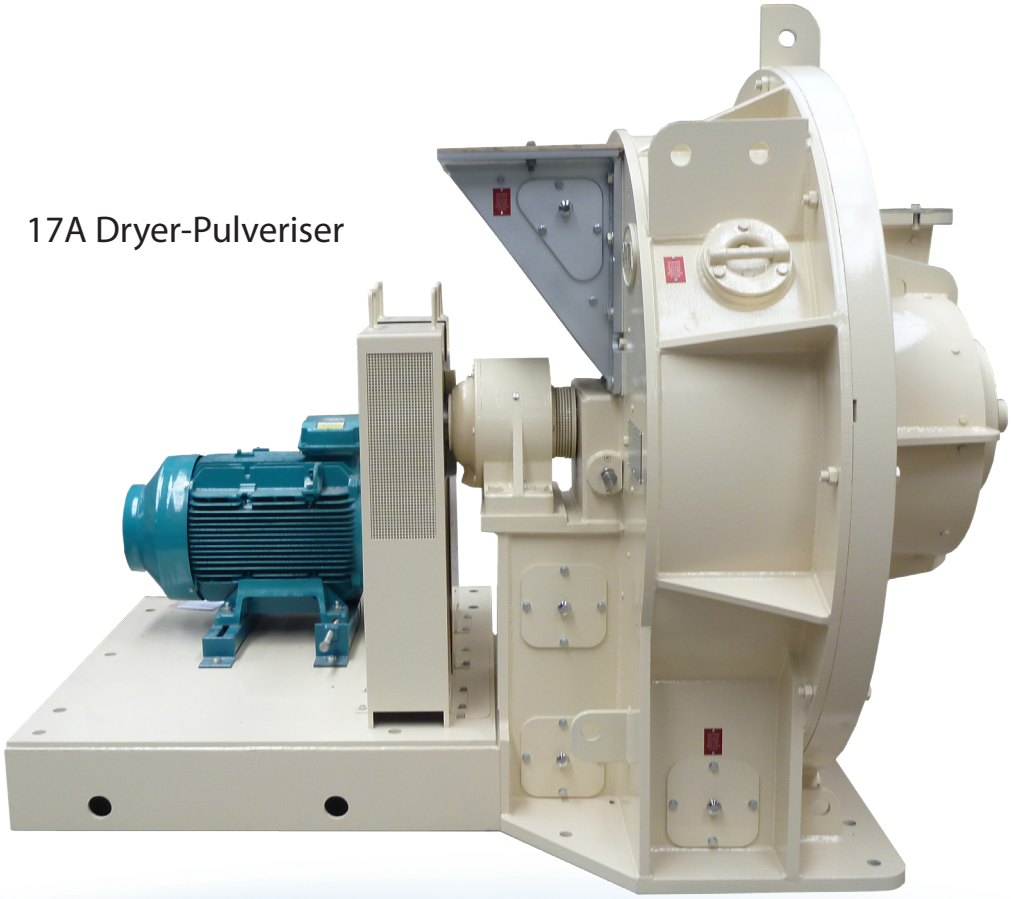
Processes:

- Drying
- De-agglomeration
- Fine grinding
- Classifying
- Surface modification

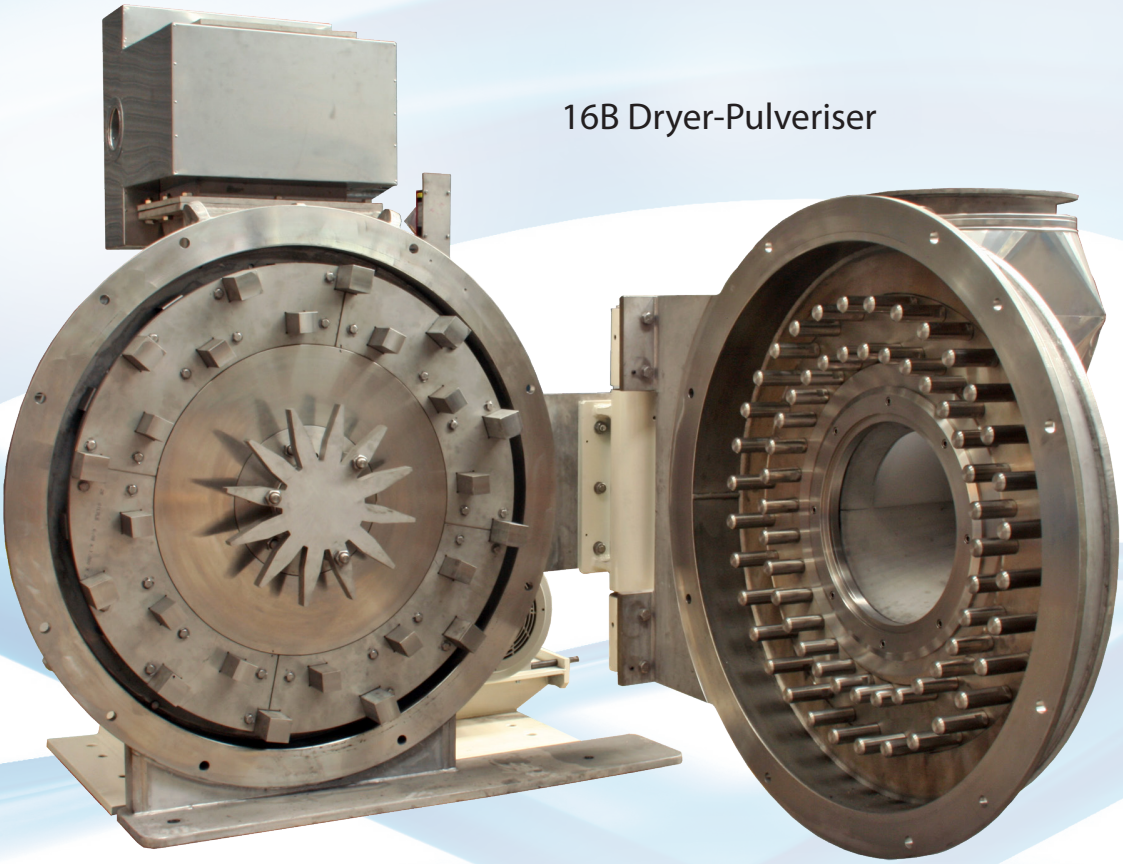
Materials:

- Sludges
- Slurries
- Filter cakes
- Precipitates
- Powders

17A Dryer-Pulveriser



16B Dryer-Pulveriser



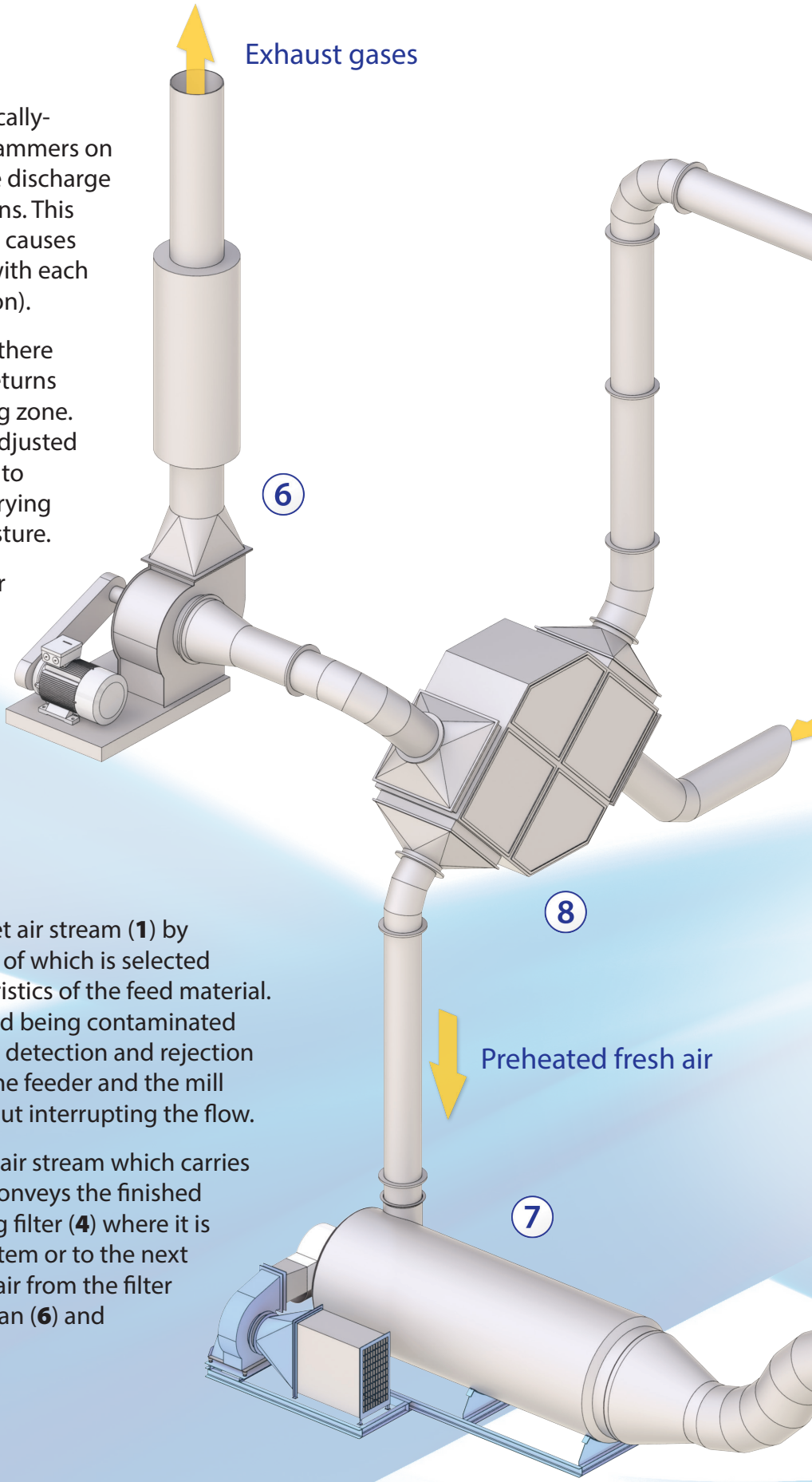
Operating Principle

The Dryer-Pulveriser has a vertically-mounted rotor carrying fixed hammers on both sides, the hammers on the discharge side intermeshing with static pins. This creates massive turbulence and causes particles of material to collide with each other and reduce in size (attrition).

Near the outlet of the machine there is an adjustable classifier that returns oversize material to the grinding zone. The classifying section can be adjusted to provide top sizes from 30µm to 500µm whilst simultaneously drying products to as low as 0.1% moisture.

A pre-sizing zone is available for applications with larger feed sizes.

An independently-driven classifier section is available on some sizes of Dryer-Pulveriser.



Process System

Material is metered into the inlet air stream (**1**) by a feeding device (**2**), the design of which is selected based on the physical characteristics of the feed material. If there is a possibility of the feed being contaminated with metallic impurities a metal detection and rejection facility is interposed between the feeder and the mill inlet. This removes metal without interrupting the flow.

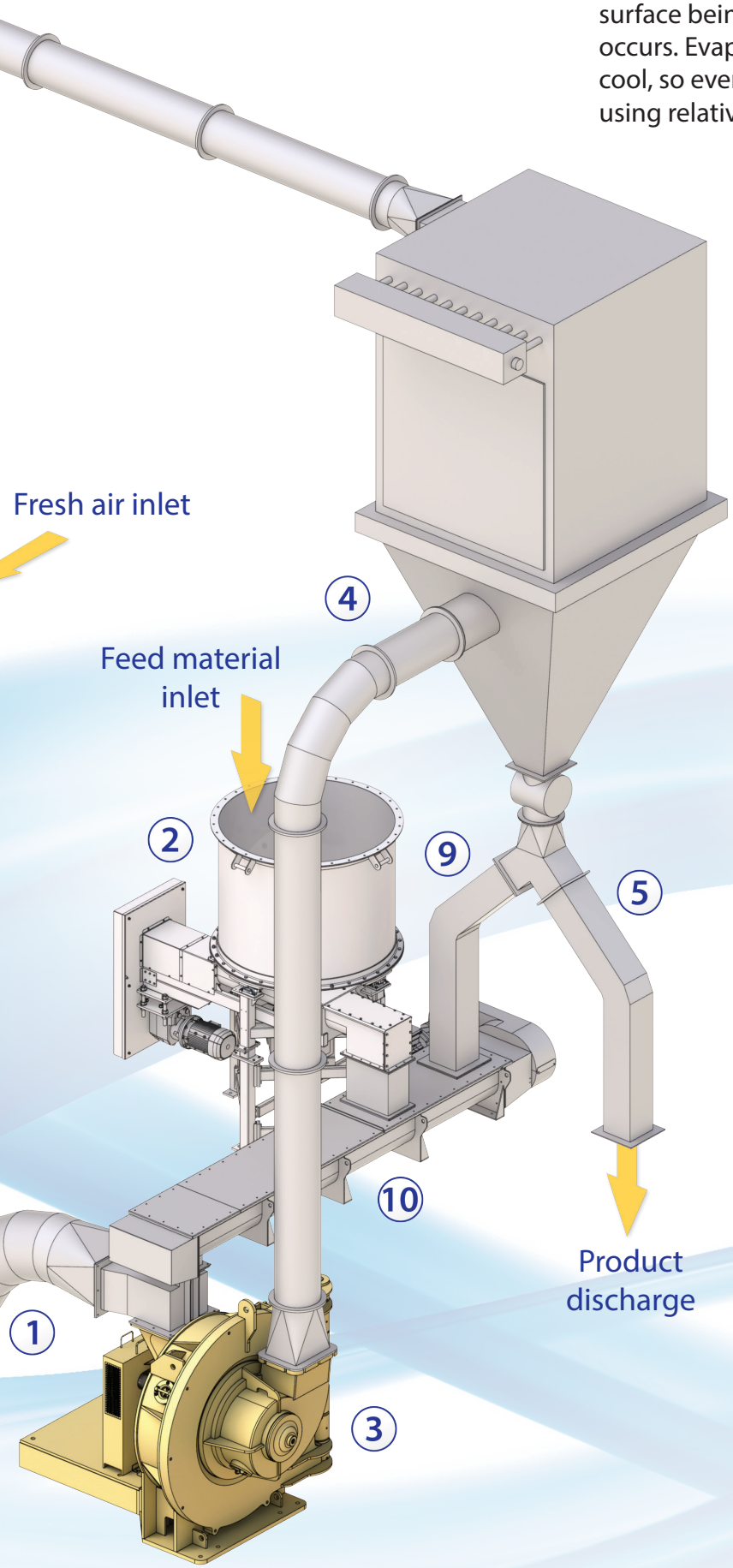
The material is entrained in the air stream which carries it through the mill (**3**). The air conveys the finished product to a cyclone and/or bag filter (**4**) where it is discharged (**5**) to a bagging system or to the next stage of the process. The clean air from the filter continues to the main process fan (**6**) and then to atmosphere.

Drying Function

The airflow into the mill can be heated to temperatures as high as 550°C to simultaneously dry the feed material. The material is flash-dried, with new wet surface being continuously exposed as size reduction occurs. Evaporative cooling keeps the material surface cool, so even heat-sensitive products can be dried using relatively high inlet temperatures.

The outlet temperature of the mill is adjusted to give the required product dryness. Any source of clean, hot air is suitable, though an oil or gas-fired air heater (**7**) is usually used.

Exhaust gases from the system can be passed through an optional heat exchanger (**8**) to heat the incoming air, increasing thermal efficiency and reducing heat losses to near zero.



Backmixing

Feeding of some sticky materials may require some feed conditioning. This is achieved by blending the feed with a proportion of the dry product, which is continuously recycled (**9**) from the product collector to a mixer/feeder (**10**) at the mill inlet. The process increases the overall material flow but does not reduce drying capacity or efficiency. The surface of the dry fraction is re-wetted in the mixing process so there is no risk of damage when recirculating heat sensitive materials.

Coating and Surface Modification

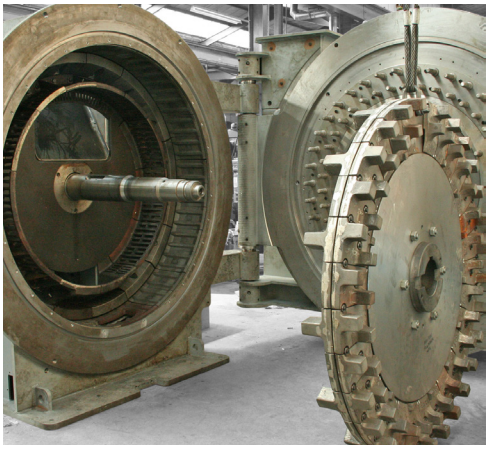
Products that require surface modification can have a range of surfactants applied during the milling and drying operations by simply metering the chemical in the required proportion into the mill with the main feed. It is possible to apply more than one surfactant simultaneously.

‘A’-series

The main casing is a fully-machined, heavy duty, fabricated steel construction. The three main elements are hinged together for easy access. All the internal surfaces are lined with alloyed iron castings for long wearing life. The main rotor is an assembly of hard castings bolted to a heavy steel disc. All the castings are of small size for ease of handling.

The swing hammer section of the mill is cast in manganese steel.

The mill is usually supplied for operation with a separate fan in the circuit; however it is possible to incorporate a fan into the mill for specific applications.

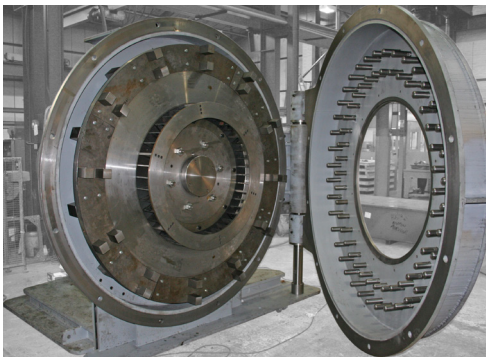


Fitting the rotor in a 20A Dryer-Pulveriser

‘B’-series

The construction of the ‘B’-series is lighter than that of the ‘A’-series, though the hinged arrangement is retained. The mill contains no cast iron wear parts but some internal linings are available. The rotor is a single fabrication but with the standard geometry of the ‘A’-series.

No swing hammer zone or internal fan is available. However, it is possible to manufacture the ‘B’-series mills in stainless steel. A 1B pilot scale unit is available for development work.

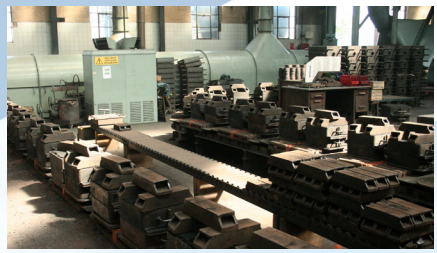


The inside of a 20B Dryer-Pulveriser, showing the fabricated rotor and integral classifier

Atritor’s well-equipped machine shop

Overview of Atritor’s cast iron foundry

The casting of sand moulds



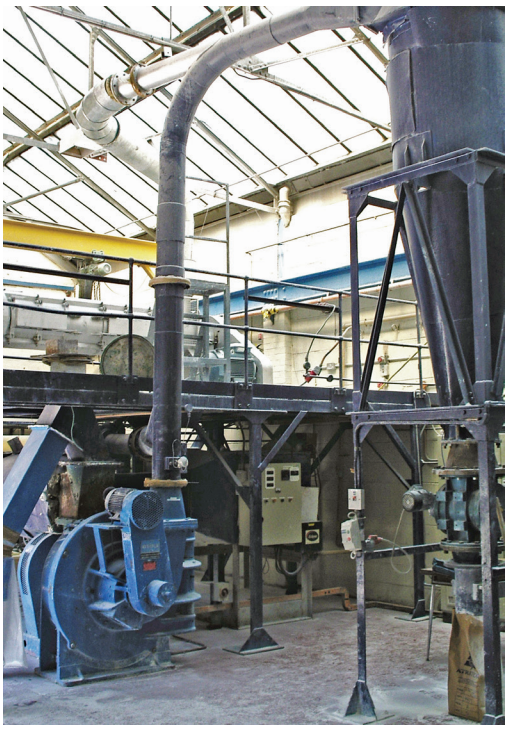
Atritor’s organised foundry production line

Pilot Plant

Atritor has production-scale pilot plant facilities available in the UK and the USA to demonstrate the equipment and processes that we offer. The pilot plant can be used to accurately size the equipment necessary for a customer's application and has, over the years, conducted in excess of 10,000 trials on a range of materials, providing a large historical database of the capabilities of the equipment.

The pilot plant is supported by a well-equipped laboratory with a range of techniques for analysis of particle size, moisture content and density of the materials processed.

It allows our process engineers to gain specific experience of the customer's product that can be used to design the materials handling systems around our processes, which enables Atritor to offer process warranties on the plants and processes that we supply.



The 8A Dryer-Pulveriser in Atritor's test facility

Technical Data

Atritor	Units	1B	4A/B	6A/B	8A/B	11A/B	16A/B	17A/B	18A/B	20A/B
Maximum **speed**	rpm	5,000	2,000	1,750	1,500	1,350	1,200	1,075	950	850
Maximum **power**	kW	2.2	15	30	37	45	75	110	160	250
Minimum **power**	kW	1.1	5.5	11	15	22	37	45	75	132
Max. **airflow 'A'**	m^3/h	-	1,250	2,500	3,500	5,000	8,500	12,500	20,000	34,000
Max. **airflow 'B'**	m^3/h	200	1,750	3,500	5,000	7,500	13,000	20,000	30,000	50,000
Max. **evaporation 'A'**	kg/h	-	140	300	420	600	1,020	1,500	2,400	4,000
Max. **evaporation 'B'**	kg/h	25	200	420	600	900	1,560	2,400	3,600	6,000
Max. **solids capacity**	kg/h	100	1,500	3,000	4,000	6,000	10,000	15,000	24,000	40,000

Material References

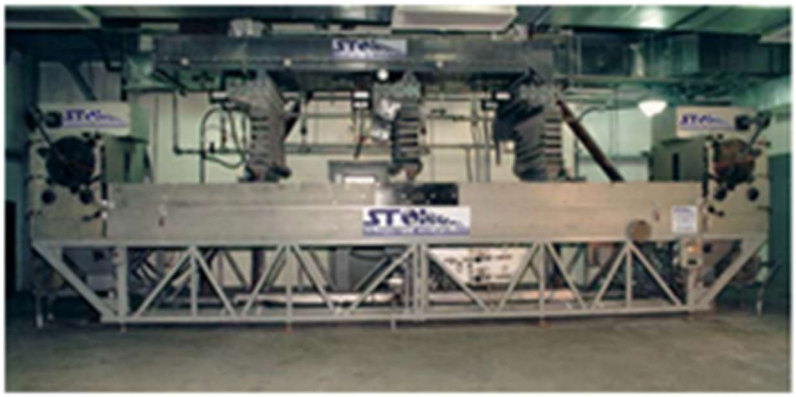
The range of materials that the Dryer-Pulveriser has processed is vast – certainly far too many to list – but it includes pulverised fuels, raw and refined minerals, organic and inorganic chemicals, dyes and pigments, plastics, cellulose, food products and waste streams.

If you have a material that requires drying, milling or simply de-agglomerating, please contact us as our extensive database of more than 10,000 tests can provide relevant data for most applications.

An 18A Dryer-Pulveriser and gas-fired air heater for processing precipitated calcium carbonate (PCC)

F42 SEPARATOR SPECIFICATIONS

Description:	Electrostatic flyash separator
Physical Envelope:	
Height:	8 ft. 1 7/8 inches (2487 mm)
Width:	5 ft. 7 inches (1702 mm)
Length:	29 ft. 11 ¾ inches. (9138 mm)
Weight:	21750 lbs. (9887 kg)
Separation Chamber:	
Width:	42 inches (1067 mm)
Length:	20 feet (6 meter)
Electrode Gap:	Continuously adjustable from 0.25inch – 0.75 inch (6-19 mm)
Feed entry:	Three locations selectable by the operator
Drive System:	
Power:	Two (2) 50 HP (37KW) electric motors
Voltage:	460 – 576 Volts
Separation Belt Speed:	10 fps to 60 fps (3-18 meter per second) continuously variable
High Voltage System:	
Output Power:	Positive and negative 6 kV, 200 mA, adjustable voltage
Input Power:	114 V or 220 Volts
Controls:	HMI (Human Machine Interface) Touch screen controls Built-in Alarm and Fault functions dynamically generated for safe operation. One button Auto-start/Auto-Stop features.



APPENDIX TD B

COPIES OF TECHNICAL PERFORMANCE DATA SHEETS FOR THE GAS AND DIESEL GENERATORS

600 kVA canopied generator

Dual certified T4F/StageV - XDWN Series

Our dual Tier4F Stage V 600 kVA canopy generator helps you increase performance and cut your emissions by up to 95%*. It adapts to your needs being switchable from 50 to 60 Hz and works seamlessly on alternative fuels such as HVO (Hydrotreated Vegetable Oil), further reducing local air quality impacts. The generators are driven by data too, resulting in more efficient service assessments and wider information gathering. The generators are also built with Arc Flash detection, Ingress Protection Anti Moisture Louvres and a new HMI Interface all adding up to a safe, reliable, clean and efficient product that will benefit your business.

* *Compared to a Stage IIIA generator.*

ELECTRICAL OUTPUT	50 Hz	60 Hz
CONTINUOUS POWER (kW/kVA)	409.1/511.375	427.0/533.75
PRIME POWER (kW/kVA)	456.0/570	552.0/690
FUEL STOP POWER/STANDBY	500.0/625	606.2/757.75

Technical data*

600 kVA GENERATOR	
MAZIMUM AMBIENT TEMPERATURE	45°C/113°F (50 Hz) 45°C/113°F (60 Hz)
BATTERY VOLTAGE (50 Hz)	24.0 Volts
BATTERY VOLTAGE (50 Hz)	24.0 Volts

CERTIFICATION	
EMISSIONS CERTIFICATE EU STAGE V	R03001771-1
EMISSIONS CERTIFICATE US EPA	R03001772-1
EMISSIONS CERTIFICATE US CARB	R03001773-1

PHYSICAL DATA	
LENGTH / WIDTH / HEIGHT	5.16m / 1.9m / 2.9m
WEIGHT (WITHOUT FUEL)	8782kg
WEIGHT (WITH FUEL)	10650kg

FUEL CONSUMPTION	50 Hz	60 Hz
100% PRIME POWER	130 l/hr	141.2 l/hr
75% PRIME POWER	97.5 l/hr	106.5 l/hr
50% PRIME POWER	66.4 l/hr	73.5 l/hr

*Equipment supplied may vary slightly

EMISSIONS DATA (@100% LOAD)	TA-LUFT 50 Hz g/kWhr	EPA 60 Hz g/kWhr
NOx (OXIDES OF NITROGEN)	0.17	0.4g
PM (PARTICULATE MATTER)	0.012	0.0137
CO (CARBON MONOXIDE)	0.043	0.066
HC (UNBURNT HYDROCARBONS)	0.007	0.013

NOISE DATA	50 Hz	60 Hz
SOUND POWER EEC	100	-
SOUND PRESSURE AT 1M	81.5 dBA	81.6 dBA
SOUND PRESSURE AT 7M	73.1 dBA	72.4 dBA

FEATURES	BENEFITS
Designed and assembled to Aggreko's standards	Reduced emissions and compliant with the latest EU Stage V regulations
Bolted, galvanised, alloy steel canopy with lockable doors	New aftertreatment system making it more efficient than the previous generation of diesel engines
Acoustically designed equipment	Flexible 50 and 60 Hz units
Low fuel level warning sensor in fuel tank	Data driven, which allows better remote information – smarter servicing
Forklift pockets in base frame and lifting beam on top Optional 2-point lifting arrangement	Works perfectly on alternative fuels as HVO
	Arc Flash detection and ingress protection moisture louvres, giving better protection of the internal components of the canopy from the environment
	Range of warnings and shutdowns on control system protects generator set from electrical and mechanical damage, helps identify and rectify faults before they occur

Fully-engineered power rental

Whether you have an existing project that needs more power, require a complete turn-key package or need power quickly to get your operations up and running, we will design a reliable, cost-effective power package tailored specifically to match your needs. We do the calculations, design the equipment set-up, deliver, install and commission it, then we take care of its operation, maintenance and fuel supply, leaving you free to concentrate on your business – whatever industry you're in.

Full range of power equipment

GENERATOR SETS

- 20 kVA to 1500 kVA in single units
- Diesel and gas fueled

LOADBANKS

- 100 kVA to 6 MVA capacity
- Resistive and inductive AC loadbanks
- DC loadbanks up to 500 V/1500 A

OTHER ANCILLARIES

- Electrical distribution boards
- Synchronising panel
- Changeover panel

TRANSFORMERS

- 630 kVA to 6.3 MVA in single units
- HV step-up capability above 25 kV
- Over current and short circuit protection

CABLES

- Single or multi-core
- High current carrying capacity
- Resistant to abrasion, fuel, oil and water

FUEL TANKS

- Capacities up to 68,000 litres
- Fully bunded to prevent leaks and hazards

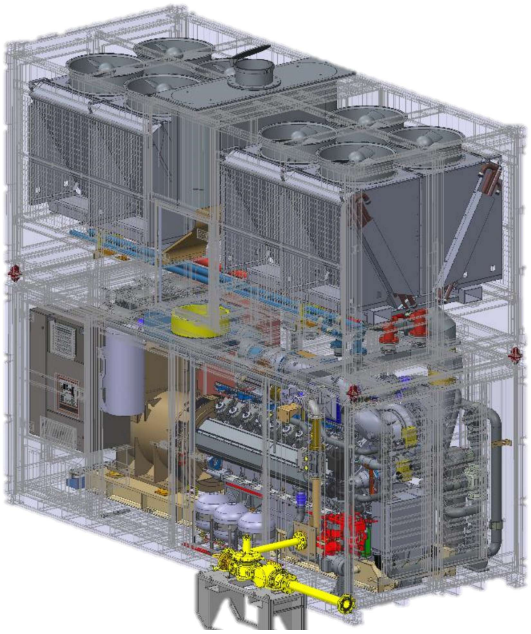
Power **how** you need it,
when you need it, **where** you need it.

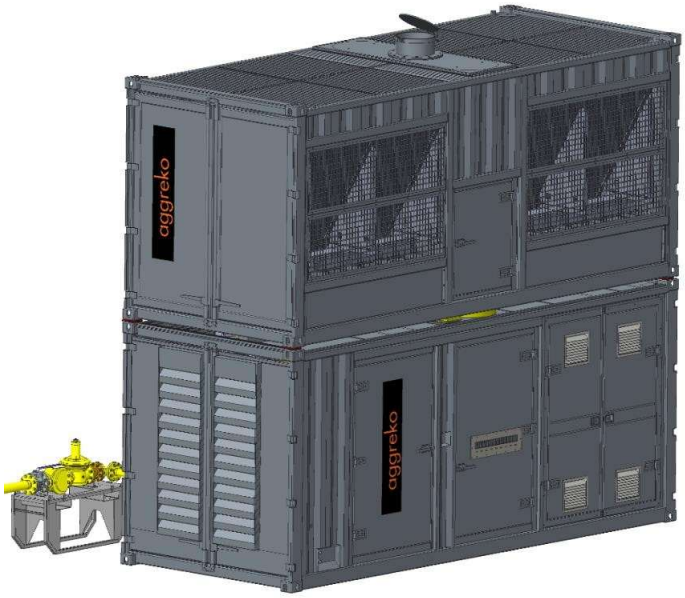
aggreko

Visit us at **aggreko.com** to get in touch

Doc No: T02000102
Release Date:
Revision A

TECHNICAL PERFORMANCE DATASHEET





1787 kVA / 1430kW
NGG Generator Set (MCPD Compliant)

(a) MACHINE INFORMATION	50Hz
GENERATOR SET MODEL REFERENCE	GG1875GASCSK
GAS COOLING MODULE MODEL REFERENCE	AP0000GCMCSK
GENERATOR SET B.O.M. REFERENCE	611028
GAS COOLING MODULE B.O.M. REFERENCE	611029

(b) ELECTRICAL OUTPUT	50Hz
STANDBY / FUEL STOP RATING	N/A
PRIME POWER RATING	N/A
CONTINUOUS POWER (ISO8528-1) [1]	1433kW / 1791kVA
VOLTAGE [2]	380-440V
NET EFFICIENCY [3] (100% CONTINUOUS POWER RATING)	39.18%

[1] This rating is based on a typical 0.8 lagging (inductive load) power factor. Parasitic loads - Coolant pumps, radiator fans, space fans, are included. It is based on standard reference conditions (ambient temp: 30°C; altitude: 500m; absolute humidity <25g/kg).

[2] Different voltage outputs might be achieved via certain alternator windings configurations.

[3] Efficiency of chemical (fuel) to mechanical to electrical energy conversion.

Machine Performance & Transient Information

(c) MACHINE EFFICIENCY

50Hz

LOAD FACTOR	MECHANICAL EFFICIENCY [4]	ELECTRICAL EFFICIENCY	NET ELEC. EFFICIENCY [5]
100%	41.74%	40.24%	39.18%
90%	41.41%	39.96%	38.79%
75%	40.64%	39.22%	37.85%
60%	39.52%	38.04%	36.37%
50%	38.58%	36.99%	35.03%

[4] Value refers to mid-ISO 3046-1 tolerance (±2.5%) and standard reference conditions.

[5] Parasitic losses Parasitic losses in standard reference conditions are 38.75kW. However, this can vary based on the ambient conditions (maximum parasitic losses are equal to 46kW).

(d) GAS ENERGY INPUT [6]

	50Hz	
100%	347.2m^3/hr (3569kW)	12262scf/hr
90%	315.1m^3/hr (3238kW)	11127scf/hr
75%	267.7m^3/hr (2751kW)	9453scf/hr
60%	220.2m^3/hr (2263kW)	7777scf/hr
50%	188.0m^3/hr (1932kW)	6638scf/hr

[6] These figures are based on an LHV: 37MJ/m^3 (993BTU/scf).

(e) LOAD PERFORMANCE

	50Hz
MINIMUM ACCEPTABLE LOADING (OF TOTAL ISO8528 C.O.P)	40%
POWER FACTOR OPERATING RANGE [7] [8] (AT ISO8528 C.O.P)	-0.95 (LEADING / CAPACITIVE) TO 0.8 (LAGGING / INDUCTIVE)
OVERALL TRANSIENT PERFORMANCE CLASS	G4
LOAD REJECTION LIMIT	100%
RAMP UP TIME	8.4kW/s
LOAD RAMP DOWN TIME	6.25kW/s

[7] The operating chart might be broader in partial loading. If power factor is leading or lagging more than 0.8, Aggreko engineers should be consulted in respect to customers' load profile and advise accordingly.

[8] See alternator operating curve (below) for full range at varying real power (kW) loads.

(f) ENERGY BALANCE		50Hz	
ENGINE LOAD	100%	75%	50%
INPUT	3658kW	2818kW	1979kW
MECHANICAL	1527kW (41.7%)	1146kW (40.6%)	764kW (38.6%)
JACKET WATER	399kW (11.2%)	349kW (12.7%)	277kW (14.3%)
OIL COOLER	207kW (5.8%)	188kW (6.9%)	160kW (8.3%)
EXHAUST GAS COOLED TO 180°C	592kW (16.6%)	495kW (18%)	383kW (19.8%)
EXHAUST GAS COOLED TO 120°C	738kW (20.7%)	606kW (22%)	459kW (23.8%)
EXHAUST GAS COOLED TO 100°C	786kW (22%)	643kW (23.4%)	484kW (25.1%)
HIGH TEMPERATURE INTERCOOLER	315kW (8.8%)	156kW (5.7%)	41kW (2.1%)
LOW TEMPERATURE INTERCOOLER	69kW (1.9%)	54kW (2%)	37kW (1.9%)
HIGH TEMPERATURE LP INTERCOOLER	0kW (0%)	0kW (0%)	0KW (0%)
LOW TEMPERATURE LP INTERCOOLER	0kW (0%)	0kW (0%)	0KW (0%)
SURFACE HEAT	71kW (2%)	65kW (2.4%)	67kW (3.4%)

(g) EXHAUST ENERGY		50Hz	
ENGINE LOAD	100%	75%	50%
EXHAUST GAS TEMPERATURE	415°C (779°C)	439°C (822°F)	471°C (880°C)
EXHAUST GAS MASS FLOW RATE (DRY)	7569kg/hr (16687lb/hr)	5707kg/hr (12582lb/hr)	3903kg/hr (8605lb/hr)
EXHAUST GAS MASS FLOW RATE (WET)	8116kg/hr (17893lb/hr)	6129kg/hr (13512lb/hr)	4199kg/hr (9257lb/hr)

(h) EXHAUST EMISSIONS [9] [10]	50Hz
NOx EMISSIONS; @5% O2, DRY	< 250mg/Nm^3 (0.81g/kWh)
NOx EMISSIONS; @15% O2, DRY	< 93mg/Nm^3 (0.81g/kWh)
CO EMISSIONS; @5% O2, DRY	< 1000mg/Nm^3 (2.7g/kWh)
CO EMISSIONS; @15% O2, DRY	< 371mg/Nm^3 (2.7g/kWh)

[9] NOx levels in *"mg/Nm³ @ 5% O2"* are guaranteed for operation between 50% and 100% rated stable load.

[10] NOx levels in *"g/kWh(mech)" are* guaranteed for operation between 80% and 100% rated stable load.

aggreko

Stage V generators & battery hybrid

Systems in synergy

Low emission temporary power solutions for your business

GREENER UPGRADES™

Our energy transition

The race to net zero is on, and at Aggreko, we recognise that everyone has a role to play in reducing emissions.

Aggreko's aim is to achieve net zero across all business operations by 2050. In addition to this...

By 2030, we aim to:

Reduce the amount of diesel fuel used in our fleet by at least 50%

Reduce local air quality emissions from our equipment by 50%

Introducing

GREENER UPGRADES™

In 2021, we introduced Greener Upgrades™, an initiative developed to support businesses in making choices that are kinder to the environment. These small switches make a big difference in lowering NOx, particulate matter and CO2 emissions, and reducing fuel consumption.

Our investment in new technology, alongside our consultative approach, delivers sustainable solutions for our customers that improve efficiencies and lower costs.

Power in partnership

We have made a multi-million pound investment to our fleet with the addition of Stage V generators and battery hybrids. Working together, this new fleet enables businesses to operate with greater efficiencies, low noise levels, and lessens the impact on global and local emissions. We introduce you to the technology and demonstrate the efficiencies they deliver, both individually and when combined.

Stage V generators

Designed to cut down on harmful pollutants, our Stage V generators are fully compliant with the European Commission's Medium Combustion Plant Directive (MCPD). They operate in the same way as the cleanest car engines limiting carbon monoxide, nitrogen oxides and particulate matter to provide efficient low carbon temporary power.

Battery hybrids

An integral part of a lower carbon future is energy storage. Harnessing power produced at one time that can be drawn upon when you need it most. Our fleet of hybrid batteries can be used across a variety of applications for a large range of sectors, enabling you to maximise your operational output whilst minimising downtime and emissions.

Stage V generators

Maximising performance, minimising emissions

Introduced by the EU, Stage V (Regulation 2016/1628) is an emissions standard for non-road mobile machinery (NRMM) with spark/compression ignition engines. It aims to reduce emitted harmful substances including particulate matter, and is an evolution of previous standards.

European Stage V non-road emission standards

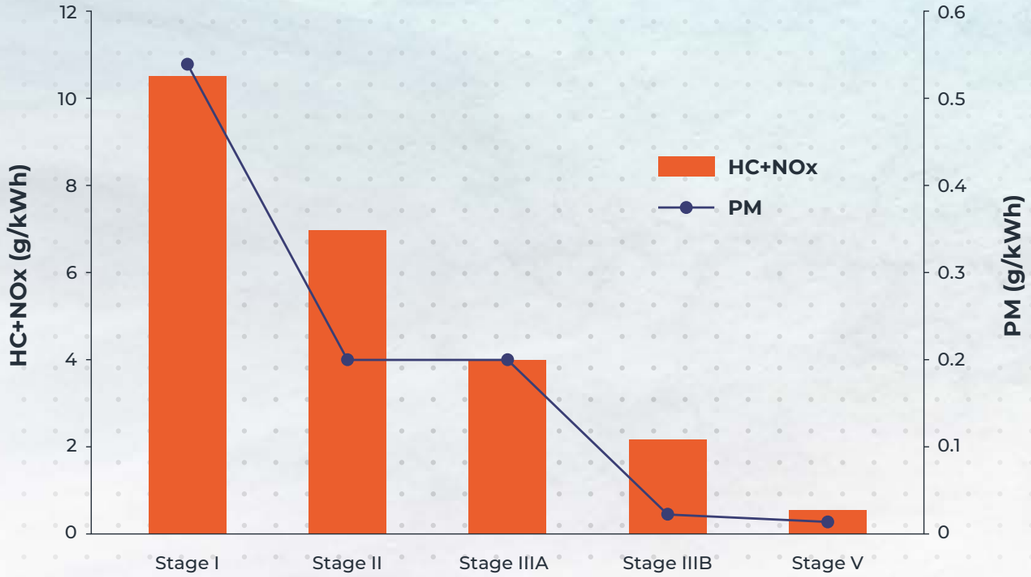


Figure 1. Emission limits from Stage I to Stage V for HC + NOx and PM

Setting the standard

Aggreko is proud to be the first UK hire company to design and manufacture our own Stage V generators. Developed to a high specification, we have the largest fleet available nationwide, with models ranging from 30kVA – 1200kVA.

Robust and fuel efficient, these low noise generators can deliver on your temporary power needs without sacrificing performance. Not simply following the standard but setting it.

Installed and monitored by experts, our Stage V generators deliver low-emission energy generation through improved technology with the following features across the range:

- Installation of a Diesel Particulate Filter to reduce fine diesel emissions
- Selective catalytic reduction system to reduce NOx emissions
- Added injection technology to further neutralise harmful particulates
- Diesel Oxidation Catalysts to reduce CO2 emissions through oxidisation
- Low noise, with variable speed fans drastically reducing sound at lower loads and in lighter ambient conditions to allow for use in urban areas
- Arc Flash detection and ingress protection to give better defence of the components against the environment
- Internal Diesel Exhaust Fluid (DEF)/Adblue tank matched to internal fuel capacity to ensure that DEF only requires filling at the same frequency as fuel tank refills
- Two external DEF/AdBlue tank options to extend on-site refill intervals, supply multiple generators and reduce the required site installation footprint

We have the **largest Stage V fleet** available nationwide, with models ranging from 30kVA – 1200kVA.

Introducing our Stage V fleet

Superior. Smart. Sustainable.

30 kVA

Fuel consumption

100% Prime power – 9.52 l/hr
75% Prime power – 7.08 l/hr
50% Prime power – 4.95 l/hr

Exhaust emissions

NOx & HC – 3.542 g/kWh
PM – 0.0006 g/kWh
CO – 0.065 g/kWh

Noise 7m at 75% load, 53 dB(A) at 50Hz

Running hours 46.5 based on 50% prime power

Size L 3.05m x W 1.17m x H 1.89m

60 kVA

Fuel consumption

100% Prime power - 15.67 l/hr
75% Prime power - 11.79 l/hr
50% Prime power - 7.97 l/hr

Exhaust emissions

NOx – 0.145 g/kWh
PM – 0.0022 g/kWh
CO – 0.047 g/kWh
HC – 0.0145 g/kWh

Noise 7m at 75% load, 55 dB(A) at 50Hz

Running hours 56.5 based on 50% prime power

Size L 3.05m x W 1.17m x H 2m

100 kVA

Fuel consumption

100% Prime power - 20.89 l/hr
75% Prime power - 15.72 l/hr
50% Prime power - 10.62 l/hr

Exhaust emissions

NOx – 0.145 g/kWh
PM – 0.0002 g/kWh
CO – 0.038 g/kWh
HC – 0.005 g/kWh

Noise 7m at 75% load, 55 dB(A) at 50Hz

Running hours 25.5 based on 50% prime power

Running hours based on low load with 380l external DEF tank - 550

Running hours based on low load with 2000l external DEF tank - 2,971

Size L 3.05m x W 1.17m x H 2m

200 kVA

Fuel consumption

100% Prime power - 38.4 l/hr
75% Prime power - 27.4 l/hr
50% Prime power - 17.6 l/hr

Exhaust emissions

NOx – 0.4 g/kWh
PM – 0.02 g/kWh
CO – 3.5 g/kWh
HC – 0.2 g/kWh

Noise 7m at 75% load, 61.7 dB(A) at 50Hz

Running hours 41 based on 50% prime power

Running hours based on low load with 380l external DEF tank - 143

Running hours based on low load with 2000l external DEF tank - 734

Size L 3.95m x W 1.2m x H 2.26m

300 kVA

Fuel consumption

100% Prime power - 57 l/hr
75% Prime power - 43 l/hr
50% Prime power - 28.5 l/hr

Exhaust emissions

NOx – 0.345 g/kWh
PM – 0.0019 g/kWh
CO – 0.038 g/kWh
HC – 0.005 g/kWh

Noise 7m at 75% load, 63.4 dB(A) at 50Hz

Running hours 25.5 based on 50% prime power

Running hours based on low load with 380l external DEF tank - 159

Running hours based on low load with 2000l external DEF tank - 858

Size L 4.5m x W 1.2m x H 2.46m

600 kVA

Fuel consumption

100% Prime power - 113.1 l/hr
75% Prime power - 84.9 l/hr
50% Prime power - 57.8 l/hr

Exhaust emissions

NOX – 0.17 g/kWh
PM – 0.012 g/kWh
CO – 0.043 g/kWh
HC – 0.007 g/kWh

Noise 7m at 75% load, 73.1 dB(A) at 50Hz

Running hours 27.1 based on 50% prime power

Running hours based on low load with 380l external DEF tank - 80

Running hours based on low load with 2000l external DEF tank - 429

Size L 5.16m x W 1.9m x H 2.9m

1200 kVA

Fuel consumption

100% Prime power - 267 l/hr
75% Prime power - 199 l/hr
50% Prime power - 137 l/h

Exhaust emissions

NOX – 0.17 g/kWh
PM – 0.012 g/kWh
CO – 0.043 g/kWh
HC – 0.007 g/kWh

Noise 7m at 75% load, 79 dB(A) at 50Hz

Running hours 15.4 based on 50% prime power

Running hours based on low load with 380l external DEF tank - 160

Running hours based on low load with 2000l external DEF tank - 858

Size L 6.06m x W 2.44m x H 2.89m

Combination DEF tank (380L DEF, 3000L Diesel) & Single purpose DEF tank (2000L DEF)

- Dramatically improves the run time of Stage V generators
- External Diesel Exhaust Fluid (DEF) Tank to support all Stage V assets which consume DEF/AdBlue in Europe (>100 kVA)
- Compatible with 100, 200, 300, 600 and 1200kVA Stage V generators with standardised connections across the range for quick setup
- Combi tank (3000l) supports simultaneous filling of 2 gensets
- Dedicated larger tank with onboard pumps to limit contamination, and heating to ensure year round performance. DEF/AdBlue quality is actively monitored by the generator to protect the aftertreatment system from damage
- Single purpose tank (2000l) supports simultaneous filling of 4 gensets

	Features	Benefits
Superior Bespoke high specification standards	Flexible 50 and 60 Hz units	Ability to use in multiple regions
	Designed and assembled to Aggreko's bespoke high specification standards: • Arc Flash detection and ingress protection moisture louvres • Forklift pockets in base frame and lifting beam on top	Giving better protection of the internal components of the canopy from the environment
	Bolted, galvanised, alloy steel canopy with lockable doors	Secured units for peace of mind
	New aftertreatment system to adhere to latest emissions legislation	Greater efficiency than the previous generation of diesel engines
	Suitable for alternative fuels, such as HVO and B10	Further minimising emissions
Smart Data driven for actionable insights	Acoustically designed equipment	Quieter sound
	Range of warnings and shutdowns on control system	Protects generator set from electrical and mechanical damage, helps identify and rectify faults before they occur
	Smarter servicing with condition based monitoring of key systems	Reduced service intervals
	Standardised internal/external fuel and DEF connections	Faster and more secure site set up with range extending external fuel and DEF fill intervals
	Low fuel level warning sensor in fuel tank	Allowing you to schedule fuel deliveries more effectively
	Remote monitoring	Allows you to easily optimise, control and manage your on-hire fleet
Sustainable Reduced emissions as standard	Installation of a Diesel Particulate Filter	Reduces fine diesel emissions
	Selective catalytic reduction system	Reduces NOx emissions
	Added injection technology	Further neutralises harmful particulates
	Diesel Oxidation Catalysts	Reduces CO2 emissions through oxidisation

The positive effects of batteries

Regardless of your load profile, our lithium-ion battery systems have been designed to offer a robust and highly mobile solution for customers with varying needs. Due to their compact footprint and weight, they are easy to transport and can accommodate the smallest of spaces. All this whilst substantially lowering fuel costs and emissions too.

There are many ways that batteries can be introduced into your operations. As a hybrid solution working alongside our generators, batteries are a reliable energy source should load fluctuate, or demand change. The systems work together to deliver a flexible approach to powering your site.

Uneven load profiles

Should your peak load fluctuate on-site due to machines with intermittent usage or motor starts, batteries can work in two ways to optimise your operations:

- A smaller battery can take care of the lower loads whilst the generator can handle the peaks
- A larger battery can handle the peak load and the generator can recharge the battery

Ideal for:

tower cranes

construction hoists

submersible pumps

Long periods of low load

If a generator isn't running at optimal capacity, utilising a battery can reduce the generator run time by up to 80% - saving emissions and fuel costs.

Ideal for:

refinery turnaround

live events

live equipment

servers

Critical power or redundancy

A battery can be the necessary back up power for your site, should your generator need to be powered down for servicing or other reasons.

Ideal for:

office trailers

site lighting

manufacturing

Remote locations

If availability of fuels and technicians is problematic due to a remote area, a battery can be the ideal equipment to fulfil your needs.

Ideal for:

drill rigs

Environmentally sensitive areas

When low noise and zero emissions are required, batteries are the perfect solution.

Ideal for:

live events

greener construction

residential areas

inner-city construction

Through the night

At night when loads may be low and power needs to be silent, hybrid batteries are the perfect solution.

Ideal for:

Construction site at night

manufacturing

Supporting solar and wind technology

Batteries integrate seamlessly with your renewable technology to smooth out fluctuations caused by intermittent power supply from wind or solar.

Ideal for:

wind farms

solar

Introducing our battery fleet

Quiet. Quantifiable. Quality.

45 kVA

AC Input voltage range
400V

Energy capacity (nominal)
56.8 kWh

Energy capacity (usable)
48.0 kWh

Charge time (minimum)
3.5 hours

Size
L 1.14m x W 1.45m x H 1.58m

Weight
1440kg

90 kVA 400V Powr2

AC Input voltage range
400V

Energy capacity (nominal)
127.9 kWh

Energy capacity (usable)
115.1 kWh

Charge time (minimum)
3 hours

Size
L 2.25m x W 1.3m x H 2.07m

Weight
2800kg

150 kVA 72 kWh – exclusive to Aggreko

AC Input voltage range
400 - 415V

Energy capacity (nominal)
72 kWh

Energy capacity (usable)
61 kWh

Charge time (minimum)
1 hour 45 minutes

Size
L 2.15m x W 1.2m x H 1.7m

Weight
4000kg

Battery features and benefits

	Features	Benefits
Quiet Minimal noise	Delivers minimal noise	Ideal for projects where sound needs to be kept to a minimum
Quantifiable Proven savings on time, cost, emissions and fuel	Plug and play with the entire Aggreko eco-system	Fast installation and commissioning
	Allows for savings on fuel	Reduces both emissions and fuel costs
	Environmentally friendly	Helps in meeting emissions regulations
Quality Exclusive intuitive features	Designed and assembled to Aggreko's standards: • Flexible manoeuvrability options with forklift pockets, lift & drag skid and lifting ring • Wide ambient temperature range	High quality bespoke specification
	Intelligent onboard energy control module that communicates with the generator	Remote monitoring which allows optimisation through the technical support desk
	Increases reliability	Manages variable loads and eliminates light load periods

Systems in synergy

Our Stage V generators work in harmony with our battery hybrids. Smart technology in our kit detects when required power is low, switching off the generator to allow the battery to take the load. This efficiency delivers fewer emissions, low noise, and reduced fuel costs.

With government restrictions on red diesel effective for businesses from April 2022, saving fuel is essential for your bottom line. We explore the fuel and emissions savings that can be achieved with our Greener Upgrades solutions in two typical scenarios.

Scenario 1

Site set up plus crane 1 using 2kW average in the evening for site and aviation lights

Option 1

- Use 200kVA canopy
- Daytime – average fuel consumption of 26 litres per hour 50% load for 60 hours (daytime)
- Night-time – 6 litres per hour for 108 hours

Weekly stats

Fuel usage: **2088 litres** **Emissions:** **5560 kg**

Option 2 using Greener Upgrades™

- Use 200kVA canopy and 45kVA battery
- Daytime – average fuel consumption 26 litres per hour 50% load for 63 hours (3 hours charging)
- Night-time – 0 litres per hour for 105 hours

Weekly fuel saving

approx. 522 litres

Weekly CO2 saving

1399 kg

Scenario 2

Full cabin set up, using generator during day and 4kW on average in the evening

Option 1

- Use 60kVA canopy
- Daytime – average fuel consumption of 8 litres per hour 50% load for 60 hours (daytime)
- Night-time – 4 litres per hour for 108 hours

Weekly stats

Fuel usage: **937 litres** **Emissions:** **2512 kg**

Option 2 using Greener Upgrades™

- Use 60kVA canopy and 45kVA battery
- Daytime – average fuel consumption 8 litres per hour 50% load for 63 hours (3 hours charging)
- Night time – 0 litres per hour for 102 hours

Weekly fuel saving

approx. 391 litres

Weekly CO2 saving

1048 kg

Fuelling our technology

In addition to the right technology, one of the simplest and most effective choices you can make in reducing your local emissions and CO2 is to switch to Hydrotreated Vegetable Oil (HVO). A new and superior type of biodiesel, HVO is made from biological material, making it one of the cleanest, greenest fuels on the market.

HVO can be used in all our generators as a drop-in fuel and can be distributed, handled and stored in the same way as traditional fuel, making it a convenient alternative to diesel. It does not contain any esters or contamination, like regular diesel and FAME, which means it can be stored for extended periods of time, with no adverse effects on performance.

The major advantages of using HVO fuel are significantly reduced harmful emissions. This is through improved burning efficiency and lower CO2 emissions, which are better for the environment.

Benefits of HVO

- Eliminates up to 90% of net CO2 greenhouse gas
- Significantly reduces nitrogen oxide (NOx), particulate matter (PM) and carbon monoxide (CO) emissions
- Biodegradable, non-toxic, and odour-free
- High cetane number means HVO is more easily ignited for smoother running, greater power and cleaner performance
- Safe to use in a wide range of applications

Real life savings

The scenarios below illustrate the real-life emissions and fuel savings you can make by combining Stage V technology, battery hybrid and a superior fuel.

By using Stage V in a load on demand (LOD) configuration alongside a Battery and HVO, you can achieve the following savings in NOx, Particulate Matter, CO2 and Fuel.

Scenario 1:

General site power: **Power required** 300kVA | **Load required** Variable | **Power required at night** 5%

HVO + Stage V + Battery Hybrid

Drop-in fuel + Load on demand configuration (LOD)

- 9% ↓ NOx
- 33% ↓ PM
- 90% ↓ CO_2
- 37% ↓ FUEL

Scenario 2:

Tower crane: **Power required** 500kVA | **Load required** Variable | **Power required at night** 5%

HVO + Stage V + Battery Hybrid

Drop-in fuel + Load on demand configuration (LOD)

- 9% ↓ NOx
- 33% ↓ PM
- 90% ↓ CO_2
- 51% ↓ FUEL

The Aggreko approach

Our team deliver a full service to our customers, from cables to kit, fuel to software. We work in partnership to help guide businesses through the energy transition delivering power solutions that lower harmful emissions and reduce fuel costs in the process.

In conjunction with the right technology, we are committed to innovation and continue to test our equipment to maximise efficiencies. This insight along with experience and knowledge of our industry allows us to deliver the right solutions with optimum operating capabilities.

Right sizing

Generators that are oversized or poorly matched for their chosen application will lead to inefficiencies. Aggreko apply innovative thinking to right sizing the right equipment to its application to ensure greater efficiency and further reduction in carbon emissions.

Load on demand

Load on demand power solutions replace a large constantly operating generator with a group of smaller generators which can power up or down automatically according to demand. If your site requires a total peak output of 1500 kVA, it is possible to use three smaller 500kVA generators together to achieve this when the site is operating at full capacity. As power demand fluctuates and reduces to 500 kVA, two of the generators can power down – minimising emissions and fuel usage.

Alternative fuels

We are exploring the viable options for greener fuel alternatives to diesel and the impact these can have to lessen global and local emissions. We have made the commitment to phase out offering diesel with our fuel management services from April 2022, instead solely providing HVO. We are also continuing to test methanol and hydrogen and have carried out multiple pilot projects with the latter including fuel cell technology which will run alongside our battery energy storage system.

Aggreko Connect

Aggreko Connect is a free online customer asset management platform providing access to all account information in one central place. It delivers insights into your business enabling you to maximise your operational efficiency. With speed and simplicity, you can view equipment on-hire, check your orders, and even review kit performance.

Aggreko Remote Monitoring (ARM)

With ARM we can monitor the health of our equipment from a central operation centre and remotely control it to ensure maximum efficiency, reducing emissions and saving fuel costs.

You'll benefit from:

- Round-the-clock remote monitoring services – 24/7 365 days a year
- Rapid response to emergencies
- Proactive equipment maintenance and fuel service

You can view the live data of any of your on-hire kit through ARM on Aggreko Connect at any site. It will also highlight should equipment stop or if a fault occurs so any issues can be remedied. These actionable insights at your fingertips prevent downtime and deliver peace of mind.

Talk to Aggreko today to see how we can support your business and deliver the following benefits:

- **Lower emissions** - helping you reach your carbon reduction targets
- **Reduced fuel usage and costs** - saving money on your bottom line
- **Low noise** - ideal for projects when sound needs to be kept to a minimum
- **Fast installation and commissioning** - plug and play with the entire Aggreko eco-system, saving you time and hassle
- **Actionable insights** - remote monitoring through ARM which allow you to optimise, control and manage your on-hire fleet through the technical support desk

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0345 824 7365

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