

Application to the relevant hazardous substances authority (planning authority)

The Planning (Hazardous Substances) Act 1990 - Section 7(1)

England - The Planning (Hazardous Substances) Regulations 2015 (Regulation 5)

Wales - The Planning (Hazardous Substances) (Wales) Regulations 2015 (Regulation 5)

Application for Hazardous Substances Consent

1 Applicant
Address

Castle Cement Limited
CASTLE CEMENT LTD
RIBBLESDALE WORKS
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CLITHEROE
BB7 4QF
01200 422401

Post code
Telephone number

Person in control of the land to which the application relates, if different to above
Address

Post code
Telephone number

2 Address or other location details of application site

CASTLE CEMENT LTD
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WEST BRADFORD ROAD
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BB7 4QF
SD7469243671

Post code
OS grid ref

3 Hazardous substance(s) covered by the application

- (a) List named substances falling within Part 2 of Schedule 1 to the Regulations first, then list any substances falling within the categories in Part 1 of that Schedule; finally list substances falling within the description in Part 3.

(b) Substances falling within Parts 1 or 3 of Schedule 1 to the Regulations may be listed under the relevant category or description or named specifically. Where a substance falls within Part 1 and 2 list under Part 2 only; where a substance falls within more than one category in Part 1 list under the category which has the lowest controlled quantity. Where a substance falling within Part 1 or 2 also falls within Part 3 list under the Part which has the lowest controlled quantity. The “controlled quantity” means the quantity specified for that substance in column 2 of Parts 1, 2 or 3 of Schedule 1 to the Regulations.

Note: The Planning (Hazardous Substances) (Amendment) Regulations 2015 are relevant to Q* (addition rule) for LPG, and relevant to notes about ammonium nitrate.

Table A

<i>Name, or relevant category or description of substance</i>	<i>Part number in Schedule 1 to the Regulations, and entry number if Part 2, category if Part 1, identity if Part 3</i>	<i>Do you have a current PHS consent* in respect of this substance? (Yes/No)</i>	<i>If “yes”, state quantity for which consent granted</i>	<i>Maximum quantity proposed to be present in tonnes</i>
Hydrogen	2 / 15	No		5
Methanol	2 / 22	No		480
Petroleum products and alternative fuels (b) kerosenes (including jet fuels)	2 / 34b	No		137
Petroleum products and alternative fuels (c) gas oils (including diesel fuels, home heating oils and gas oil blending streams)	2 / 34c	No		202
Haz. to Aqtc. Env., Cat. Acute 1 or Chronic 1 (E1) / Ammonia water 24.5% NH3	1 / E1	No		70
Ammonium nitrate	2 / 3	No		4

*a hazardous substances consent

Ammonium nitrate is used in the quarry for mineral working activities as an explosive and we believe this use is exempt from the hazardous substances regulations, it has been included in this table for completeness.

4 Manner in which substance(s) are to be kept and stored

For each substance, category or description of substance, covered by the application, provide the following information, referring to the substance location plan where appropriate.

“vessel” means any container designed or adapted to contain hazardous substances which is affixed to the land, and includes a container which forms part of plant or machinery which is affixed to the land but does not include a pipeline.

“Buried” or “Mounded” vessel includes a vessel which is only partially buried or partially mounded.

“moveable container” means any container designed or adapted to contain hazardous substances other than a vessel.

(a) Tick one box below to show whether the substance(s) will be present for storage only or will be stored and involved in a manufacturing, treatment or other industrial process:

Table B

<i>Substance including Part no. in Sch. 1 to the Regs, and entry no. if Part 2, category if Part 1, identity if Part 3</i>	<i>Storage only</i>	<i>Stored and involved in an industrial process</i>
2 / 15		Yes
2 / 22		Yes
2 / 34b		Yes
2 / 34c		Yes
1 / E1 / Ammonia water 24.5% NH3		Yes
2 / 3		Yes

(b) For each vessel to be used for **storing** the substance(s) give the following information:

Table C (i)

<i>Vessel No*</i>	<i>Substance including Part no. in Sch. 1 to the Regs, and entry no. if Part 2, category if Part 1, identity if Part 3</i>	<i>Installed above ground† (Yes/No)</i>	<i>Buried (Yes/No)</i>	<i>Mounded (Yes/No)</i>	<i>Maximum capacity (tonnes)</i>	<i>Highest vessel design temperature °C</i>	<i>Highest vessel design pressure (bar absolute)</i>
Tank T401 drawing reference no. 11	2 / 22	Yes (with full secondary containment)	No	No	240	30	1.2
Tank T402 drawing reference no. 12	2 / 22	Yes (with full secondary containment)	No	No	240	30	1.2
Coal mill Kerosene tank drawing ref no. 1013	2 / 34b	Yes (double skinned tank)	No	No	100	30	1.2
Electrical workshop Kerosene tank drawing ref no. 25	2 / 34b	Yes (with full secondary containment)	No	No	1	30	1.2
Vehicle DERV tank drawing reference 52	2 / 34c	Yes (with full secondary containment)	No	No	47	30	1.2
Vehicle DERV tank drawing reference 53	2 / 34c	Yes (with full secondary containment)	No	No	42	30	1.2

<i>Vessel No*</i>	<i>Substance including Part no. in Sch. 1 to the Regs, and entry no. if Part 2, category if Part 1, identity if Part 3</i>	<i>Installed above ground† (Yes/No)</i>	<i>Buried (Yes/No)</i>	<i>Mounded (Yes/No)</i>	<i>Maximum capacity (tonnes)</i>	<i>Highest vessel design temperature °C</i>	<i>Highest vessel design pressure (bar absolute)</i>
Vehicle DERV tank drawing reference 54	2 / 34c	Yes (with full secondary containment)	No	No	43	30	1.2
Kiln light up tank drawing reference 16	2/34b	Yes (with full secondary containment)	No	No	37	30	1.2
Stores gas oil heating tank drawing reference 60	2 / 34c	Yes (with full secondary containment)	No	No	3	30	1.2
Garage gas oil tank drawing reference 43	2 / 34c	Yes (with full secondary containment)	No	No	3.5	30	1.2
Tyre bay gas oil tank drawing reference 51	2 / 34c	Yes (with full secondary containment)	No	No	3.5	30	1.2
Welfare block gas oil tank drawing reference 31	2 / 34c	Yes (with full secondary containment)	No	No	3	30	1.2

<i>Vessel No*</i>	<i>Substance including Part no. in Sch. 1 to the Regs, and entry no. if Part 2, category if Part 1, identity if Part 3</i>	<i>Installed above ground† (Yes/No)</i>	<i>Buried (Yes/No)</i>	<i>Mounded (Yes/No)</i>	<i>Maximum capacity (tonnes)</i>	<i>Highest vessel design temperature °C</i>	<i>Highest vessel design pressure (bar absolute)</i>
Packing plant gas oil heating tank drawing reference 4	2 / 34c	Yes (with full secondary containment)	No	No	7	30	1.2
Quarry workshop and office gas oil heating tank drawing reference 33	2 / 34c	Yes (with full secondary containment)	No	No	3	30	1.2
Quarry vehicle gas oil tank drawing reference 34	2 / 34c	Yes (with full secondary containment)	No	No	45	30	1.2
Fitting shop gas oil heating tank drawing reference 26	2 / 34c	Yes (with full secondary containment)	No	No	3	30	1.2
Ammonia water tank drawing reference no. 8	1 / E1 / Ammonia water 24.5% NH3	Yes (with full secondary containment)	No	No	55	30	1.2

* identify by reference to substance location plan

† if “Yes”, specify whether or not it will be provided with full secondary containment

- (c) For each substance, category or description of substance, state the largest size of any **moveable** container(s) to be used for that substance, category or description of substances:

Table C (ii)

<i>Substance including Part no. in Sch. 1 to the Regs, and entry no. if Part 2, category if Part 1, identity if Part 3</i>	<i>Storage area on site*</i>	<i>Maximum capacity (tonnes or cubic metres or other units – please specify units)</i>
2 / 15	The area shown in red on the site plan, bounded by the clinker store to the south east, gantry store to the north west and coal plant to the north east	0.247 tonnes
2 / 34c	Two Moveable fuel bowser used in quarry	1.3 m ³
2 / 3	Quarry store	0.5 tonnes

* identify by reference to substance location plan

- (d) For each substance, category or description of substance, describe any non-vessel storage (e.g. stacks) to be used for that substance, category or description of substances:

Table C (iii)

<i>Substance including Part no. in Sch. 1 to the Regs, and entry no. if Part 2, category if Part 1, identity if Part 3</i>	<i>Storage area on site*</i>	<i>Description of storage</i>	<i>Maximum capacity (tonnes or cubic metres or other units – please specify units)</i>
No storage items			

* identify by reference to substance location plan

- (e) Where a substance, category or description of substance is to be used in a **manufacturing, treatment or other industrial process(es)**, give a general description of the process(es), describe the major items of plant which will contain the substance(s); and state the maximum quantity (in tonnes) which is liable to be present in the major items of the plant, and the maximum temperature (°C) and pressure (bar absolute) at which the substance, category or description of substance is liable to be present:

Table D

<i>Substance including Part no. in Schedule 1 to the Regs, and entry no. if Part 2, category if Part 1, identity if Part 3</i>	<i>Description of process(es)</i>	<i>Major items of plant*</i>	<i>Max. quantity (tonnes/hr)</i>	<i>Max. temp. (°C)</i>	<i>Max. pressure (bar absolute)</i>
2 / 15	Cement Manufacture	Kiln 7	0.3 [#]	2000	1.013
2 / 22	Cement Manufacture	Kiln 7	3	2000	1.013
2 / 34b	Cement Manufacture	Kiln 7	1 [‡]	2000	1.013
2 / 34b	Kerosene usage	Coal mills	N/A	500	1.013
2 / 34c	Quarrying	Quarry	N/A	30	1.13
1 / E1 / Ammonia water 24.5% NH3	Cement Manufacture	Kiln 7	0.2	2000	1.013
2 / 3	Quarrying	Quarry	N/A	30	1.13

* identify by reference to substance location plan,

Maximum during demonstration,

‡ For kiln start ups only

Process Description Cement Manufacture

Cement manufacture is a carbon and energy intensive process. The cement industry currently emits around 7% of global carbon dioxide. The Mineral Products Association with Hanson Cement and others was successful in the UK Government fuel switching competition. As part of phase 3 of this competition Ribblesdale Works will be carrying out an industrial scale demonstration of kiln operation using a net zero carbon fuel mix. The fuel mix comprises meat and bone meal (MBM), glycerine (a biomass by product from Biodiesel production) and hydrogen(H₂) . A short trial is planned for March-December 2021 to demonstrate the potential net zero carbon fuel mix for the production of cement clinker. The trials are planned to be carried out on 5 separate days over a period of weeks. Each trial day will gradually change from normal operation to a fuel mix using increasing amounts of MBM, glycerine and Hydrogen. The MBM is already used at the plant and the glycerine has similar physical properties to the Cemfuel(hazardous liquid waste derived fuel) currently used and will use the same transport and control systems as the Cemfuel. Glycerine is non hazardous and has a flash point greater than 100°C.

The use of hydrogen, the reason for this application, will gradually increase up to approximately 0.3 tonnes per hour (3500 Sm³/h). The H₂ will be delivered to, and stored on site in tube tankers each of 247kg capacity. Due to limitations in the UK H₂ production capacity and logistic tankers will be delivered and stored on site for up to 4 days prior to use. Once the trial day is completed the partial empty tankers will be returned. The maximum quantity of H₂ expected to be on site is less than 5 tonnes. During the trial the tube tankers will be discharged through a specially designed pressure reduction and flow control skid equipped with pressure relief systems and venting systems. From the skid the hydrogen flows through a continuously welded pipeline and kiln burner into the kiln where it will be combusted with the other kiln fuels.

Kerosene, gas oil and DERV usage

Kerosene is used as fuel for drying coal in the coal mills.

The gas oil stored on site is mainly used for space heating and fuelling mobile plant such as excavators, quarry dumpers and forklift trucks. Some gas oil or kerosene is used for kiln light ups.

DERV stored on site is used to fuel cement delivery

Quarrying

Limestone and shale are quarried on site, quarry blasting takes place once or twice per week using explosives brought to site by a specialist blasting company, the active quarry faces are over 1 km from the kiln process. Some explosives are produced on site by mixing ammonium nitrate with fuel oil (ANFO).

5 Additional Information

- (a) If you have an existing PHS consent(s) as referred to in Table A, **attach a copy of each consent** to this application. There are no existing hazardous substance consents.
- (b) **List the maps or plans** or any explanatory scale drawings of plant/buildings submitted with this application **(as a minimum submit a site map and a substance location plan – see Notes below)**.

Site Map Information

Site location map

Substance Location Plan Information

site plan R13-A-18

- (c) Provide a brief overview description of the **main activities** carried out or proposed to be carried out on the land to which the application relates.

Production of Portland Cement. The hazardous substance application relates to a short trial, which has been funded by the BEIS fuel switching competition to demonstrate the potential to operate a cement kiln with a zero carbon fuel mix. The trial seeks to demonstrate the use of biomass with hydrogen. The trial will be carried out using a specially designed hydrogen control "skid" which will control the flow of H₂ from tube tankers to the kiln main burner. The maximum quantity of H₂ stored in tankers on site will be 4 tonnes, this is expected to be consumed on a single day at maximum rate of 0.3 tonnes per hour for a short period.

- (d) Provide details of how each relevant substance is proposed to be transported to and from the land to which the application relates, for example the size and frequency of vehicle deliveries, the size or maximum flow rate of pipeline imports/exports.

Table E

Substance including Part number in Schedule 1 to the Regulations, and entry number if Part 2, category if Part 1, identity if Part 3	How, and other details such as frequency and quantity, transported to and from the land to which the application relates	
	Transported to site	Transported from site
2 / 15	Transport to site will be in dedicate tube tankers operated by the H2 supplier each tanker holds 247 kg of H2 at 228 bar pressure. During the peak trial day there will be up to 12 tankers on site. Due to limitations on H2 production capacity up to 4 tankers per day will be delivered to the site in the days preceding the trial.	Partially emptied tankers will return to the supplier once the H2 has been consumed in the process. It is anticipated that around 50 kg of H2 will be left in the tanker as there will be insufficient pressure in the tubes to supply this material to the kiln at the desired pressure and flowrate.
2 / 22	The installation does not use pure methanol, it uses Cemfuel (SLF) a hazardous liquid waste as kiln fuel. HSE provide specific guidance on the classification of SLF(Cemfuel) for COMAH. The guidance is that Cemfuel containing more than 10% methanol it should be treated as methanol for the purposes of COMAH rather than as generic toxic providing the Cemfuel is not toxic in its own right (by the presence of other toxic materials). All the Cemfuel supplied to Ribblesdale is either non toxic or contains greater than 10% methanol. The Cemfuel is delivered in road tankers and transferred to dedicated bulk storage tanks, before being pump to the kiln for use.	The Cemfuel is combusted on site and does not leave the site. There may be rare occasions when tanker will leave the site containing Cemfuel for example if there are difficulties unloading the tanker due to a breakdown on the unloading systems or problems with emptying the tanker.
2 / 34b	Delivered to site by road tanker	Consumed on site for heating
2 / 34c	Delivered by road tanker	Consumed on site for heating, on and off road vehicles
1 / E1 / Ammonia water 24.5% NH3	Delivered by road tankers	Consumed on site for selective non catalytic NOx reduction in kiln 7

Substance including Part number in Schedule 1 to the Regulations, and entry number if Part 2, category if Part 1, identity if Part 3	How, and other details such as frequency and quantity, transported to and from the land to which the application relates	
	Transported to site	Transported from site
2 / 3	Delivered to site by delivery van	Consumed in on site quarry as part of explosive mixture used for quarry blasting.

- (e) Provide details of the vicinity of the land to which the application relates, where such details are relevant to the risks or consequences of a major accident (relevant details include numbers of people in neighbouring developments that could be affected by a major accident).

The land where the Hydrogen will be stored is within the cement manufacturing plant and approximately 150m from the nearest site boundary it will be more than 80m from the Cemfuel storage tanks. The H₂ storage area is in the centre of the plant. There are 2 private dwellings approximately 200m from the storage area and the Johnson Matthey plant is approximately 400 m to the south west, employing approximately 240 people some working continuous shifts. There are a further 10 homes between 200 and 300 m from the storage area. The Hanson main offices for the cement plant are approximately 200 m from the storage area with typically 20 employees present during office hours. There are no regularly occupied buildings within 100 m of the H₂ storage area.

- (f) Provide a brief overview of the measures taken or proposed to be taken to limit the consequences of a major accident.

HAZID and HAZOP studies will be undertaken as part of the trial design. The H₂ storage and control skid will be subject to a HAZOP already as part of the supplier's standard design process of H₂ supply systems. The H₂ will be stored at a safe distance from heat and ignition sources in accordance with BCGA code of practice CP33 - The bulk storage of hydrogen at customer's premises. The control skid and tube tankers will be electrically earthed and the operation of the skid will be controlled by the H₂ supplier's personnel. The control skid and pipework to the burner will be pressure tested and if needed non-destructive testing carried out prior to commissioning. The demonstration trials will be carried out during day time when additional day staff are present on site. There are likely to be further control measures required arising from the hazard studies that will need to be implemented in addition to those outlined here. Training such tool box talks covering the trial activities, additional hazards and mitigation will be provided, where necessary specific training will be given following completion of the various hazard studies.

The pressure reduction and flow control skid will be equipped with pressure relief systems and venting to control the pressure release in the event of an emergency shutdown that requires depressurisation of the hydrogen system. The hydrogen pipeline will be continuously welded pipeline and will run through areas of very low occupancy, the only flanges are expected to be hydrogen supply skid, pressure reduction and flow control station both of which will be located in areas of very low occupancy. The installation has been subject to a DSEAR assessment, with


restrictions on source of ignition in all areas where hydrogen is stored or used (with the exception of the combustion in the kiln itself).

- (g) Give any further information which you consider to be relevant to the determination of this application.

The demonstration trial is for a limited period only. A 4 tonne maximum storage quantity has been selected for the hydrogen, the current plan anticipates a maximum of 3 tonnes (12 tube tankers) to be on site for the final trial day. This will allow only a few hours operation with the maximum H₂ flowrate, if the demonstration is successful at an early stage when operating at the 3500Sm³/h flow rate then there is the potential to increase the duration at maximum flow on later days in the trial programme providing sufficient tube trailers are available. The total H₂ consumed during the demonstration is expected to be less than 10 tonnes.

The flow control skid is being specially designed for this, and other H₂ fuel switching demonstrations, by BOC the H₂ producer. Cement kilns operate continuously, prior to the demonstration with H₂ operation the plant will operate normally with coal, MBM and glycerine on the trial days the coal will gradually be replaced with hydrogen up to a maximum H₂ flowrate set for the day. The net zero fuel mix will only be possible for a few hours on days 4 and 5 of the planned trial. When the trial is completed the control skid will be removed from the plant.

I/We hereby apply for hazardous substances consent in accordance with the proposals described in the application

Signed 

on behalf of CASTLE CEMENT LTD

(insert name of person in control of the land if different to applicant)

Date 09/12/2020

To be accompanied by the notices and certificates required by regulations 6 and 7 of the Regulations.

Notes

“Site map” is a map, reproduced from, or based on, an Ordnance Survey map with a scale of not less than 1:10,000, which identifies the land to which the application relates and shows National Grid lines and reference numbers.

“Substance location plan” is a plan of the land to which the application relates, drawn to a scale of not less than 1:2,500, which identifies-

- (a) any area of land intended to be used for the storage of the substance;
- (b) where the substance is to be used in a manufacturing, treatment or other industrial process, the location of the major items of plant involved in that process in which the substance will be present; and
- (c) access points to and from the land.

