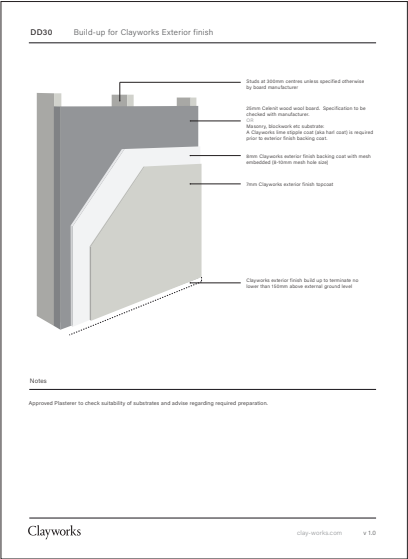


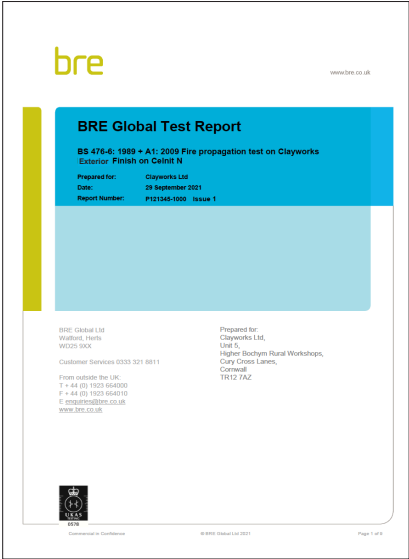


Clayworks

EXTERIOR FINISHES
DATA SHEETS



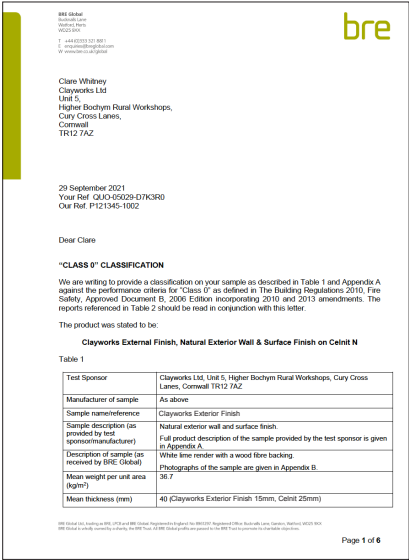
BUILD-UP FOR CLAYWORKS EXTERIOR FINISH
Page 3



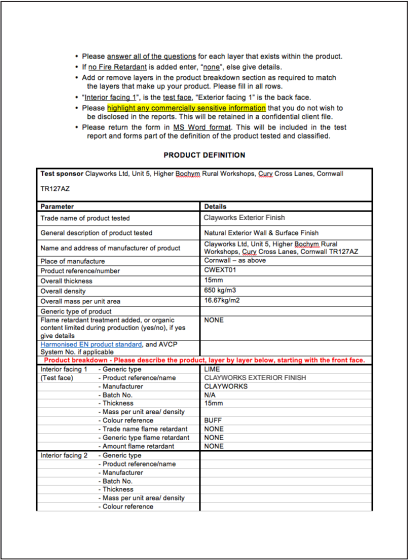
BS 476-6 BRE GLOBAL TEST REPORT
Available on request



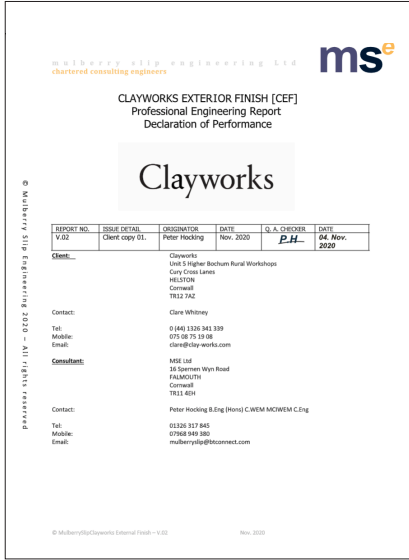
BS 476-7 BRE GLOBAL TEST REPORT
Available on request



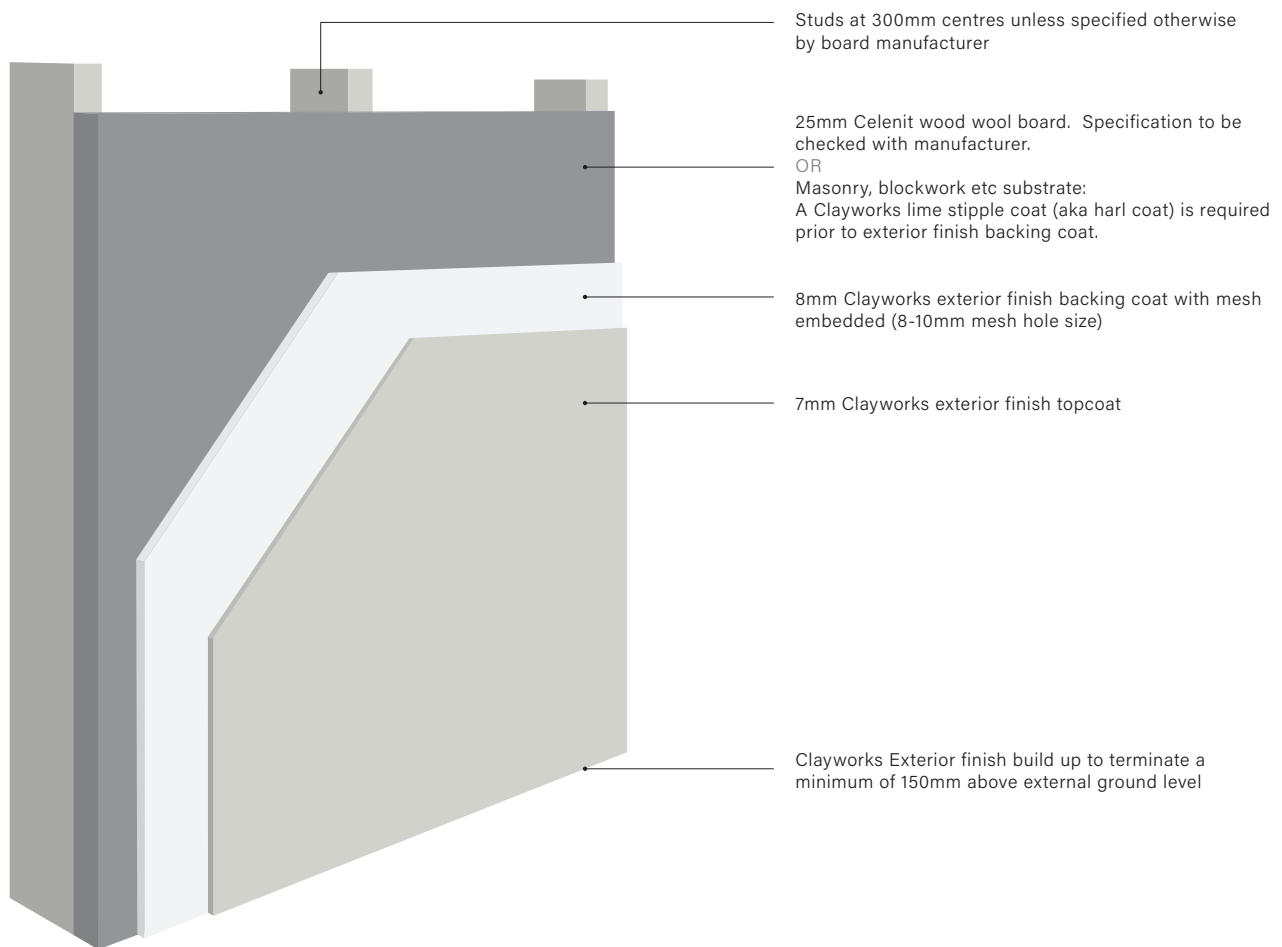
BRE 'CLASS ZERO' CLASSIFICATION
Available on request



PRODUCT DEFINITION
Available on request



ENGINEERING REPORT
Page 4



Notes

Approved Plasterer to check suitability of substrates and advise regarding required preparation.
Approved Plasterer to confirm build-up and specifications.

Design considerations:

- roof overhang or capping should be included to protect the finish at the top of wall.
- cills should not be formed with Clayworks Exterior finish.

mulberry slip engineering Ltd
chartered consulting engineers



CLAYWORKS EXTERIOR FINISH [CEF] Professional Engineering Report Declaration of Performance

Clayworks

REPORT NO.	ISSUE DETAIL	ORIGINATOR	DATE	Q. A. CHECKER	DATE
V.02	Client copy 01.	Peter Hocking	Nov. 2020	<i>P.H.</i>	04. Nov. 2020

Client:

Clayworks
Unit 5 Higher Bochum Rural Workshops
Cury Cross Lanes
HELSTON
Cornwall
TR12 7AZ

Contact:

Clare Whitney

Tel:

0 (44) 1326 341 339

Mobile:

075 08 75 19 08

Email:

clare@clay-works.com

Consultant:

MSE Ltd
16 Spemen Wyn Road
FALMOUTH
Cornwall
TR11 4EH

Contact:

Peter Hocking B.Eng (Hons) C.WEM MCIWEM C.Eng

Tel:

01326 317 845

Mobile:

07968 949 380

Email:

mulberryslip@btconnect.com

© Mulberry Slip Engineering 2020 – All rights reserved

CONTENTS

ITEM	DESCRIPTION	PAGE NO.
1.	Executive summary	3
2.	Essential characteristics of NHL	4
3.	Aggregate	4
4.	Water	4
5.	Application technical guidance	5
6.	Mix design	5
7.	Safety	6

Appendices

[Appendix A – Declaration of Performance](#)

[Appendix B - MSE Ltd Standard Terms and conditions](#)

1. Executive Summary.

Clayworks External Finish (CEF) is a natural mineral wall finish and a hydraulic lime (NHL) based cement free render product suitable for external application. The CEF has been formulated by Clayworks to complement the company's primary range of Clay Plasters which are not suitable for external use. CEF is manufactured utilising a responsibly sourced controlled blend of lime (NHL) to EN 459-1, carefully selected aggregates with the addition of natural inert mineral pigments if specified. The unique properties of this render make it suitable for the external application on various density substrates, for renovation of old and listed buildings and ecological new builds.

The active NHL ingredient conforms with British Standard EN 459-1: 2015 'Building Lime. Definitions, specifications, and conformity criteria', which is applicable to building limes used as binders for the preparation of mortar for masonry, rendering and plastering and the production of other construction products. The products special composition allows the product to breathe and also permits constant hygrometric exchange between the substrate and the environment.

The pre-mixed 25kg bags of Clayworks External Finish render is 100% natural and ready to use, just add water and mix.

The NHL element is manufactured by calcinating a high calcium limestone in carefully controlled conditions at a temperature of around 1200°C. The quicklime produced is then crushed and hydrated to produce a fine powder with a approximate bulk density of 650 kg/m³. The NHL so utilised in the production of CEF is ISO 9001 certified.

The CEF pre-mix render product is factory supplied and quality controlled.

It is clear from my experience as a professional Chartered Engineer that the various constituents forming CEF features the following characteristics:

- Non-combustible: as tested by the British Research Establishment (BRE) in accordance with BS 476-7:1997
- 100% natural
- Durable
- Breathable
- Flexible
- Colour consistent
- Less susceptible to sulphate attack
- Environmentally friendly, as lime renders actively absorb CO₂ from the atmosphere
- Highly resistant to freeze thaw
- Factory supplied and quality controlled
- Easy to use, just add water

For a [Declaration of Performance](#) as per the harmonized technical Specification BS EN 459-1 refer to Appendix A.

2. Essential Characteristics of the NHL constituent.

Table 1.0 – Mix ratios, compressive strengths, and elastic moduli

Mortars Mix Ratio	Compressive strength (N/mm ²)				Elastic Moduli (Mpa)		
	BS EN 459	1:2	1:2.5*	1:3	1:2	1:2.5	1:3
7-days		0.75	0.57	0.53			
28-days	3.5*	1.88	1.47	1.34	9010	9000	8070
6-months		7.1	5.34	4.94	15260	13501	13150
12-months		7.5	5.90	3.90	15280	13620	13150
24-months		8.63	6.00	3.97	17480	13785	13670
Consumption per 1m ³ of mortar kg +/- 10%		305	244	216			
**Mortar durability class 5-6							
*BS EN 459 (mortar ratio 1:1 by volume, with ISO 679:2009 Sand) [Methods of testing cements. Determination of strength]							

CEF Pre-bag renders features:

- Shelf life: 8 to 12 months (when shrink wrapped, sealed and dry)
- Bag weight: 25kg
- Product storage: always in a cool dry area of the ground, under cover or sheeted.
- Working temperatures: not below 5°C or above 30°C. Ensure that any high suction materials are thoroughly dampened before application. Avoid rapid drying due to high temperatures or strong winds etc by curing with a light water mist several times a day as necessary.
- Reworking: the product is possible within 5-hours of initial mix.
- Aggregate: Clayworks utilise well graded aggregates of various sizes (see below) at a 1:2.5 (NHL: Sand)
- Sustainability: Lime is produced at a far lower temperature than cement, therefore requiring significantly less energy to produce. Lime has a unique ability to absorb carbon dioxide from the atmosphere, further minimizing total CO₂ emissions.

3. Aggregate

The sand constituent part of CEF is achieved by the blend of two different kiln dried aggregate types:

- Aggregate type 1: is a fine angular well graded 2mm down to 75 microns flint type (52% by weight of the total)
- Aggregate type 2: is a coarse angular well graded 5mm down to 75 microns flint type (35% by weight of the total)

The sand, so utilised, is a washed sharp flint sand with angular grains to ensure good bonding qualities and is chemically inert. Note that CEF does not utilise soft building sand and sands with a high fines content, these are avoided to lessen the extent of excessive shrinkage.

4. Water.

Only utilise clean (potable), cool water, the addition of clean water should be a careful consideration as it will affect the ultimate strength and the durability of the mortar. Note that too little water will prevent the chemical processes taking place and thereby weaken the material. Water should be added sparingly.

Approximately 5 L of water is required for a 25kg pre-mix bag.

5. General application technical guidance.

Preparation of the substrate

All substrates should be thoroughly cleaned and free from all loose particles, dust and debris and examined for contamination, deterioration, water suction capacity and strength. Ensure the substrate surface is not overly smooth, if this is the case roughen the substrate surface to ensure an adequate key for the initial render coat. Salts and efflorescence should be removed prior to render application by dry brushing (non-metallic bristles).

Shrinkage, drying and weather damage

Ensure the applied render coating is suitably protected for excess heat by water mist curing and sheltered from inclement weather. This can be achieved by simple wetting tests, keen observation, and preparation from the outset of application. See below:

Shrinkage: as the lime based render begins to set in the drying out phase shrinkage is reduced by the use of a plasterers float and misting the wall as necessary and applied the float at equal pressure across the surface in a tight circular pattern.

Drying out: any lime-based render should not be allowed to dry too quickly. NHL based render that is allowed to dry out overly quickly is more likely to fail.

Pre-Wetting the lime render substrate surface

The control of shrinkage can be better achieved by the pre-wetting of the substrate thus avoiding the loss of moisture from the mix to the substrate. Wetting is best achieved by mist spray type applicators. If the substrate is super porous e.g. chalks, cob, soft stone, or block etc wetting by hosepipe might be necessary.

Weather

Great care should be taken to the weather as strong sun, wind, rain, and frost will have a negative bearing on the outcome of performance of the lime rendering. The render coating needs to be kept dry enough to permit the render to hydrate but not too quickly such that it dries and shrinks. The render surface should be protected from rainfall (wind driven or direct) and where necessary protected behind wetted hessian type material curtains to provide suitable protection from the sun and or wind. Frost should be avoided over the initial 14-days.

6. CEF mix design.

The Clayworks External Finish mix design is as below.

- 87% sand by weight (@ 1800kg/m³)
- 13% NHL by weight (@ 650 kg/m³)

This equates to a around 1: 2.5 (NHL: Sand) mix by volume.

The approximate coverage is approximately 1.5m²/25kg bag.

7. Safety

CEF contains NHL which becomes alkaline when wet and may cause skin irritation. Use goggles, gloves and protecting cream (barrier cream). Avoid prolonged contact with the skin. Avoid inhaling dust. Wash affected area with warm water and soap. Wash eyes thoroughly and consult a physician. Do not ingest.

END.

APPENDIX A – DECLARATION OF PERFORMANCE

1. Unique Identification code of the product type:
[CLAYWORKS EXTERNAL FINISH \[CEF\]](#)
2. Batch Number:
[Printed batch/order code is printed on the side of each specific consignment](#)
3. Intended use(s):
[External rendering mortar and external coloured rendering mortar](#)
4. Manufacturer:

[Clayworks Ltd](#)
[Unit 5 Higher Bochum Rural Workshops](#)
[Cury Cross Lanes](#)
[HELSTON](#)
[Cornwall](#)
[TR12 7AZ](#)

[Phone: 0 \(44\) 1326 341 339](#)
[Web: \[www.clay-works.com\]\(http://www.clay-works.com\)](#)
5. Authorised representative

[N/A](#)
6. Systems of Assessment and Verification of Constancy of Performance (AVCP)

[System 4](#)
7. Harmonised standard(s):

[British Standard EN 459-1: 2015 Building Lime. Definitions, specifications, and conformity criteria](#)

[BS EN 998-1: 2016 Specification for mortar for masonry - Part 1: Rendering and plastering mortar](#)

[BS EN 998-2: 2016 Specification for mortar for masonry - Part 2: Masonry mortar](#)
8. Declared Performance

Essential Characteristics	Performance/NPD	Harmonised Technical Standard
Reaction to Fire	Euroclass A1	EN998-1:2010
Capillary water absorption	Class W0	EN998-1:2010
Water vapour permeability coefficient (μ)	μ 15/35 (tabulated)	EN998-1:2010
Adhesion (N/mm ²) and fracture pattern	≥ 0.05 N/mm ² (FP A/B)	EN998-1:2010
Thermal conductivity (W/(m.K))	0.83 W/(m.K)	EN998-1:2010
Durability*	NPD	N/A
Dangerous substance(s)	Refer to Material safety data sheet(s)	N/A

*NPD Properties not determined as they are not relevant (No Performance Determined).

9. The performance of the product identified above is in conformity with the set of declared performance/s.

This Declaration of Performance is issued, in accordance with Regulation (EU) No. 305/2011, under the sole responsibility of the manufacturer identified above.

Signed:

Clayworks Ltd Director

Dated: