

# HAPAS

## Larsen Manufacturing Ltd t/a Larsen Building Products

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**HAPAS Certificate**  
**17/H261**  
Product Sheet 3

### LARSEN HIGHWAYS BEDDING MORTARS AND BACKFILL CONCRETE

#### LARSEN PM04

This HAPAS Certificate Product Sheet<sup>(1)</sup> is issued by the British Board of Agrément (BBA), supported by Highways England (HE) (acting on behalf of the Overseeing Organisations of the Department for Transport; Transport Scotland; the Welsh Assembly Government and the Department for Regional Development, Northern Ireland), the Association of Directors of Environment, Economy, Planning and Transport (ADEPT), the Local Government Technical Advisers Group and industry bodies. HAPAS Certificates are normally each subject to a review every three years.

(1) Hereinafter referred to as 'Certificate'.

This Certificate relates to Larsen PM04 for use in the installation, raising and reinstatement of ironwork, up to and including installation Group 4 of BS EN 124-1 : 2015 where rapid trafficking is required.

#### CERTIFICATION INCLUDES:

- factors relating to compliance with HAPAS requirements
- factors relating to compliance with Regulations where applicable
- independently verified technical specification
- assessment criteria and technical investigations
- design considerations
- installation guidance
- regular surveillance of production
- formal three-yearly review.



#### KEY FACTORS ASSESSED

**Performance** — the product, when used as bedding mortar, meets the requirements for compressive strength and rapid setting in accordance with HD 27/15, Clause 3.11, and the requirements for bedding materials in accordance with HA 104/09, Clause 6.1(a) to (d) (see section 6).

**Durability** — provided the surrounding pavement remains structurally sound, the product will have an anticipated service life of up to five years (see section 8).



The BBA has awarded this Certificate to the company named above for the product described herein. This product has been assessed by the BBA as being fit for its intended use provided it is installed, used and maintained as set out in this Certificate.

On behalf of the British Board of Agrément

Date of First issue: 20 April 2017

Simon Wroe – Head of Approvals  
Engineering

Claire Curtis-Thomas  
Chief Executive

*Certificate amended on 16 May 2017 to update section 11.*

*The BBA is a UKAS accredited certification body – Number 113.*

*The schedule of the current scope of accreditation for product certification is available in pdf format via the UKAS link on the BBA website at [www.bbacerts.co.uk](http://www.bbacerts.co.uk)  
Readers are advised to check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA direct.*

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## Requirements

In the opinion of the BBA, Larsen PM04, when manufactured and installed in accordance with the provisions of this Certificate, is satisfactory as an ironwork installation product. The product meets the relevant requirements for rapid-hardening bedding mortars of HA 104/09 and the requirements for rapid construction of HD 27/15 of the *Design Manual for Roads and Bridges* (DMRB).

(1) The DMRB is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Assembly Government and the Department for Regional Development (Northern Ireland).

## Regulations

### Construction (Design and Management) Regulations 2015

### Construction (Design and Management) Regulations (Northern Ireland) 2016

Information in this Certificate may assist the client, designer (including Principal Designer) and contractor (including Principal Contractor) to address their obligations under these Regulations.

See sections: 3 *Delivery and site handling* (3.1 and 3.3) of this Certificate.

## Technical Specification

### 1 Description

1.1 Larsen PM04 is a fast-setting two-part polyester resin mortar consisting of the following components:

- Larsen PM04 Filler Component — consisting of a blend of sand and catalyst. The catalyst component acts as activator in the hardening process when combined with the resin compound
- Larsen PM04 Resin Component — an amber liquid organic compound, used in combination with the powder component.

1.2 The following materials may be used with the product:

- Larsen MBC10 — a cementitious backfill mortar used to provide a level surface prior to application of permanent surfacing materials.

1.3 Ancillary components for use with the product, but outside the scope of this Certificate, include:

- Larsen BES 10 Seal and Tack — a spray-applied sealant, applied to the vertical edges at joint interfaces. This is used prior to application of the hot- or cold-applied asphalt.

1.4 Quality control checks are carried out on the raw materials during manufacture and on the finished product.

### 2 Manufacture

2.1 The product is manufactured using typical batch-blending processes for producing resin and powder blends.

2.2 As part of the assessment and ongoing surveillance of product quality, the BBA has:

- agreed with the manufacturer the quality control procedures and product testing to be undertaken
- assessed and agreed the quality control operated over batches of incoming materials
- monitored the production process and verified that it is in accordance with the documented process
- evaluated the process for management of nonconformities
- checked that equipment has been properly tested and calibrated
- undertaken to carry out the above measures on a regular basis through a surveillance process, to verify that the specifications and quality control operated by the manufacturer are being maintained.

2.3 The management system of Larsen Manufacturing Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by SGS (Certificate GB13/88131).

### 3 Delivery and site handling

3.1 The product is delivered to site in the packaging and weights given in Table 1. Packaging bears the manufacturer's name and address, and mixing instructions.

Table 1 Larsen PM04 packaging and weight

Product type	Weight (kg)	Packaging type	Shelf Life (months) <sup>(1)</sup>
PM04	25	Tub containing the 2 parts	Min 6
	12.5		Min 6
	6.5		Min 6
MBC10	25	2 part plastic bag	6

(1) Unopened containers/packs, when stored under dry conditions in accordance with the Certificate holder's instructions.

3.2 The product must be stored in unopened containers, in dark, cool and dry locations away from extremes of temperature.

3.3 The Certificate holder has taken the responsibility to classify and label the product under the *CLP Regulation (EC) No 1272/2008 on the classification, labelling and packaging of substances and mixtures*. Users must refer to the relevant safety data sheet(s).

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Larsen PM04.

## Design Considerations

### 4 Use

4.1 Larsen PM04 is satisfactory for use in the installation, raising and reinstatement of ironwork, up to and including installation Group 4 of BS EN 124-1 : 2015 where rapid construction and trafficking is required.

4.2 The product is used for the rapid bedding and fixing applications in highways and pavements.

4.3 When used as a bedding material the thickness must be 10 up to 50 mm.

### 5 Practicability of installation

Installation of the product must be carried out by specialist contractors experienced with this type of product.

### 6 Performance

6.1 Larsen PM04, when used as a bedding material, will achieve a nominal compressive strength of 60 N·mm<sup>-2</sup> within two hours and will meet the requirements for rapid construction in HD 27/15, Clause 3.11.

6.2 The product also meets the requirements for rapid-hardening bedding materials of HA 104/09, Clause 6.1 (a) to (d) for temperatures between 5°C and 30°C.

6.3 The workable life of the mixed Larsen PM04, with regards to the requirements of HA 104/09 Clause 6.1 (b), is temperature dependent, with warm conditions accelerating the setting and low temperature conditions requiring extended curing times (see section 11).

## 7 Maintenance

The product is not subject to any routine maintenance requirements but any damage must be repaired as soon as practicable (see section 12).

## 8 Durability

Provided the surrounding pavement remains structurally sound, the product will have an anticipated service life of up to five years.

## Installation

### 9 General

9.1 The mixing and installation of Larsen PM04 must be carried out in accordance with the procedures described in this Certificate and the Certificate holder's literature. Reference must also be made to the *Recommendations for Installation* of Annex F, BS EN 124-1 : 2015.

9.2 The compressive strength and rapid-construction characteristics of Larsen PM04 are affected by temperature, which must be between 5°C and 30°C during curing. The advice of the Certificate holder must be sought when the material temperature is outside this range.

9.3 Precast concrete inspection chambers should comply with the requirements of BS 5911-4 : 2002 and BS EN 752 : 2008.

9.4 Where other materials are to be used in conjunction with the product (eg to repair/rebuild the supporting structure), such materials should have a strength commensurate with the reinstatement product, in accordance with HA 104/09, Clause 9.15.

9.5 When packing materials are used to support and level the frame, they must be compatible with the product and of sufficient strength so as not to detrimentally affect the compressive strength of the bedding material. The Certificate holder must be consulted for suitable materials.

### 10 Substrate preparation

10.1 A perimeter area, indicating the minimum width needed for excavation to include any defects, is marked out around the existing frame of a failed installation.

10.2 The marked area is saw-cut and excavated to uncover the flange of the existing cover and frame. The existing cover and frame are removed using a suitable lifting device, taking care to avoid dropping loose materials into the shaft.

Figure 1 Preparation of damaged ironwork (from site visit)



10.3 All old bedding mortar is removed, and the supporting structure is cut back or loose bricks are removed, until a sound base is achieved.

10.4 The newly-exposed substrate must be clean, free from oil, grease and dust, and be dry and free from loose particles and other contamination, ensuring a sound substrate is achieved. Checks must be made to confirm that it is of adequate size and strength to support the frame, cover and expected loading prior to commencing the reinstatement work.

10.5 The depth needed to install the frame and cover level to the road surface is determined, taking into account the depth of the frame and the manufacturer's recommended maximum and minimum thicknesses (see section 4.3).

10.6 The finishing course of the supporting structure must be adjusted accordingly. For brick structures, levelling should be achieved prior to the installation of the final course.

10.7 Concrete structures must be repaired using suitable concrete repair techniques and materials. The Certificate holder must be consulted for suitable materials.

10.8 All old bedding material, loose paint, rust and any other debris must be removed from the frame prior to installation.

## **11 Installation**

11.1 The product is mixed and laid strictly in accordance with the manufacturer's recommendations.

11.2 When using Larsen PM04, the substrate must be clean and dry prior to application of the mortar.

11.3 When mixing, the filler component is slowly added to the resin, at a ratio of one bag of filler to one tin of resin, and mechanically mixed to achieve a firm non-slump mix with a uniform consistency. The mixed Larsen PM04 must be used within five to ten minutes of mixing (dependant on temperature). If the product is to be installed at temperatures below 5°C or above 30°C, the manufacturer should be consulted for further guidance.

11.4 The mixed Larsen PM04 must be placed immediately on the supporting structure (see Figure 1). The product must be applied in a single pass, in a bed of 5 to 50 mm thickness, allowing a 5 to 10 mm excess thickness.

11.5 The frame is then placed onto the bedding mortar, ensuring that it is fully supported and that the frame does not overhang the bedding mortar at any point. A straight edge is placed over the frame and the surrounding carriageway, tamping the frame to ensure the correct level is achieved.

11.6 Care must be taken to eliminate air voids between the substrate/bedding and the bedding/frame. Any exposed areas must be float finished, the voids filled and any loose material removed.

11.7 The bedding mortar should be allowed to set to a point at which a tap with a hammer leaves no depression. Once this is achieved, Larsen MBC10 backfill concrete can be applied.

11.8 Once the backfill material has reached the initial set, all vertical edges of the excavated area and the manhole frame are sprayed with LarsenBES 10 Seal and Tack, ensuring all surfaces are covered in preparation for the application of either a hot- or cold-applied asphalt course.

11.9 The traffic can be re-opened after 2 hours following completion of the installation, depending on site conditions.

## **12 Repair**

In the event that the product is damaged, the ironwork will need to be removed and reinstated as detailed in sections 9 to 11.

### 13 Tests

Tests were carried out and the results assessed to determine:

- pot life and workability
- tensile strength
- shrinkage
- water absorption
- compression strength
- flexural strength
- effect of freeze/thaw
- full-scale load testing with D400 access cover.

### 14 Investigations

14.1 The manufacturing process was evaluated, including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.

14.2 Visits to sites were made to witness installation of the product.

## Bibliography

BS 5911-4 : 2002 + A2 : 2010 *Concrete pipes and ancillary concrete products — Specification for unreinforced and reinforced concrete inspection chambers (complementary to BS EN 1917 : 2002)*

BS EN 124 -1: 2015 *Gully tops and manhole tops for vehicular and pedestrian areas — Gully tops and manhole tops made of composite materials*

BS EN 752 : 2008 *Drain and sewer s outside buildings*

BS EN ISO 9001 : 2008 *Quality management systems — Requirements*

HA 104/09 *Design Manual for Roads and Bridges : Volume 4, Geotechnics and Drainage : Section 2, Drainage : Part 5, Chamber Tops and Gully Tops for Road Drainage and Services : Installation and Maintenance*

HD 27/15 *Design Manual for Roads and Bridges : Volume 7, Pavement Design and Maintenance : Section 2, Pavement Design and Construction : Part 4, Pavement Construction Methods*

### 15 Conditions

#### 15.1 This Certificate:

- relates only to the product/system that is named and described on the front page
- is issued only to the company, firm, organisation or person named on the front page – no other company, firm, organisation or person may hold claim that this Certificate has been issued to them
- is valid only within the UK
- has to be read, considered and used as a whole document – it may be misleading and will be incomplete to be selective
- is copyright of the BBA
- is subject to English Law.

15.2 Publications, documents, specifications, legislation, regulations, standards and the like referenced in this Certificate are those that were current and/or deemed relevant by the BBA at the date of issue or reissue of this Certificate.

15.3 This Certificate will remain valid for an unlimited period provided that the product/system and its manufacture and/or fabrication, including all related and relevant parts and processes thereof:

- are maintained at or above the levels which have been assessed and found to be satisfactory by the BBA
- continue to be checked as and when deemed appropriate by the BBA under arrangements that it will determine
- are reviewed by the BBA as and when it considers appropriate.

15.4 The BBA has used due skill, care and diligence in preparing this Certificate, but no warranty is provided.

15.5 In issuing this Certificate the BBA is not responsible and is excluded from any liability to any company, firm, organisation or person, for any matters arising directly or indirectly from:

- the presence or absence of any patent, intellectual property or similar rights subsisting in the product/system or any other product/system
- the right of the Certificate holder to manufacture, supply, install, maintain or market the product/system
- actual installations of the product/system, including their nature, design, methods, performance, workmanship and maintenance
- any works and constructions in which the product/system is installed, including their nature, design, methods, performance, workmanship and maintenance
- any loss or damage, including personal injury, howsoever caused by the product/system, including its manufacture, supply, installation, use, maintenance and removal
- any claims by the manufacturer relating to CE marking.

15.6 Any information relating to the manufacture, supply, installation, use, maintenance and removal of this product/system which is contained or referred to in this Certificate is the minimum required to be met when the product/system is manufactured, supplied, installed, used, maintained and removed. It does not purport in any way to restate the requirements of the Health and Safety at Work etc. Act 1974, or of any other statutory, common law or other duty which may exist at the date of issue or reissue of this Certificate; nor is conformity with such information to be taken as satisfying the requirements of the 1974 Act or of any statutory, common law or other duty of care.