

## PPG Protective and Marine Coatings

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HAPAS Certificate  
**07/H124**  
Product Sheet 3

### PAINTS FOR CORROSION PROTECTION OF STRUCTURAL STEELWORK IN HIGHWAY APPLICATIONS

#### SIGMASHIELD 460 — TO HE ITEM NO 123

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 SigmaShield 460, for use as part of a specification for the corrosion protection of structural steelwork in Highway Applications in accordance with the Manual of Contract Documents for Highway Works, Volumes 1 and 2, where Item No 123 is specified.

#### 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

**Corrosion resistance** — a complete paint system incorporating the product, when applied in accordance with this Certificate, will provide satisfactory resistance to corrosion of the substrate steel (see section 6).

**Durability** — a complete paint system, based on the products described in this Certificate, can be expected to perform satisfactorily for a period in excess of 15 years before its first major maintenance (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



John Albon — Head of Approvals  
Construction Products



Claire Curtis-Thomas  
Chief Executive

Date of Fourth issue: 10 March 2017

Originally certificated on 20 February 2008

*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

The Highways Technical Advisory Committee (HiTAC) and HAPAS Specialist Group 12 (Paints and similar protective coatings for corrosion protection of structural steelwork) have agreed with the BBA the aspects of performance to be used by the BBA in assessing the compliance of paints and similar protective coatings as set out in the Guideline Document. Additional requirements of the Overseeing Organisations are set out in the following documents:

- Manual of Contract Documents for Highway Works (MCHW)<sup>(1)</sup>, Volume 1 (Paints) Series 1900 and 5000
- Manual of Contract Documents for Highway Works (MCHW)<sup>(1)</sup>, Volume 2 Series NG 1900 and NG 5000
- Design Manual for Roads and Bridges, BD 35/14
- Design Manual for Roads and Bridges, BD 87/05.

(1) The MCHW 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 section: 3 Delivery and site handling (3.1 and 3.2) of this Certificate.

## Technical Specification

### 1 Description

1.1 SigmaShield 460 is a high solids, two-pack, epoxy-polyamide glass flake coating for use as part of a specification for the corrosion protection of structural steelwork in Highway Applications, in accordance with the MCHW, Volumes 1 and 2, where Item No 123 is specified. The product is available in two standard colours, black and off-white. Other colours are available to special order.

1.2 The product has the following characteristics:

Specific gravity	base	1.64 – 1.73
	curing agent	1.01 – 1.03
	mixed	1.45 – 1.55
Volume solids (%)	mixed	80
Flashpoint (°C)	base	32
	curing agent	26
	mixed	27
VOC (g·l <sup>-1</sup> )	mixed	219.

1.3 Sigma Thinner 91-92 is used to thin the product prior to application and Sigma Thinner 90-53 is used for cleaning equipment.

1.4 The Certificate holder's product data sheet gives full information on the product including material safety data and package labelling.

### 2 Manufacture

2.1 The product is manufactured by a batch-blending process.

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 the manufacturer has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2008 by Bureau Veritas (Certificates 6006509 and FR007208).

### 3 Delivery and site handling

3.1 The product is supplied in 20 and 4 litre packs, in the correct proportions. The gross weights of the mixed containers are 31 and 6.2 kg respectively.

3.2 The Certificate holder has taken the responsibility of classifying and labelling 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).

3.3 When stored in their original containers under the conditions recommended by the Certificate holder, the product has a minimum shelf-life of 12 months.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on SigmaShield 460.

### Design Considerations

#### 4 Use

4.1 Where included as part of the specification for a paint system as listed in the Supplement to Paints for Corrosion Protection of Structural Steelwork in Highway Applications<sup>(1)</sup>, SigmaShield 460 is satisfactory for use as an intermediate coat of a corrosion protection system for structural steel.

4.2 SigmaShield 460 meets the requirements of the Guidance Document and BD 35/14, when included as part of the specification for a paint system as listed in the Supplement to Paints for Corrosion Protection of Structural Steelwork in Highway Applications.

(1) Product Sheet 99 of this Certificate.

#### 5 Practicability of installation

The product is designed to be applied by operatives experienced with this type of product.

#### 6 Corrosion resistance

The product has been tested in accordance with the requirements of the Guideline Document SG12 and meets all of the requirements, and may contribute to corrosion resistance when included as part of the specification for a paint system as listed in the Supplement to Paints for Corrosion Protection of Structural Steelwork in Highway Applications.

#### 7 Maintenance

Regular planned maintenance may be required at the intervals specified in section 8 of this Certificate. Any damage must be repaired in accordance with the MCHW, Volume 1 (Paints), Series 5000.

#### 8 Durability

A complete paint system, based on the products described in this Certificate, can be expected to perform satisfactorily for a period in excess of 15 years before its first major maintenance.

### Installation

#### 9 Application

9.1 Substrates must be cleaned and prepared in accordance with the MCHW, Volume 1 (Paints), Series 1900 and 5000, and the Certificate holder's instructions.

9.2 The base (Part A) is mixed with a power agitator, after which the entire contents of the curing agent (Part B) are added, and the product mixed thoroughly. After mixing, the product may be thinned using Sigma Thinner 91-92, by up to 5% for airless spray, by between 5% and 10% for air-assisted spray and up to 5% for brush/roller application.

9.3 The product is applied by airless spray (tip 0.53 to 0.79 mm, output fluid pressure 190 to 225 bar) or air-assisted spray (tip range 1.5 to 2 mm, output fluid pressure 3 to 4 bar), to achieve a dry film thickness (dft) range of 250 µm to 400 µm. The Certificate holder can advise on suitable spray equipment.

9.4 Small areas can be coated by brush or roller.

9.5 The product is overcoated with the Certificate holder's products bearing the appropriate HAPAS approval, observing the minimum overcoating period given in Table 1.

**Table 1** Application properties

	Temperature (°C)			
	5	10	20	30
Surface dry (hours)	16	8	3	2
Hard dry (hours)	30	16	8	5
Minimum overcoating time (hours)	36	24	8	6
Pot life (hours)	–	180	90	45

9.6 The product must be used within the pot lifetime given in Table 1.

## Technical Investigations

### 10 Tests

The following tests were conducted and the results assessed to determine:

- liquid paints
  - density
  - flashpoint
  - volume solids
  - viscosity
  - volatile organic compound
  - pot life
  - other composition requirements
- applied coating
  - opacity of primer, undercoat and topcoat
  - colour designation
  - visual comparison of primer, undercoat and topcoat colours against the declared standard
  - gloss
  - surface dry (ballotini)
  - hard dry
  - application and appearance
  - minimum overcoating time
  - film thickness
  - flexibility (topcoats only)
- complete system
  - artificial weathering of topcoat
  - scratch resistance of single pack topcoat and of two-pack topcoat
  - impact resistance
  - adhesion for systems of thickness <250 µm, and for systems of thickness >250 µm
  - salt spray
  - sulfur dioxide
  - humidity.

### 11 Investigations

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.

## Bibliography

BS 7079-A1 Supplement 1 : 1989 *Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness – Representative photographic examples of the change of appearance imparted to steel when blast-cleaned with different abrasives*

BS EN ISO 8501-1 : 2007 *Preparation of steel substrates before application of paint and related products – Visual assessment of surface cleanliness – Rust grades and preparation grades of uncoated steel substrates and of steel substrates after overall removal of previous coatings*

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

BD 35/14 *Design Manual for Roads and Bridges (DMRB), Volume 2 Highway Structures : Design (Substructures and Special Structures), Materials, Section 4 Paints and Other Protective Coatings – Part 1 Quality Assurance Scheme for Paints and Similar Protective Coatings*

## Conditions of Certification

### 12 Conditions

12.1 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 or 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.

12.2 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.

12.3 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.

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

12.5 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.

12.6 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.