

## NAYLOR TWINWALL HDPE DUCTING SYSTEM

### NAYLOR METRO-DUCT

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 Government and the Department for Infrastructure, 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 Naylor Metro-Duct, a twinwall high-density polyethylene (HDPE) ducting product, for use in highways as underground ducting for electricity, gas, water supply services, street lighting cables and fibre-optic cabling for telecommunications.

#### 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

**Strength** — the ducts have adequate strength for the intended application (see section 5).

**Performance of joints** — the joints in the ducts will have an adequate degree of protection to solid foreign objects and against water (see section 6).

**Resistance to elevated temperatures** — the ducts have adequate resistance to long-term deformation at an elevated temperature of 45°C (see section 7).

**Practicability of installation** — the ducts are easily installed and have an adequately smooth internal surface to allow installation and withdrawal of cables (see section 9).

**Durability** — when installed and used in accordance with this Certificate, the ducts will have a service life in excess of 50 years (see section 11).



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 Third issue: 1 December 2020

Originally certificated on 14 January 2008

Hardy Giesler  
Chief Executive

*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 MUST check the validity and latest issue number of this Agrément Certificate by either referring to the BBA website or contacting the BBA directly.*

*Any photographs are for illustrative purposes only, do not constitute advice and should not be relied upon.*

## Requirements

In the opinion of the BBA, Naylor Metro-Duct, when used in accordance with the provisions of this Certificate, will meet or contribute to meeting the requirements of the *Manual of Contract Documents for Highways Works (MCHW)*<sup>(1)</sup>, Volume 1 *Specification for Highways Works (SHW)* and Volume 2 *Notes for Guidance on the Specification for Highway Works*.

Further requirements are contained in the MCHW, Volume 3, and additional site requirements may be included in particular contracts.

(1) The MCHW is operated by the Overseeing Organisations: Highways England (HE), Transport Scotland, the Welsh Government and the Department for Infrastructure (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 13 *General* (13.1) of this Certificate.

## Additional Information

This Certificate replaces Certificate 03/R132.

## CE Marking

The Certificate holder has taken the responsibility of CE marking the elastomeric sealing rings, in accordance with harmonised European Standard BS EN 681-1 : 1996.

## Technical Specification

### 1 Description

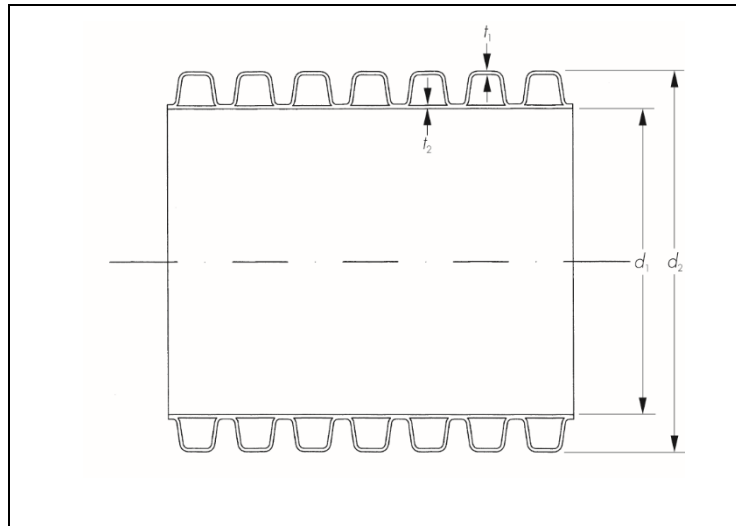
1.1 Naylor Metro-Duct is a HDPE twinwall pipe, manufactured by a twin-extrusion process in a standard length of 6 m. Two pipes are extruded simultaneously, one inside the other, and heat-welded together in one continuous process.

1.2 The outer wall is corrugated and the inner wall is smooth finished. Details and dimensions are given in Table 1 and Figure 1.

Table 1 Duct dimensions

Nominal size (d1) (mm)	Internal diameter (d <sub>1</sub> - Nominal) (mm)	External dia (d <sub>2</sub> - Nominal) (mm)	Outer Thickness t <sub>1</sub> min (mm)	Inner Thickness t <sub>2</sub> min (mm)	Nominal mass (g.m <sup>-1</sup> )
50	52.0	63.6	0.35	0.40	245
94	94.5	110.9	0.35	0.30	590
100	100.0	117.1	0.35	0.30	630
125	125.3	145.3	0.40	0.30	890
137	137.5	160.5	0.40	0.30	990
150	150.5	179.6	0.40	0.30	1180

Figure 1 Duct dimensions



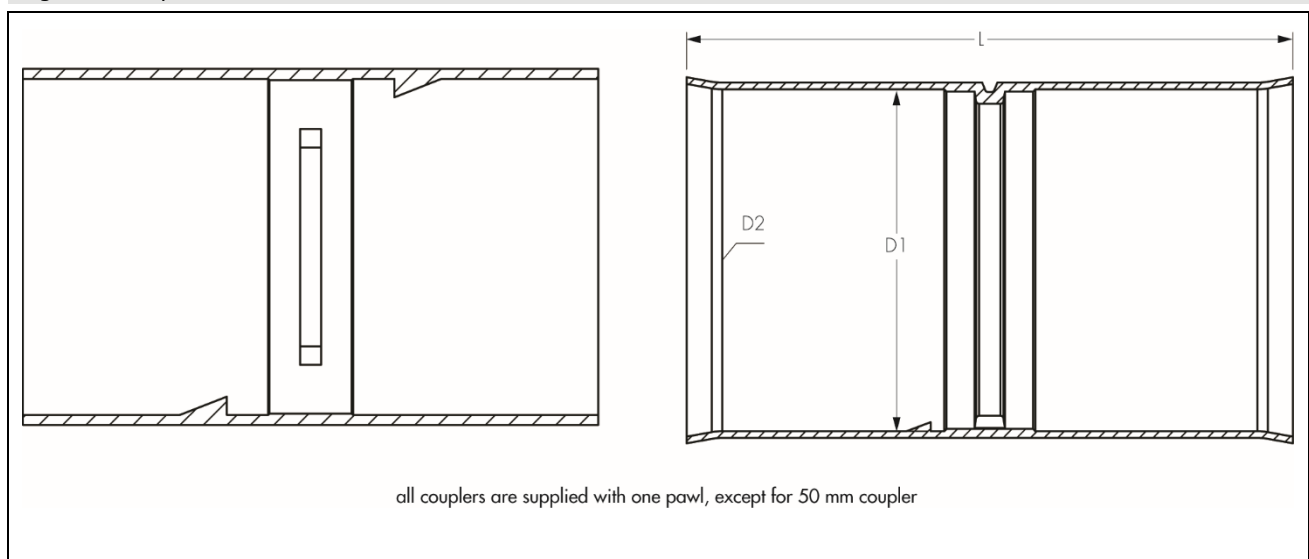
1.3 The product is available in a colour range of black, purple, orange, green, blue, yellow, red, grey and brown. The colour coding is in accordance with National Joint Utilities Group (NJUG) guidelines. The ducts are marked appropriately in accordance with the customer's requirements and the specifications listed in BS EN 61386-24 : 2010.

1.4 A black polypropylene (PP) coupler is used to join the ducts. Details of the couplers are given in Table 2 and Figure 2.

Table 2 Coupler dimensions

Nominal size (mm)	Nominal ID Entry ( $d_1$ ) (mm)	Nominal ID Seal ( $d_2$ ) (mm)	Nominal length (mm)	Nominal wall thickness (mm)
50	64.9	64.1	110	2.0
94	112.6	111.3	200	2.1
100	119.0	117.7	200	2.4
125	146.8	145.6	200	2.7
137	162.0	161.0	178	2.4
150	180.0	179.0	178	2.5

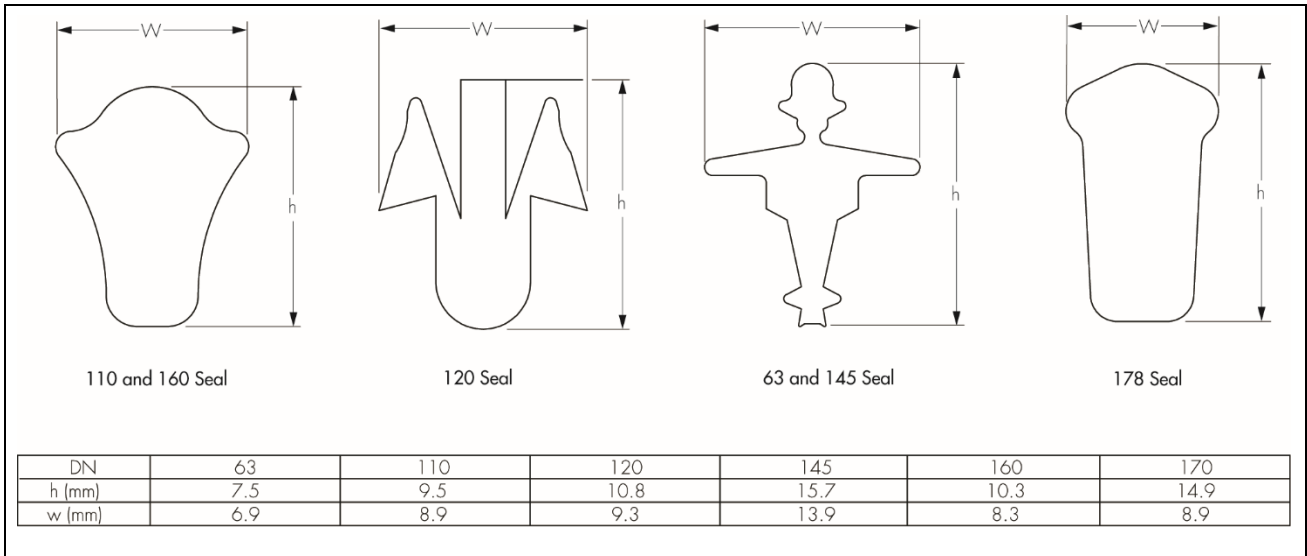
Figure 2 Couplers



1.5 Each coupler requires two rubber seals to ensure a watertight joint. The seals are supplied by the Certificate holder and must be fitted in conjunction with Naylor Lubricant<sup>(1)</sup> to facilitate the connection of the seals, in accordance with the installation instructions. The seals are manufactured to, and CE marked in accordance with, BS EN 681-1 : 1996 (see Figure 3).

(1) Outside the scope of this Certificate.

Figure 3 Seals (dimensions in mm)



1.6 Quality control includes checks on raw materials, dimensional checks, and compression and impact tests.

## 2 Manufacture

2.1 The ducts are manufactured by the Certificate holder from HDPE in a twin extrusion process. Two pipes are extruded simultaneously, one inside the other, and heat-welded together in one continuous process. The ducts are manufactured using a specific colour coding in accordance with the type of application and/or use.

2.2 The couplers are manufactured from PP using a conventional injection moulding technique.

2.3 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 being operated by the manufacturer are being maintained.

2.4 The management system of Naylor Drainage Ltd has been assessed and registered as meeting the requirements of BS EN ISO 9001 : 2015 by BSI (Certificate FM01420).

## 3 Delivery and site handling

3.1 The product is delivered to site strapped into stillage's.

3.2 When used for electrical cables, the ducts are marked with the legend 'Electric Cable Duct'. For other services the marking/colour coding must comply with the requirements of the relevant authority concerned.

3.3 The HDPE ducts and PP couplers have good resistance to UV degradation but, to avoid damage or deterioration in storage, it is recommended that the ducts should be protected from direct sunlight. However, if this is unavoidable, the following mechanism of deterioration should be considered:

- up to 3 months — daily exposure to direct sunlight will cause negligible UV degradation but extreme surface temperatures of up to 80°C are possible on exposed surfaces and may cause some localised distortion
- 3 to 12 months — daily exposure to direct sunlight may have a significant effect on the impact resistance and physical properties of the duct
- over 12 months' — daily exposure to direct sunlight will damage the ducts and should be avoided.

## Assessment and Technical Investigations

The following is a summary of the assessment and technical investigations carried out on Naylor Metro-Duct.

### Design Considerations

#### 4 Use

Naylor Metro-Duct, when installed in accordance with the recommendations given in this Certificate and in the MCHW, Volumes 1 and 2, is suitable for use in highways as underground ducting for electricity, gas and water supply services, street lighting cables, fibre optic cabling for cable television and telecommunications.

#### 5 Strength

5.1 The product has adequate robustness to resist the loads associated with installation and with subsequent use in the situations described in this Certificate.

5.2 The ducts satisfy the requirements for structural wall thermoplastic pipes listed in the MCHW, Volume 1, Table 5/2 *Pipes for Ducts*.

5.3 The ducts will have adequate resistance to the impact loads normally encountered during handling and installation.

5.4 When tested in accordance with BS EN ISO 9967 : 2016, the ducts have an adequate resistance to long-term deformation.

5.5 The ducts satisfy the impact requirements defined as 'normal duty', and the resistance-to-compression requirements defined as type 450 in BS EN 61386-24 : 2010.

#### 6 Performance of joints

When joined with seals and couplers in accordance with the installation instructions, the ducts produce a system with a degree of protection to solid foreign objects and against water to BS EN 60529 : 1992, first characteristic numeral 4 and second characteristic 7 respectively. This equates to an IP code of 47 to this Standard.

#### 7 Resistance to elevated temperatures

7.1 The maximum temperature to which the ducts and couplers will be subjected in service as electrical cable ducts is dependent on the ground thermal conductivity, of burial, ground temperature and the heat load imposed by the electrical cable.

7.2 In general, cables with a surface temperature of up to 60°C will not affect the integrity of the ducts. For example, in a typical installation with 300 mm<sup>2</sup> copper cable carrying a current of 600 Amps imposing a heat load of 25 W·m<sup>-1</sup>, the cable would have a surface temperature of 60°C which would result in a mean internal duct temperature of 45°C.

7.3 The ducts have adequate resistance to long-term deformation at an elevated temperature of 45°C.

#### 8 Resistance to chemicals

The HDPE used to manufacture the ducting, and the PP used to manufacture the couplers, are expected to have adequate resistance to the types and levels of chemicals typically found in soils and groundwater in civil engineering applications.

#### 9 Practicability of installation

9.1 The ducts can be installed easily under normal site conditions.

9.2 The ducts have a smooth internal surface and a static friction coefficient of less than 0.27, when tested in accordance with ENA TS 12-24. The ducts and their joints do not present any internal projection or any unacceptable impedance to the installation or withdrawal of cables through the duct run.

## **10 Maintenance**

As the product is buried and has suitable durability (see section 11), maintenance is not required.

## **11 Durability**

When the product is installed and used in accordance with this Certificate, the materials from which the ducts are manufactured will not significantly deteriorate and the system will have a service life in excess of 50 years.

## **12 Reuse and Recyclability**

The product is manufactured from polyethylene and polypropylene, which can be recycled.

## **Installation**

### **13 General**

13.1 Naylor Metro-Duct must be installed in accordance with the general requirements and any additional site requirements.

13.2 The general requirements must be in accordance with the MCHW, Volume 3, as shown in Figure 4 of this Certificate.

13.3 Ducting laid in depths of cover, other than those specified in Figure 4, must be laid in accordance with the procedures described in the contract with Highways England (HE).

13.4 The product must be adequately protected against damage from site construction traffic and from agricultural or similar operations.

13.5 When used as ducts for fibre optic cabling the recommendations of BS 50174-3 : 2013 should be followed.

### **14 Procedure**

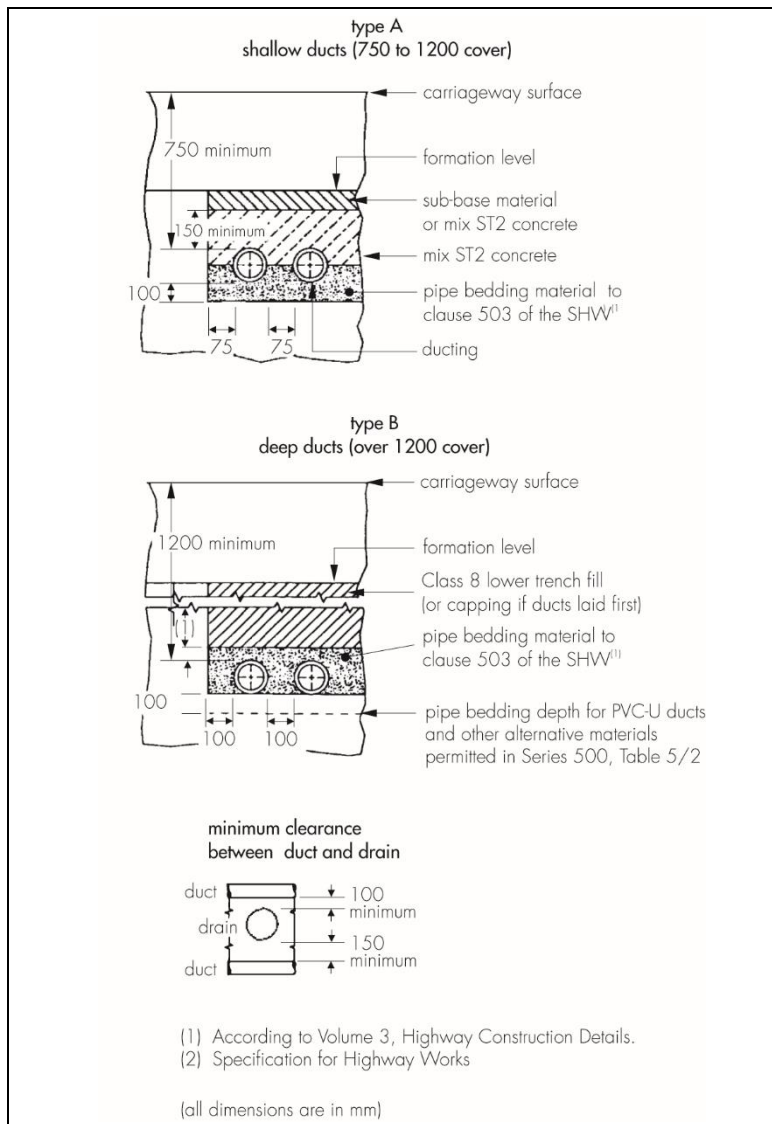
14.1 The products should be installed in accordance with the manufacturer's current literature. Ducting should be cut using a coarse-toothed saw or heavy duty jig saw. Before jointing, it must be ensured that the pipe ends are free of sharp edges, swarf and grit.

14.2 The seal should be placed on the third rib of the duct for smaller sizes and in the second valley for 160/137 and 178/150.

14.3 Naylor Lubricant (outside the scope of this Certificate) should be applied to the outside edge of the seal and the inside of the coupler. If installing without seals, Naylor Lubricant can be used for an easier jointing on site.

14.4 It must be ensured that the pipe end and seal are free from dirt and grit, and introduce the ducting to the coupler and push home, ensuring the pipe end is flush.

**Figure 4 Highway construction details**



Note: For motorway communications ducting systems, installation must be in accordance with the relevant parts of the MCHW, Volume 3.

## Technical Investigations

### 15 Tests

Tests were carried out and the results assessed to determine:

- dimensional accuracy
- resistance to compression to BS EN 61386-24
- impact strength at -5°C to BS EN 61386-24
- creep ratio at 45°C to BS EN ISO 9967 : 2016
- resistance to sharp objects to the MCHW, Volume 1, Clause 518.13
- static friction coefficient to ENA TS (12-24)
- degree of protection against foreign objects to BS EN 60529 : 1992, first characteristic numeral 4, Test condition 13.2
- watertightness of joints to BS EN 60529 : 1992, second characteristic numeral 7, Test condition 14.2.

### 16 Investigations

16.1 An assessment was made of data relating to:

- material properties
- ease of jointing
- durability.

16.2 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 EN 681-1 : 1996 *Elastomeric seals — Material requirements for pipe joint seals used in water and drainage applications — Vulcanized rubber*

BS EN 50174-3 : 2013 + A1 : 2017 *Information technology — Cabling installation — Installation planning and practices outside buildings*

BS EN 60529 : 1992 + A2 : 2013 *Degrees of protection provided by enclosures (IP code)*

BS EN 61386-24 : 2010 *Conduit systems for cable management — Particular requirements — Conduit systems buried underground*

BS EN ISO 9001 : 2015 *Quality management systems — Requirements*

BS EN ISO 9967 : 2016 *Thermoplastics pipes — Determination of creep ratio*

ENA (Energy Networks Association) TS 12-24 - Issue 3 (2014) — *Technical Specifications for Plastic ducts for buried electric cables*

Manual of Contract Documents for Highway Works, Volume 1 : *Specification for Highway Works*

Manual of Contract Documents for Highway Works, Volume 2 : *Notes for Guidance on the Specification for Highway Works*

Manual of Contract Documents for Highway Works, Volume 3 : *Highway Construction Details*

National Joint Utilities Group (NJUG), Volume 1 - Issue 9 (2018) — *NJUG Guidelines on the Positioning and Colour Coding of Underground Utilities' Apparatus*



### 17 Conditions

#### 17.1 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.

17.2 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.

17.3 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.

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

17.5 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.

17.6 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.