

**CERTIFICATE No. 08/0312**

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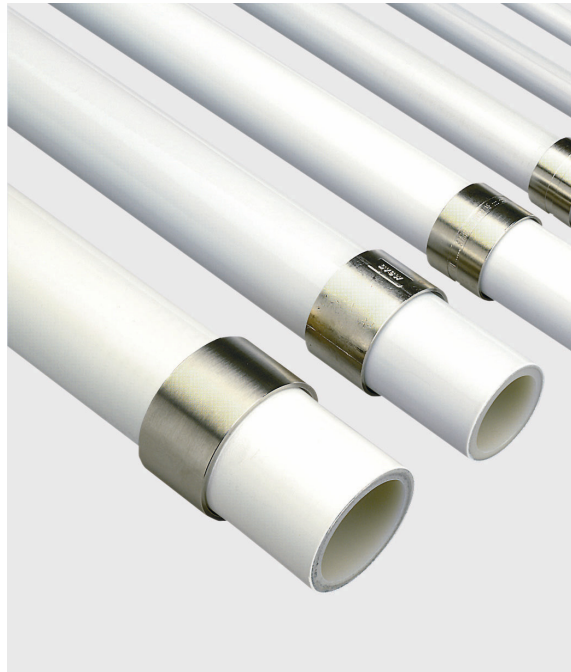
## PRINETO PE/AL/PEX Plumbing, Central & Underfloor Heating System

### Tubes et Raccords Rohre und Anschlüsse

The **Irish Agrément Board** is designated by Government to issue European Technical Approvals.

Irish Agrément Board Certificates establish proof that the certified products are '**proper materials**' suitable for their intended use under Irish site conditions, and in accordance with the **Building Regulations 1997 to 2007**.

The **Irish Agrément Board** operates in association with the **National Standards Authority of Ireland (NSAI)** as the National Member of UEAtc.



#### PRODUCT DESCRIPTION AND USE

This Certificate relates to **Prineto Pex** polyethylene multilayer barrier pipe and press-fit fittings. The **Prineto Pex** polyethylene multilayer barrier pipe is manufactured from high density cross-linked polyethylene plastic with an aluminium foil layer on the outside wall of the pipe which in turn is covered with a thin layer of white polyethylene material. The multilayered pipe has been developed for hot/cold water services, central (radiator) and underfloor heating systems. The aluminium layer on the outside wall of the pipe acts as an oxygen barrier. **Prineto Pe/Al/Pex** pipes meet the requirements of Class 1, 2, 4 and 5 service conditions as specified in Table I of ISO 15875-1: 2003 - *Plastics piping systems for hot and cold water installations - Cross-linked polyethylene (PE-X)*.

#### MANUFACTURE AND MARKETING

The product is manufactured and marketed by:

IVT Installations & Verbindungstechnik GmbH & Co. KG,  
Gewerbering Nord 5  
D-91189 Rohr,  
Germany.

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## 1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), the **Prineto Pex** Plumbing, Central & Underfloor Heating Pipes when used in accordance with the provision of this Certificate, are satisfactory for the purpose defined above and can meet the requirements of the Building Regulations 1997 to 2007 as indicated in Section 1.2 of this Certificate.

## 1.2 BUILDING REGULATIONS 1997 to 2007

### REQUIREMENT:

#### **Part D – Materials and Workmanship**

**D3 – Prineto Pex** Hot & Cold Plumbing Central and Underfloor Heating Pipes as certified in this IAB Certificate, are proper materials fit for their intended use (see Part 4 of this Certificate).

**D1 – Prineto Pex** Hot & Cold Plumbing, Central and Underfloor Heating Pipes, used in accordance with this IAB Certificate, can meet the requirements for materials and workmanship.

#### **Part G – Hygiene**

##### **G1 – Bathrooms and Kitchens in Dwellings**

Hot and cold water systems using **Prineto Pex** pipe, used in accordance with this IAB Certificate can meet the current requirements for hot and cold water services.

##### **G2 – Sanitary Conveniences and Washing facilities**

Hot and cold water systems using **Prineto Pex** pipe and used in accordance with this IAB Certificate can meet the current requirements for the provision of hot and cold water services.

#### **Part L – Conservation of Fuel and Energy**

##### **L1 – Conservation of Fuel and Energy**

Heating and hot water systems using **Prineto Pex** Plumbing, Central & Underfloor Heating Pipe can meet the current requirements for heating controls and the insulation of pipes and ducts (see Section 4.2 of this Certificate).

## 2.1 PRODUCT DESCRIPTION

This Certificate relates to **Prineto Pex** polyethylene multilayer barrier pipe and press-fit fittings. The **Prineto Pex** polyethylene multilayer barrier pipe is manufactured from high density cross-linked polyethylene plastic with an aluminium foil layer on the outside wall of the pipe which in turn is covered with a thin layer of white polyethylene material. The multilayered pipe has been developed for hot/cold water services, central (radiator) and underfloor heating systems. The aluminium layer on the outside wall of the pipe acts as an oxygen barrier. **Prineto Pe/Al/Pex** pipes meet the requirements of Class 1, 2, 4 and 5 service conditions as specified in Table 1 of ISO 15875-1: 2003 - *Plastics piping systems for hot and cold water installations - Cross-linked polyethylene (PE-X)*. The wall thickness of the pipe varies between 2.0 and 4.9 mm depending on pipe size. The pipes are available in the sizes as shown in Table 1. **Prineto Pe/Al/Pex** pipes/fittings are manufactured in European pipe sizes therefore, care should be exercised when connecting the system to Irish imperial size fittings and that the appropriate adaptor fittings are used.

Nominal diameter (mm)	14	17	21	26	33
Wall thickness mm:	2.0	2.8	3.4	4.0	4.9
Weight kg/100m:	12.6	14.4	21.1	30.8	47.7
Standard lengths (m) :	-	4	4	4	4
Standard coils: (m)	100	100	100	50	-
Colour:	White				

**Table 1: Product Range**

For installations in a solid floor (see section 2.4) the base pipe is protected with a minimum screed thickness of 35mm or should be placed in black LDPE conduit pipe.

### ANCILLARY ITEMS:

Standard pipe clips  
Standard trunking systems.

## 2.2 MANUFACTURE

The **Prineto Pe/Al/Pex** composite pipe is produced as a five layered pipe by a combination of an extrusion and aluminium welding process. The plastic inner and outer layers are manufactured from high density polyethylene and the barrier layer from aluminium foil strip. The pipes are subsequently cross-linked.

## 2.2.1 QUALITY CONTROL

Continuous quality control is carried out during manufacture, including checks on dimensional accuracy, degree of heat reversion, pressure resistance, thermostability, thermal ageing and leak-tightness.

## 2.3 DELIVERY, STORAGE AND MARKING

To maintain **Prineto Pe/Al/Pex** pipe in the best possible condition for use it may be stored either horizontally or vertically but should be stored out of direct sunlight. Pipe lengths or coils, should be stored and supported so as to avoid sagging. The pipe should be similarly supported in transit and protected from abrasion and crushing. The pipe is supplied in straight lengths of 4m long or coils of 50-100m depending on pipe diameter. The pipe bears a continuous mark showing the manufacturer's trade mark, nominal pipe size, operating temperature and pressure, manufacturing code, year and week of production. Each coil also shows the manufacturer's name and product description, the IAB identification mark and Certificate number and contains instructions on storage and installation.

## 2.4 INSTALLATION PROCEDURE

Installation must be carried out in accordance with the manufacturer's instructions and BS 5955: Part 8: 2001 *Specification for the installation of thermoplastics pipes and associated fittings for use in domestic hot and cold water services and heating systems*, and BS 6700:2006 *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*. Buried joints which are inaccessible post installation should be avoided.

As all plastics materials expand & contract with temperature change greater than metal pipes, due allowance in pipe runs shall be made on installation to accommodate expansion & contraction of the pipe.

### Procedure

#### Cutting

To ensure successful jointing, **Prineto Pe/Al/Pex** pipe ends should be cut smoothly and squarely. This can be achieved only with an **Prineto Pe/Al/Pex** (correctly sharpened) pipe shears. After cutting of the pipe the nickel plated sleeve is pushed on to the pipe. A special expanding tool is used to expand the inside of the pipe (expand once) for ease of assembly of the fitting (see Fig. 1).

### Jointing

Joints are made with the **Prineto Pe/Al/Pex** pipe and brass fittings by means of a pressed on nickel plated brass sleeve using a gripper pliers. The expanded pipe end is pushed over the Serrated pipe support section of the fitting. With the correct size of gripper jaws in the gripper pliers and the sleeve is pushed into place. The gripper pliers and the correct size of jaws are supplied for each assembly size by the manufacturer. Care must be taken to select the appropriate jaw type for each pipe size being assembled, as the correct fit and applied force is critical to achieve a leak tight joint (see Figures 1 and 2). The pipe joint is made as follows:

- (1) Place the nickel plated sleeve over the end of the cut pipe and using the correct expanding tool expand pipe end.
- (2) Push the prepared pipe up to the shoulder on the serrated pipe support section of the fitting.
- (3) Using the gripper pliers push the nickel plated sleeve up to the fitting shoulder. Check that the joint is fully secure by pulling on it. The joint is now complete.



**Figure 1.** Showing the correct method for using the widening tool for expanding the pipe prior to insertion of the pipe into the fitting – expand once.



**Figure 2.** Showing the correct method for using the gripper tool for placing the sleeve over the pipe after insertion of the pipe onto the fitting.

Pipe dimensions (mm)	Bending radii without tools	Bending radii with internal pipe bending spring or device with lateral guide
14 x 2.0	5 x d	
17 x 2.8	5 x d	4.5 x d
21 x 3.4	5 x d	4.5 x d
26 x 4.0	5 x d	
33 x 4.9	5 x d	

*'d' is the diameter of the pipe*

**Table 2: Showing minimum Bend radii.**

### Bending

The bending of **Prineto Pe/Al/Pex** 14 to 33mm diameter pipe may be carried out without bending tools and the 17/21mm diameter pipe can also be carried out using the appropriate internal bending spring to achieve a radius of 4.5 x d. The bending operation shall not result in either indentations or deformations on the inside or outside of the pipe.

The pipe should not be heated with a hot airgun/blow lamp or similar type of equipment.

Pipe dimension (mm)	Max. pipe clip spacing (m)
14 x 2.0	0.8
17 x 2.8	0.9
21 x 3.4	1.0
26 x 4.0	1.0
33 x 4.9	1.1

**Table 3: Showing maximum clipping distances.**

### Clipping

The **Prineto Pe/Al/Pex** pipelines shall be fixed to a load bearing base as referenced in Table 3 and immediately before and after a pipe elbow, using the appropriate clamps. Surface mounted fixing of **Prineto Pe/Al/Pex** pipes shall be carried out with pipe clips including insulation material. The insulation material shall be compatible with the plastic pipe. The fixing of **Prineto Pe/Al/Pex** pipe in a wall shall be installed with the correct support system and using the specified pipe clips. All clips should be positioned in such a way so that due allowance for expansion and contraction of the pipework is provided (See Table 3 for the maximum pipe clip spacings).

### Protection

**Prineto Pe/Al/Pex** pipe shall be protected from direct sunlight and UV radiation. The pipe shall be covered during transport or storage if it has been removed from its original packaging. When the pipe is placed in a black conduit sleeve or other opaque insulating material this should act as adequate protection against UV radiation. As with all plumbing piping **Prineto Pe/Al/Pex** pipe should be sleeved when passing through walls and protected from nails, etc., when placed under floorboards or buried under plaster.

### Installation in a screed

The system should be pressure tested to 1.5 times the working pressure before the concrete screed or sand/cement is laid over the pipe or conduit. Should pressure testing take place in sub-zero temperatures all necessary precautions should be taken to avoid frost damage to the pipes or heating system. Screeds should be laid in accordance with the relevant requirements of BS 8204: Part 1: 1987 *In-situ flooring – Code of practice for concrete bases and screeds to receive in-situ floorings*.

### Installation in a suspended timber floor

Pipe runs are secured to joists using **Prineto Pe/Al/Pex** pipe clips. The recommended spacing of supports are shown in Table 3.

The pipes are secured on the sides of joists. Structural timbers should be notched only with the permission of the architect or structural engineer and in accordance with CL. 13.7.9. of BS 6700: 2006. *Specification for design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*. The system should be pressure tested before nailing down the floor deck.

### Commissioning the system:

When commissioning the system it must be flushed with water, the pump started and residual air removed by opening the bleed valves in each circuit. The system must be checked for leaks after all the air has been removed and before the pipes are covered. The system shall be tested hydraulically by subjecting the pipes, pipe fittings and connected appliances to a test pressure of not less than 1.5 times the maximum working pressure in accordance with Clause 3.1.12.3.4 of BS 6700 : 2005 – *Specification for Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*. There shall be no visible leakage of water and the pressure will be maintained for one hour.

As with all plumbing systems care should be taken in the layout of pipe runs to avoid damage from nailing. To minimise the risks of damage associated with nailing through floor decks the pipe runs should be kept clear of room perimeters and where possible doorways.

### Boiler connections

**Prineto Pe/Al/Pex** multilayered pipe should not be connected directly to a boiler or similar heat source. It is important to ensure that such a connection is made with a minimum of one metre length of copper pipe. **Prineto Pe/Al/Pex** pipe can be joined to this.

### Gas pipe

**Prineto Pe/Al/Pex** barrier pipe must never be used for gas piping.

### Electrical connections

Since it is extruded from plastics material, **Prineto Pe/Al/Pex** is an insulator and is NOT suitable for earthing electrical appliances. Alternative arrangements must be made to earth metal items such as sinks, baths etc. as required by the 'National Rules for Electrical Installations ET 101/(current version). This is particularly important when extending existing buildings.



### 3. GENERAL

The heating demands for particular rooms are designed in accordance with the CIBSE Guide 1980: Part A.

To calculate the pressure drop in the pipes connected to each radiator or underfloor heating coil, the total length of pipe is defined as the sum of the lengths of flow and return pipes from the boiler.

Flow rates for the **Prineto Pe/Al/Pex** pipe are calculated *in accordance with BS 6700: 2006 'Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages'*.

#### 3.1 Structural design

Floor constructions should be designed to comply with the relevant technical specifications selected from:

*I.S. 326: Part 1: 1995 Code of Practice for the Structural Use of Concrete.*

*B.S. 5268: Part 2: 1996 Structural use of timber – Code of practice for permissible stress design, materials and workmanship.*

*TGD document to Part B of Building Regulations 1997- 2006.*

#### 3.2 Safe working temperatures and pressures

The **Prineto Pe/Al/Pex** multilayer pipe in combination with the metal clamp fittings have been tested for application classes 1,2, 4 and 5 in accordance with Table 1 of ISO 10508 : 2006 and a maximum working pressure of 10 bar at 20°C.

#### 3.3 Chemical resistance

Polyethylene pipe should not come into contact with materials such as cellulose based paints, paint thinners or strippers, soldering flux, acid based descalents or aggressive cleaning products. However, the material used in the **Prineto Pe/Al/Pex** pipe will not be adversely affected by accidental contact with linseed oil based sealing compounds or soldering flux, although these materials should not be used in making joints to the pipe.

#### 3.4 Effect on water quality

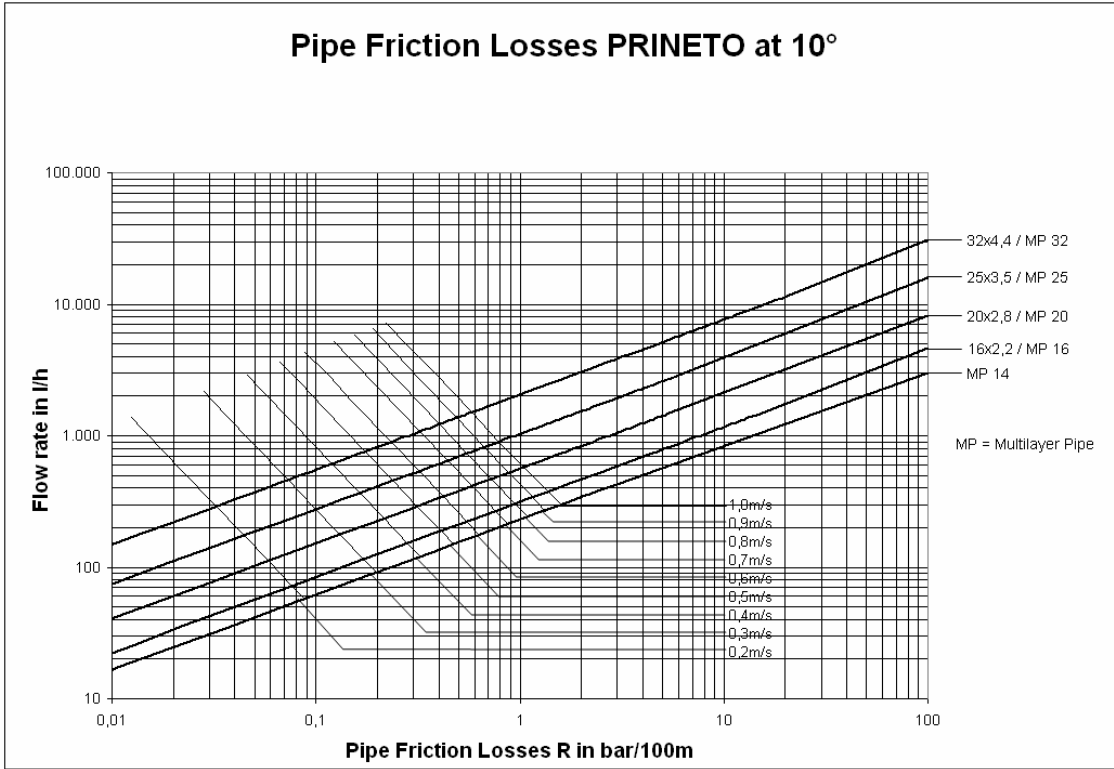
**Prineto Pe/Al/Pex** barrier pipe and fittings are approved by WRC-NSF (UK Water Fittings Byelaws Scheme) as a system which has passed full tests on the effect on water quality in accordance with test criteria based on published standards.

#### 3.5 Flow characteristics

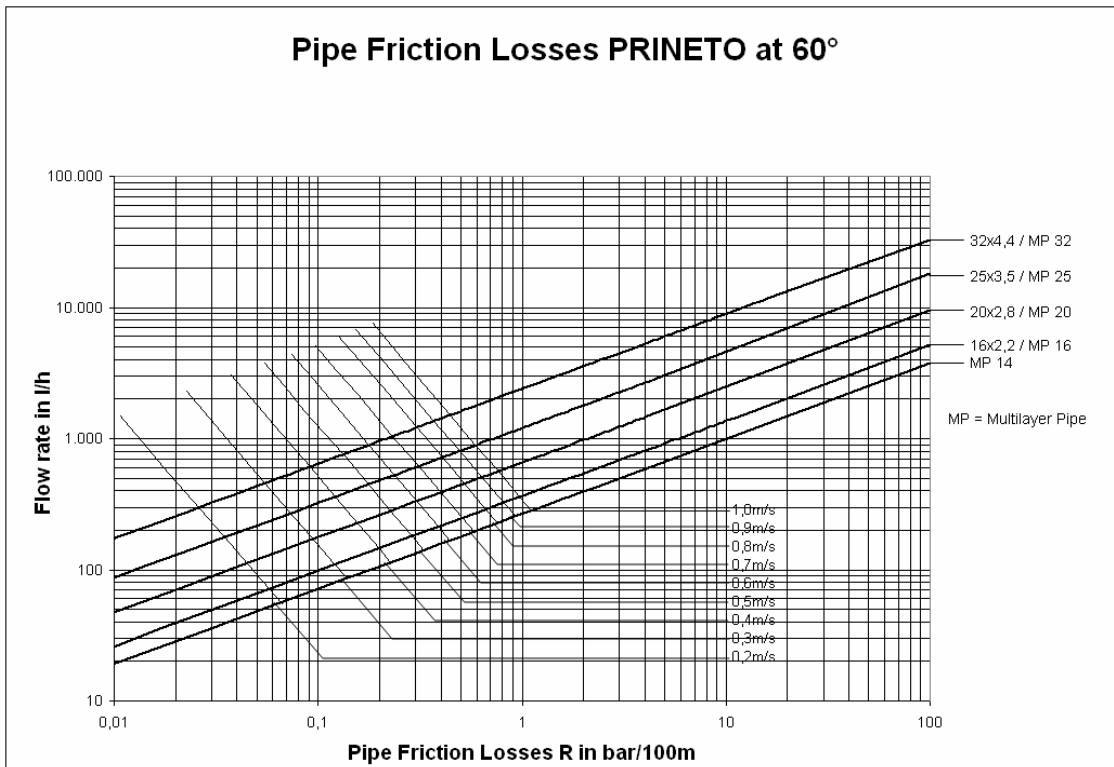
The bore of the **Prineto Pe/Al/Pex** pipe is less than copper or steel pipe of the equivalent outside diameter. The consequent reduction in flow rate for a given pressure head should be considered when designing a system, see Tables 4 and 5 for design flow rates, head losses and velocities for the **Prineto Pe/Al/Pex** pipe.

#### 3.6 Note on System Design

In systems where low water content gas boilers with cast iron heat exchangers are used it is recommended that the balancing valve for the hot water circuit be a brass lockshield gate valve (Conforming to BS 5154: 1991 *Specification for copper alloy globe, globe stop and check, check and gate valves*). This lockshield valve is important so as to prevent the valve being inadvertently turned off while the boiler is on and so avoid the pipework being exposed to excessive temperatures by providing an open circuit for water to circulate between the boiler flow and return.



**Table 4: Showing the pressure loss diagram for the Prineto Pe/Al/Pex pipe sizes at 10°C.**



**Table 5: Showing the pressure loss diagram for the Prineto Pe/Al/Pex pipe sizes at 60°C.**

#### 4.1 BEHAVIOUR IN FIRE

Where the **Prineto Pe/Al/Pex** barrier pipe passes through an element or structure or cavity barrier the opening should be firestopped in a way that will permit thermal movement.

#### 4.2 THERMAL INSULATION

Heating controls and pipe insulation must meet the minimum requirements of Part L Conservation of Fuel and Energy of the Building Regulations 1997 - 2007. Guidance is given in Section 2-3 of the Technical Guidance Document to Part L.

#### 4.3 DURABILITY

The **Prineto Pe/Al/Pex** barrier pipe has been widely used in other European countries for excess of ten years. Experience with the system has been favourable.

For central and under floor heating applications, in accordance with good practice, it is recommended that a corrosion inhibitor is used and its concentration checked and maintained in accordance with the manufacturers instructions.

As with all plumbing and heating systems the control fittings, i.e. thermostatic radiator valves may require replacement within the life time of the **Prineto Pe/Al/Pex** pipe.

The **Prineto Pe/Al/Pex** barrier pipe will have a life at least equivalent to that expected from a traditional installation with metal pipes and fittings.

#### 4.4 TESTS AND ASSESSMENTS WERE CARRIED OUT TO DETERMINE THE FOLLOWING:

- dimensional accuracy
- thermal cycling on pipes and fittings
- opacity
- long-term hydrostatic pressure resistance of pipe
- resistance to pull-out of assembled joints
- short-term hydrostatic pressure resistance of pipes at 20°C
- short term hydrostatic pressure resistance of pipes at 95°C

#### 4.5 OTHER INVESTIGATIONS

- (i) **Prineto Pe/Al/Pex** PE/AL/PEX barrier pipe with brass clamp fittings has been tested for application Classes 1, 2, 4 and 5 according to ISO 15875-1 : 2003 with a maximum working pressure of 10 bar at 20°C.
- (ii) Existing data on product properties in relation to toxicity with respect to suitability for use with potable water supplies, mechanical strength/ stability and durability were assessed.
- (iii) The manufacturing process was examined including the methods adopted for product quality control, and details were obtained of the quality and composition of the materials used.
- (iv) Site visits were conducted in Ireland to assess the practicability of installation and the history of performance in use of the product.



- 5.1** National Standards Authority of Ireland ("NSAI") following consultation with the Irish Agrément Board ("IAB") has assessed the performance and method of installation of the product/process and the quality of the materials used in its manufacture and certifies the product/process to be fit for the use for which it is certified provided that it is manufactured, installed, used and maintained in accordance with the descriptions and specifications set out in this Certificate and in accordance with the manufacturer's instructions and usual trade practice. This Certificate shall remain valid for five years from date of issue so long as:
- (a) the specification of the product is unchanged.
  - (b) the Building Regulations 1997 to 2007 and any other regulation or standard applicable to the product/process, its use or installation remains unchanged.
  - (c) the product continues to be assessed for the quality of its manufacture and marking by NSAI.
  - (d) no new information becomes available which in the opinion of the NSAI, would preclude the granting of the Certificate.
  - (e) the product or process continues to be manufactured, installed, used and maintained in accordance with the description, specifications and safety recommendations set out in this certificate.
  - (f) the registration and/or surveillance fees due to IAB are paid.
- 5.2** The IAB mark and certification number may only be used on or in relation to product/processes in respect of which a valid Certificate exists. If the Certificate becomes invalid the Certificate holder must not use the IAB mark and certification number and must remove them from the products already marked.
- 5.3** In granting Certification, the NSAI makes no representation as to;
- (a) the absence or presence of patent rights subsisting in the product/process; or
  - (b) the legal right of the Certificate holder to market, install or maintain the product/process; or
  - (c) whether individual products have been manufactured or installed by the Certificate holder in accordance with the descriptions and specifications set out in this Certificate.
- 5.4** This Certificate does not comprise installation instructions and does not replace the manufacturer's directions or any professional or trade advice relating to use and installation which may be appropriate.
- 5.5** Any recommendations contained in this Certificate relating to the safe use of the certified product/process are preconditions to the validity of the Certificate. However the NSAI does not certify that the manufacture or installation of the certified product or process in accordance with the descriptions and specifications set out in this Certificate will satisfy the requirements of the Safety, Health and Welfare at Work Act. 2005, or of any other current or future common law duty of care owed by the manufacturer or by the Certificate holder.
- 5.6** The NSAI is not responsible to any person or body for loss or damage including personal injury arising as a direct or indirect result of the use of this product or process.
- 5.7** Where reference is made in this Certificate to any Act of the Oireachtas, Regulation made thereunder, Statutory Instrument, Code of Practice, National Standards, Manufacturer's instructions, or similar publication, it shall be construed as reference to such publication in the form in which it is in force at the date of this Certification.

## The Irish Agrément Board

This Certificate No. **08/0312** is accordingly granted by the NSAI to **IVT Installations & Verbindungstechnik GmbH & Co. KG**, on behalf of The Irish Agrément Board..

Date of Issue: **April 2008**

Signed



**Seán Balfe**  
Director of the Irish Agrément Board

Readers may check that the status of this Certificate has not changed by contacting the Irish Agrément Board, NSAI, Glasnevin, Dublin 9, Ireland. Telephone: (01) 807 3800. Fax: (01) 807 3842. [www.n sai.ie](http://www.n sai.ie)