

CERTIFICATE No. 06/0251

Hewing Pro-Aqua, Hewing GmbH,
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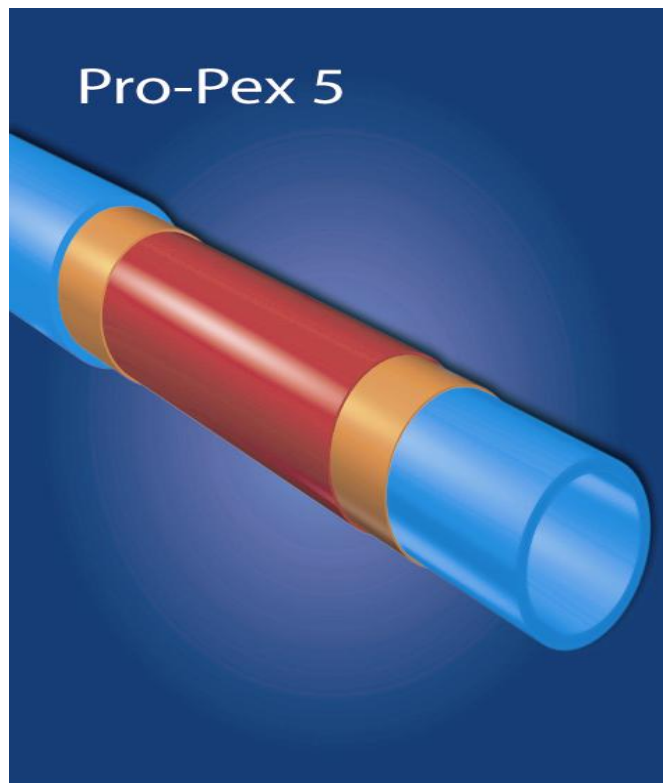
Pro-Pex 5 Plumbing, Central & Underfloor Heating Pipe

Tubes et Raccords Rohre und Anschlusse

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 2006**.

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



PRODUCT DESCRIPTION:

This Certificate relates to the Pro-Pex 5 Plumbing, Central and Underfloor Heating Pipe comprising High Density cross linked polyethylene barrier pipe, and ancillary components.

This Certificate certifies compliance with the requirements of the Building Regulations 1997 to 2006.

USE:

Pro-Pex 5 High Density Cross-Linked barrier Plumbing, Central and Underfloor Heating pipe is used for hot and cold water services, central and underfloor heating systems.

MANUFACTURE AND MARKETING:

The product is manufactured by:

Hewing GmbH,
Waldstrasse 3,
D-48607 Ochtrup,
Germany.

The product is marketed in Ireland by:

Hevac Ltd.,
Muirfield Drive
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1.1 ASSESSMENT

In the opinion of the Irish Agrément Board (IAB), Pro-Pex 5 High Density Cross-Linked Plumbing, Central and Underfloor Heating Pipe, if used in accordance with this Certificate is satisfactory for the purpose defined above and can meet the requirements of the Building Regulations 1997 - 2006 as indicated in Section 1.2 of this Certificate.

1.2 BUILDING REGULATIONS 1997 to 2006 REQUIREMENT:

Part D – Materials and Workmanship

D3 – Pro-Pex 5 High Density Cross-Linked Plumbing, Central and Underfloor Heating Pipe is an acceptable material as indicated in Part 4 of this Certificate.

D1 – Pro-Pex 5 High Density Cross-Linked Plumbing, Central and Underfloor Heating Pipe as certified in this Certificate, can meet the requirements of the building regulations for workmanship.

Part L – Conservation of Fuel and Energy

L1 - Conservation of Fuel and Energy

Heating and hot water systems using Pro-Pex 5 High Density Cross-Linked Plumbing, Central and Underfloor Heating Pipe can meet the current requirements for heating controls and the insulation of pipes and ducts (see Part 4 of this Certificate).

2.1 PRODUCT DESCRIPTION

Pro-Pex 5 High Density barrier pipe is a cross-linked polyethylene plastic plumbing pipe developed for hot/cold water services, central and underfloor heating systems. The pipe meets the requirements of class 5 service conditions specified in Table 1 of ISO 15875-1: 2003 for a service life of 50 years. The Pro-Pex 5 pipe has an EVOH oxygen barrier layer at mid-wall thickness. The pipe is a multi-layered cross-linked polyethylene product with a wall thickness of between 1.65 and 2.6 mm depending on pipe size. (See Table 1.)

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

Colour: Beige/Grey			
Nominal diameter:	½"	¾"	1"
Outside dia. mm:	14.63	20.98	27.33
Wall thickness mm:	1.65	2.05	2.6
Standard coils m:	100	50	50
Standard lengths m:	6	6	6
ANCILLARY ITEMS: Compression fittings to IS EN 1254-3 :1998 Standard pipe clips Standard trunking systems			

Table 1: Product Range

2.2 MANUFACTURE

The cross linked High Density polyethylene is produced by extrusion and is then cross-linked by the Electron Beam process.

2.2.1 Quality Control

Continuous quality control is carried out during manufacture including checks on dimensional accuracy, degrees of cross-linking, heat reversion, pressure testing, thermo stability and leak tightness.

The management systems of Hewing GmbH have been assessed and registered as meeting the requirements of EN ISO 9001 : 2000 by DNV (Certificate Registration No. Cert-13979A-2004-AQ-ESN-TGA).

2.3 DELIVERY, STORAGE AND MARKING

To maintain Pro-Pex 5 Pipe in the best possible condition for use, it may be stored either horizontally or vertically but should be stored out

of direct sunlight. All Pro-Pex 5 pipe is supplied in protective cardboard boxes or tubes for ease of storage and use (see Figure 1). The pipe lengths should be similarly supported in transit and protected from abrasion and crushing.

The pipe is supplied in rolls of 50-100 m & 6 m lengths depending on pipe diameter. The pipe bears a continuous mark showing the manufacturer's trade mark, dimensions, maximum 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.



Figure 1

2.4 INSTALLATION PROCEDURE

Installation must be carried out in accordance with the manufacturer's instructions, BS 5955:Part 8:1990 (1995) *Specification for the installation of thermoplastics pipes and associated fittings for use in domestic hot and cold water services and heating systems*, and BS 6700:1987 *Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages*. General installation details are shown in Figures 2 and 3. If a joint beneath the floor is unavoidable, e.g. due to local damage, a compression fitting to IS EN 1254-3:1998 must be used for the purpose.

As all plastics materials expand and contract with temperature change, due allowance in pipe runs should be made on installation to accommodate expansion and contraction of the pipe.

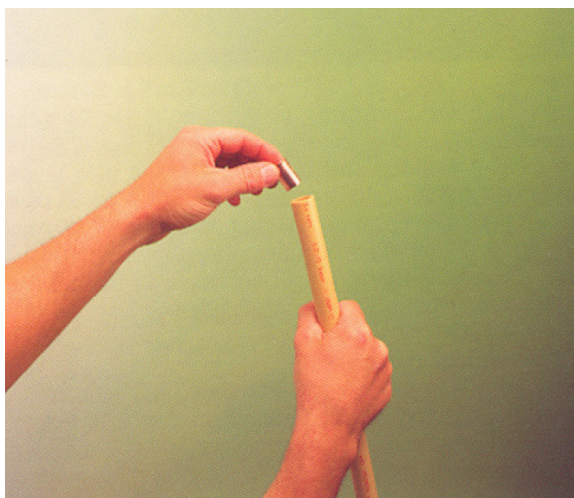


Figure 2

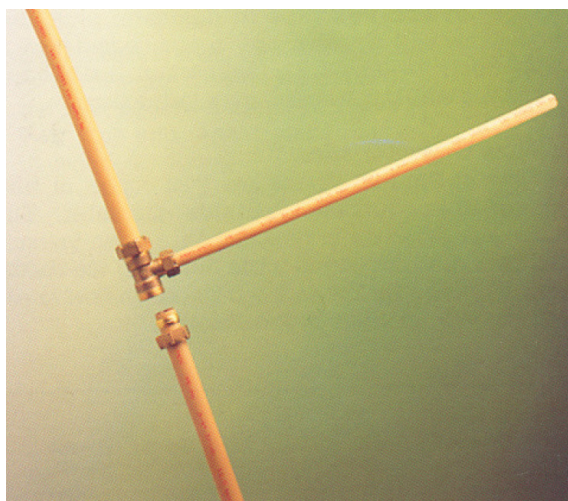


Figure 3

Procedure

Cutting:

To ensure successful jointing, Pro-Pex 5 pipe ends should be cut smoothly and squarely. This can be achieved with sharp purpose-made pipe secateurs, or copper pipe cutters. A hacksaw may be used but the pipe ends should be correctly trimmed and filed to allow easy insertion of the Pro-Pex 5 pipe insert.

Jointing:

Pro-Pex 5 Pipe may be used with any standard Irish Size compression fitting (manufactured to IS EN 1254-3 ; 1998). Place the nut and olive on the outside diameter of the pipe and the insert in the end of the pipe (as in Figure 3). Push the pipe up to the shoulder in the fitting and hand tighten the nut. The nut is **further tightened a half turn** with the correct size spanner to complete the compression joint. Check that the pipe is fully secure by pulling on it.

Bending:

For sharp bends (<80mm in radius), standard elbow fittings should be used. Where bends of 80mm radius are required in 1/2" Pro-Pex 5 pipe, it is often quicker, neater and cheaper to use standard 90° angle elbow. Gentle bends (radii ≥ 175mm) may be made by the use of pipe clips on either side of the bend positioned to maintain the bend radius.

The pipe should not be heated with a blow lamp or hot air gun.

1/2" Pro-Pex 5 Pipe	80 mm using angle brackets 175 mm using pipe clips
3/4" Pro-Pex 5 Pipe	225 mm using pipe clips
1" Pro-Pex 5 Pipe	300 mm using pipe clips

Table 2: Minimum Bend Radii

Clipping:

Clips should be positioned adjacent to fittings wherever possible making due allowance for expansion and contraction of the pipework. Where Pro-Pex 5 Pipe is to be surface mounted and visible the following clipping distances are recommended (see Table 3).

	Average service temperature		
	20 °C	60 °C	80 °C
1/2" Pro-Pex - horizontal	500 mm	400 mm	300 mm
- vertical	800 mm	600 mm	500 mm
3/4" Pro-Pex - horizontal	800 mm	600 mm	500 mm
-vertical	1200 mm	1000 mm	800 mm
1" Pro-Pex -horizontal	800 mm	600 mm	500 mm
- vertical	1200 mm	1000 mm	800 mm

Table 3: Clipping Distances

Where Pro-Pex 5 pipe is to be boxed-in or installed under floors or in loft spaces etc., clipping distances can be increased or the clips omitted altogether if the pipe is adequately supported by other means.

Protection:

Pro-Pex 5 Pipe is a tough material that needs no greater protection from accidental damage when installed than conventional copper. As with copper, Pro-Pex 5 pipe should be sleeved when passing through walls and protected from nails etc. when placed under floorboards or buried under plaster.

Pro-Pex 5 Pipe is stabilised to withstand limited exposure to ultraviolet radiation or sunlight but is not designed for permanent direct exposure. Under such conditions, placing the pipe in black conduit or lagging is required.

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 floorings – 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 Pro-Pex 5 pipe clips. The recommended spacing of supports is shown in Table 3.

The pipes are secured on the sides of the joists. Structural timbers should be notched only with the permission of the architect or structural engineer and in accordance with BS 6700:1987 cl. 13.7.9. 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.

A notice should be displayed in buildings where the system is installed drawing attention to the risks of damage associated with nailing through floor decks. To minimise this risk the pipe runs should be kept clear of room perimeters and where possible doorways.

Boiler connections:

Pro-Pex 5 Pipe must not be joined 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 of copper pipe. Pro-Pex 5 pipe can be joined to this.

Gas pipe:

Pro-Pex 5 should never be used for gas piping.

Electrical connections:

Since it is extruded from plastics materials, Pro-Pex 5 Pipe 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/A1: (current version).

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.

The flow characteristics of the Pro-Pex 5 pipe are calculated using accepted classical techniques.

3.1 STRUCTURAL DESIGN

Floor constructions through which plumbing pipework has to traverse must be designed to comply with the relevant technical specification selected from:

IS 326:1988 *Code of practice for the structural use of concrete*

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

TGDs to Part A and Part B of the Building Regulations 1997 to 2006.

3.2 SAFE WORKING TEMPERATURES AND PRESSURES

The pipe meets the requirements for Class 5 service conditions specified in Table 1 of ISO 15875-1:2003 for a service life of 50 years. These conditions include operating temperatures of 60° for 25 years operation, 80°C for 10 years and 100°C for 100 hours at a working pressure of 4 bar. The pipe is also suitable for cold water services for a period of 50 years at temperatures of 20°C and an operating pressure of 10 bar. There is an adequate safety factor to ensure that damage to the pipe will not occur in the event of boiler thermostat or other control failure.

3.3 CHEMICAL RESISTANCE

The materials used in the Pro-Pex 5 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.

As with all PEX pipe care should be exercised that contact with cellulose based paints, paint thinners or strippers, acid based decalents, or aggressive cleaning products should be avoided.

3.4 EFFECT ON WATER QUALITY

The use of Pro-Pex 5 pipe in domestic plumbing installations will not give rise to any degradation in water quality (ref. European Drinking Water Directive 1998) when installed in accordance with the manufacturer's instructions.

As Pro-Pex 5 pipe is not opaque it should be placed in black conduit where exposure to natural light after installation is a possibility.

3.5 FLOW CHARACTERISTICS

The bore of Pro-Pex 5 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 the central heating system. See Tables 4 and 5 for design flow rates, head losses and velocities for Pro-Pex 5 pipe.

3.6 Note on System Design

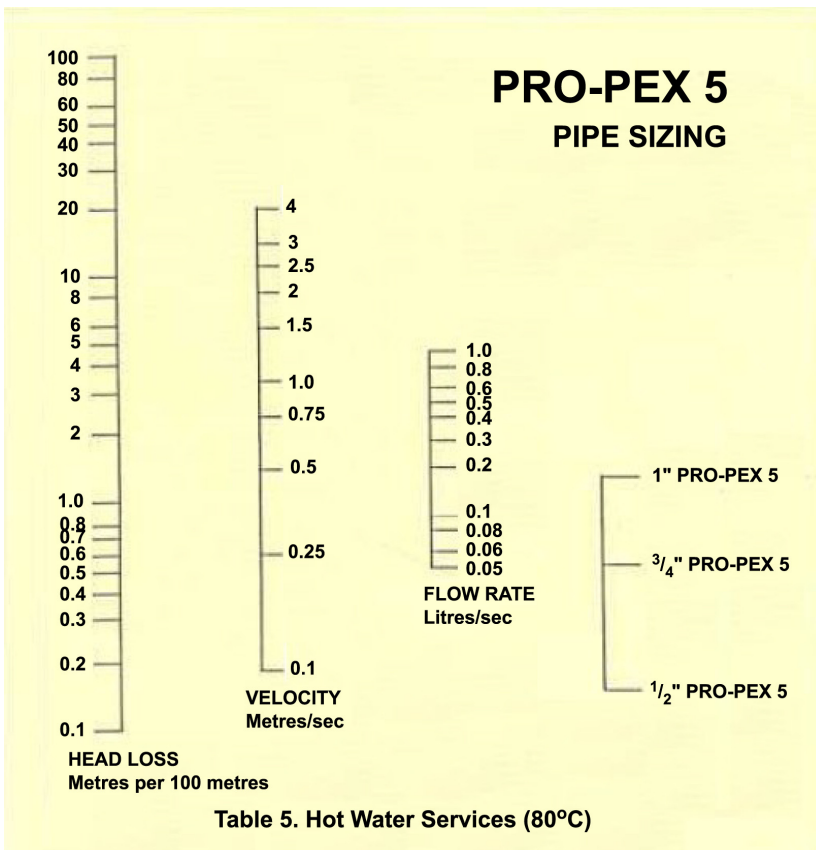
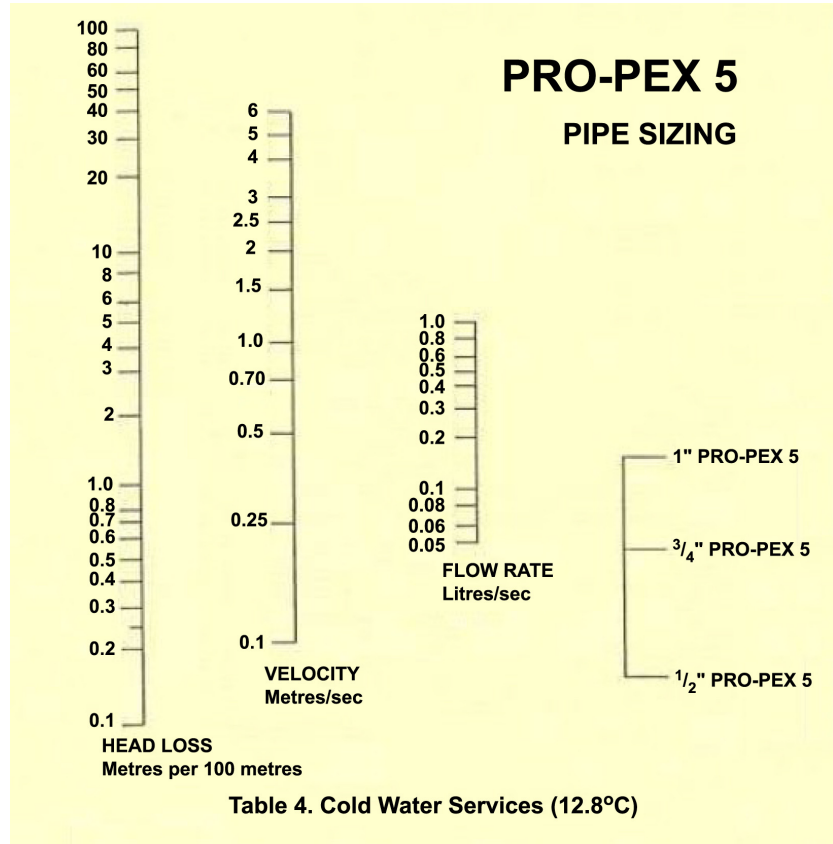
In systems where low water content gas boilers with cast iron heat exchangers are used it is recommended that a balancing valve for the hot water circuit be a brass lockshield gate valve (*Conforming to BS 5154 : 1991 Specification for copper alloy globe, globe stop and check, check and gate valves*). 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.

PIPE SIZING METHODS

1. Start by assuming a particular diameter of Pro-Pex 5 pipe.
2. Draw a straight line from the assumed pipe size through the design flow rate required.
3. Continue this line across the Velocity and Head Loss scales.
4. Check that the head loss does not exceed the permissible loss of head per 100m.

$$\frac{\text{available head} \times 100}{\text{effective pipe length}}$$

5. Ensure that the flow velocity is not too high i.e. maintain flow velocity below 3 metres per second.
6. If the checks in 4 and 5 are not valid for the pipe size chosen then choose the next largest diameter of Pro-Pex 5 pipe and repeat steps 1 through 5.



Notes

7. To determine the flow rate that will result from the selected pipe, draw a line from the pipe size selected to the permissible loss of head on the Head Loss Axis (see step 4 in pipe sizing method above for calculation). The flow rate is where this line cuts the Flow Rate Axis.
8. To determine the residual head available in that pipe, join the pipe size chosen to the flow rate required using a straight line and continue the line through the Head Loss Axis. The difference between the permissible loss of head and this mark is the residual head in the pipe in metres per 100 metres.

4.1 BEHAVIOUR IN FIRE

Where the Pro-Pex 5 pipe passes through an element of structure or cavity barrier the opening should be fire stopped 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 of the Building Regulations 1997 to 2006. Guidance is given in Sections 2 and 3 of the Technical Guidance Document to Part L.

4.3 DURABILITY

Pro-Pex 5 pipe has been widely used in other European countries for in excess of fifteen years. Experience with the system has been favourable.

For central heating and underfloor heating applications in accordance with good practice it is recommended that a corrosion inhibitor is used and its concentration checked and maintained as per 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 Pro-Pex 5 pipe.

Pro-Pex 5 pipe will have a life of 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
- Effect of thermal cycling on pipes & fittings
- Degree of cross-linking
- Long-term hydrostatic pressure resistance of pipe
- Hydrostatic pressure resistance of fittings
- 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

4.6 OTHER INVESTIGATIONS

- (i) 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.
- (ii) The manufacturing process was examined including the methods adopted for quality control, and details were obtained of the quality and composition of the materials used.
- (iii) Site visits were conducted 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 2006 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. 1989, 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. **06/0251** is accordingly granted by the NSAI to **Hewing GmbH** on behalf of The Irish Agrément Board.

Date of Issue: **May 2006**

Signed



Sean Balfe
Director, 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