



## PE-Xc pipes

The flexible all-rounders

- Surface regulation
- Radiator connections
- Drinking water installations

# The high-performance partner

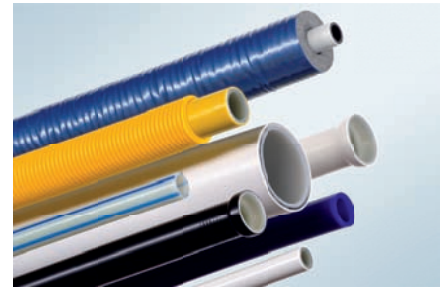
## Hewing – the reliable supplier for high-performance plastic pipe technology.



In Hewing GmbH's plants, all processes are focused on the fulfilment of individual client requirements.



The company maintains strong, successful partnerships with its clients.



Hewing offers an extensive portfolio of pipe solutions. Moreover, we develop customized products for market introduction in close cooperation with our customers.

Here, customers can benefit from a diverse product range which leaves nothing to be desired. Hewing provides custom manufacturing according to clients' specific requirements. This is ensured via:

- the world's largest manufacturing facility for physically crosslinked polyethylene pipes (PE-Xc pipes), including two plants for physical crosslinking
- sophisticated, flexible production of butt-welded multilayer pipes (MT multilayer pipes),
- competent and innovative research and development.

Hewing components are used in surface regulation, radiator connection and drinking water installation systems, as well as in industrial applications. The company clearly focuses on supplying companies who provide complete systems. A successful concept on a global scale, the export quota is above 50%.

### **The service benefit**

When you select Hewing, you select high quality, without compromise. This also applies to the versatile range of services accompanying its products, which is specially designed to support system suppliers in their work. It extends from research and development in co-operation with the client to marketing support, continuously available technical support, specifically defined training events and flexible logistics.

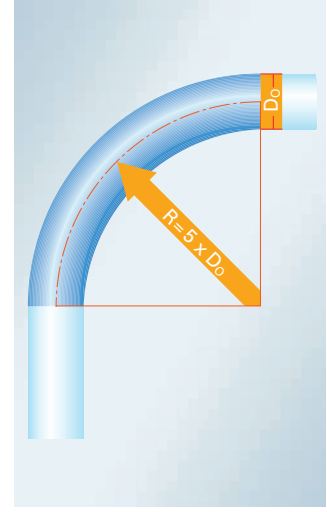
Environmental awareness is a significant quality criterion for Hewing. From product development to manufacture and delivery, it plays a decisive role. For example, thanks to the active environmental policy of the company, production waste is 100 % recycled both in-house and externally.



PE-Xc pipes are easy to process even at sub-zero temperatures, and provide numerous application benefits.



One of the main features of PE-Xc pipes is their flexibility.



By hand, bend radii of up to five times the external diameter are possible.

## PE-Xc – the high-performance material

Hewing PE-Xc pipes are virtually predestined for implementation in drinking water installations and – equipped with an oxygen barrier – in heating applications. They have been reliably and securely displaying their material benefits for decades.

In contrast to metal pipes, they are absolutely corrosion-free. Even incrustations do not have a chance. Additionally, the extremely smooth surface of the PE-Xc pipes ensures minimal pressure losses. This is particularly significant for drinking water installations and the adherence to related regulations. In terms of hygiene, the material is flawless. It does not react with substances dissolved in water, is resistant to fluctuating pH values and has no impact whatsoever on drinking water quality.

### **Durable and resistant**

Furthermore, the PE-Xc pipes are highly durable, with a service life well in excess of 50 years, as continuously proven by creep strength tests. This is possible thanks to their high resistance to stress cracking, as well as to outstanding temperatures and pressures. The PE-Xc pipes are even resistant to chemicals encountered on construction sites and in subsequent operation – e.g. antifreeze, corrosion in-

hibitors, screed additives and cleaning agents. A list of chemicals and their influences on polyethylene pipes is provided in the supplementary sheet 1 of DIN 8075.

### **Flexible and ductile**

A further major argument in favour of selecting PE-Xc pipes is their ease of use and processing on the construction site. On account of their extreme flexibility, they can generally be adapted to existing room geometry without using expensive forming equipment. They can easily be bent: by hand up to five times the external diameter, or even tighter using a bending tool. PE-Xc pipes also feature outstanding robustness in transport and on the construction site. They are extremely resistant to mechanical stress as well as impact, abrasion and wear. PE-Xc pipes provide all these benefits, even at sub-zero temperatures. Freezing of filled pipes should be avoided, although PE-Xc pipes provide increased protection against frost damage in comparison to metal pipes due to their expandability.

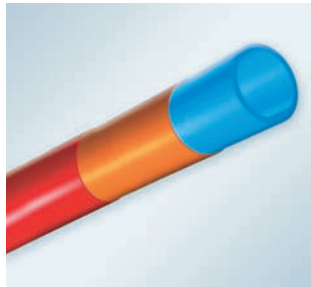
# PE-Xc – Designed for you

High-quality pipe technology, individually constructed and manufactured.

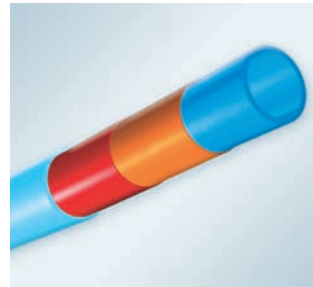
This is one of Hewing's great advantages.



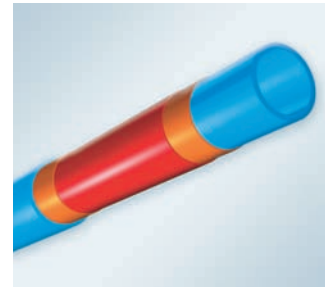
PE-Xc pipe without oxygen barrier: suitable for drinking water installations.



Tri-Pipe: oxygen impermeable coating for heating applications.



PEX-4-Pipe with external PE layer protecting the oxygen barrier.



Penta-Pipe: Completely crosslinked with central oxygen barrier in pipe wall.

Clients can optimise product design to precisely meet their respective system and application requirements. Furthermore, many parameters can be individually defined for PE-Xc pipes. Thus, Hewing provides the opportunity for clients to uniquely design their system technology via these pipes.

## The material

The base material for PE-Xc pipes is high-density polyethylene, which is subsequently physically crosslinked to the actual pipe extrusion (see page 6). Upon client request, Hewing can also process medium-density polyethylene.

## The layer composition

PE-Xc pipes are available at Hewing with one, three, four and five layers. Whilst the single layer variant is mainly designed for drinking water installations, the pipes with multiple layers are also used in heating applications and many further areas thanks to their oxygen barrier (according to DIN 4726). Both the PEX-4-Pipe and the

Penta-Pipe feature protective external layers which protect the EVOH (ethylene vinyl alcohol copolymer) oxygen barrier against damage.

## Dimensions

Both the internal and external diameter of PE-Xc pipes as well as the thickness of individual layers and overall pipe walls meet client requirements and fit the desired connection technology. In general, the pipes are available with external diameters ranging from 8 to 40 mm and a wide variety of wall thicknesses. Thus, an entire product range for floor distribution, as well as rising, basement distribution and floor pipes is provided.



PE-Xc pipes are available in dimensions from 8 to 40 mm.



The individual signature is the 'identification' of PE-Xc pipes – including continuous traceability.



In-plant pre-insulated pipes provide true added value by facilitating work processes on construction sites.

## DESIGNED FOR YOU.

### Fitting compatibility

The precise orientation of PE-Xc pipes towards the required connection technology is closely associated to the selection of dimension. In addition to the required know-how, Hewing also provides clients with the corresponding test engineering. Competent support regarding system-specific fitting development is also available on request. In general, PE-Xc pipes are suitable for all customary fittings on the market – from press and sliding sleeve fittings to clamp ring and plug fitting.

### Pipe lengths

Everything is possible at Hewing, from short bar products and coils for various pipe lengths to PE-Xc pipe deliveries on large drums for 'endless laying'. Delivery is generally in customer-specific card boxes or on customer-specific pipe drums.

### Signature

Each pipe receives a special signature with relevant, client-specific information. In addition to necessary technical information e.g. regarding pipe material, dimensions, audit and quality marks as well as manufacturer's labels, it can also contain further elements or information such as logos, company descriptions and application area(s). Traceability in the framework of quality assurance is additionally ensured

at all times via the inscribed plant order number and metre marking.

### Colour

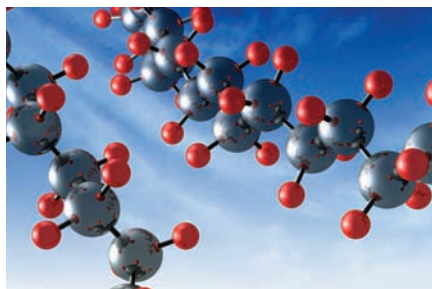
PE-Xc pipes are produced in diverse colours on the Hewing extrusion lines. They can be completely coloured, coated with a coloured layer or emblazoned with coloured stripes. Thus, pipe colour can be easily coordinated to match the client's corporate design, for instance.

### In-plant insulation

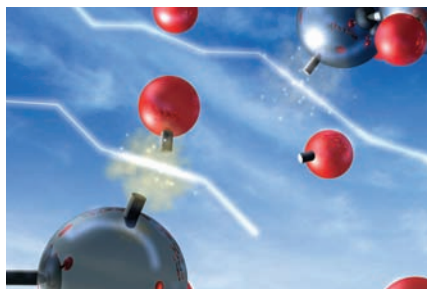
Hewing provides work process facilitation on construction sites as well as easy implementation of relevant standards and regulations with PE-Xc pipes pre-insulated in-plant. They are available with strong PE all-round insulation (with or without additional moisture protection), asymmetrical insulation or even with corrugated protective pipes as a pipe-in-pipe solution. RaFuRo, a specially-insulated pipe-in-pipe solution for floor heating and radiator connections, represents a special solution for a single heating circuit and thus, a single operating temperature.

# From granulate to high-performance pipe

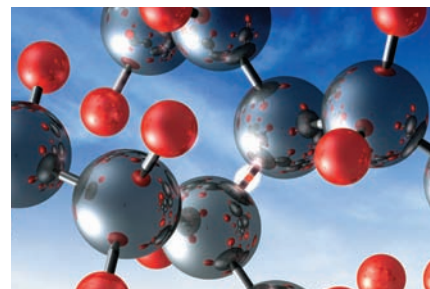
Hewing uses high or medium-density polyethylene according to client requirements in the manufacture of PE-Xc pipes.



Two hydrogen atoms are attached to each long chain of carbon atoms of the non-crosslinked polyethylene.



An electron accelerator shoots energy rich electrons at the pipes which dislodge some hydrogen atoms from the PE molecule chains.



At the points where hydrogen atoms have been dislodged, reactive points are created which are attracted to one another. If two reactive points are close enough together, the molecule chains link - forming a single three-dimensional network.

The raw material is supplied as granulate featuring a specific Hewing compound, i.e. containing few selected additives such as colour pigments, heat aging stabilisers or carbon black for UV protection.

In the first production step, the non-crosslinked PE pipes are produced from the granulate. Here, these are extruded in either one or five layers; the single layer variants are generally subsequently used for further processing into Tri-Pipe or PEX-4-Pipe. In the following calibration stage, the pipes are assigned their final dimensions such as external diameter and wall thickness. They are then cooled in the cooling basin of the plant.

#### From PE to PE-Xc

The most significant stage of refinement now takes place with the physical crosslinking of single and five layer PE pipes using high-energy electrons. This extremely hygienic, precise process provides

high temperature resistance, longevity and outstanding mechanical properties of the pipes. The pipes are then checked in the leak detector system, which ensures that only 100 % tight PE-Xc pipes arrive on construction sites.

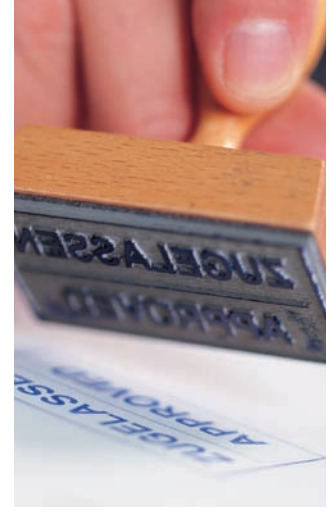
The five layer PE-Xc pipes are thus available for final production. The single layer variants are given additional layers in further extrusion steps as applicable, either producing Tri-Pipe or PEX-4-Pipe. All types of pipe can be integrated into corrugated pipes following signature, insulated symmetrically or asymmetrically and cut to length and packaged entirely according to respective client requirements.



Hewing also puts the raw materials through their paces using state-of-the-art testing facilities, e.g. DSC measurement (Differential Scanning Calorimetry).



The creep strength test is a core test, used, for example, to determine the service life of PE-Xc pipes. For these tests alone, Hewing provides a capacity of 1,500 test stations.



On request, Hewing coordinates entire certification projects for clients and carries out the required tests on in-house test facilities.

## Tried and tested Hewing quality

In the framework of in-plant and third-party monitoring, strict quality controlling accompanies the PE-Xc pipe product supply process – from delivery of the special PE granulate to the distribution of the finished products. Even the raw materials are thoroughly checked for absolute adherence to Hewing specifications upon delivery. In production itself, all manufacturing stages are subject to detailed inspection, e.g. with regard to dimensions, wall thickness and impermeability.

Sample pieces of each large drum PE-Xc pipe are sent directly to the quality assurance laboratory where they are tested for pressure and aging resistance etc. In intensive application tests, they repeatedly prove their outstanding suitability for sanitary and heating applications. All test records are archived and stored for at least ten years, maintaining records for every metre of PE-Xc pipe produced.

### Testing programmes for clients

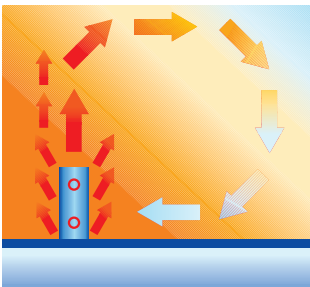
The Hewing testing and quality assurance laboratory also supports clients in the integration of Hewing products into their complete systems. Client-specific testing

programmes can comprise both approval tests and tests during development. This enables Hewing to implement virtually all relevant required certification tests on accredited test facilities. This saves valuable time and money. Tests during the development, in turn, generate clarity regarding the functionality and practicability of new pipes, fittings and components. This ensures that only optimised products and systems which meet the specified requirements reach official certification tests.

Clients have real experts at their disposal with Hewing: They possess exceptional know-how in development and certification projects through intensive cooperation with national and international testing institutes, and collaboration with numerous standardisation as well as expert organisations.

# PE-Xc pipes for surface regulation

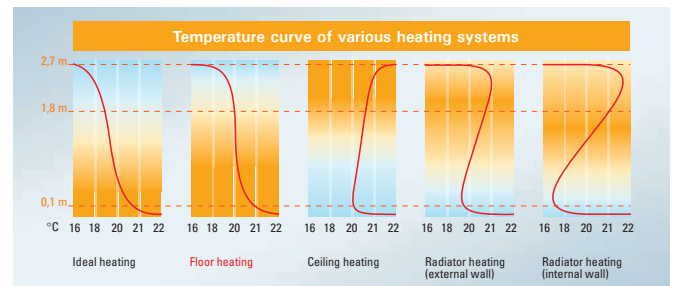
One of the main areas of application for Hewing PE-Xc pipes are state-of-the-art surface regulation systems, which have firmly established themselves on the market.



Whilst radiators cause significant airflow within the room...



... surface regulation systems provide even heat / chill output which prevents dust turbulence from the offset.



Comprehensive physiological investigations prove that the temperature profile of a floor heating system corresponds very closely to the ideal profile, in contrast to alternative forms of heating.

For example, over 50 % of newly built detached houses and apartment buildings in Germany feature floor heating. Today, they no longer exclusively serve heating purposes, but are often also used for cooling. Thanks to their large heating/cooling surfaces they provide efficient energy-saving and environmentally protective solutions.

Numerous benefits can be achieved with state-of-the-art surface regulation systems:

## Healthy room climate:

- In heating mode, surface temperatures generally range from a pleasant 22 °C to 27 °C.
- Virtually ideal temperature distribution, thus creating a real feel-good climate in the room.
- Thermally-generated draughts are a thing of the past thanks to the minimal

temperature difference between radiation surface and room air.

- Anti-allergenic due to minimal dust turbulence and moisture reduction e.g. in flooring.

## Economical operation:

- Low pre-flow temperatures in heating mode, generally between 33 °C and 40 °C.
- Ideally combinable with alternative energy sources such as state-of-the-art condensing technology, heat pumps or solar energy.
- Large surface radiation heat/chill output. Regarding heating in comparison to radiators, the room temperature can be reduced by 2 °C whilst maintaining the same temperature feeling – saving up to 12 % in energy costs.

- Self-regulating: heat/chill output is further reduced as the difference between air temperature and surface temperature of the surface regulation system decreases.
- Economical: offers for surface regulation systems already include additional construction services (e.g. heat insulation). Furthermore, this means of heat distribution increases the value of a building.

## Design freedom:

- Lack of radiators enables optimal utilisation of space.
- Open choice of flooring suitable for surface regulation systems: from tiles to carpets and parquet.





Continuous measurements on the oxygen impermeability of Hewing PE-Xc pipes for heating applications show they are well within limit values specified in DIN.



Hewing PE-Xc pipes provide all the criteria for rapid, easy installation.



With the flexible pipes, shifts in direction during installation can be implemented in seconds.

### **Flexible, light and robust**

PE-Xc pipes display their full range of benefits in surface regulation systems for heating and/or cooling. It is not without good reason that over 70 % of all floor heating in Germany is implemented using crosslinked polyethylene pipes. They significantly facilitate installation thanks to their flexibility and minimal weight: Assembly is rapidly completed, even at sub-zero temperatures. In addition, 'endless laying' from large drums is possible, reducing cutting and thus also costs, as well as avoiding connection points in screed.

In transport and during laying, PE-Xc pipes benefit from their robustness. Even heavy mechanical pressure does not lead to loss in quality. Their resistance to construction chemicals is also a benefit in wet systems. Both cement and flow screed including potential mixed additives can be used without complication.

### **Oxygen impermeable and corrosion-free**

PE-Xc pipes are absolutely corrosion and encrustation free in operation. With PE-Xc pipes for heating applications, oxygen diffusion into the heating system and potential resultant corrosive processes are effectively prevented by an EVOH barrier. Hewing quality is well within required applicable DIN limit values for oxygen diffusion in heating systems. The oxygen barrier on the four-layer PEX-4 pipe and the five-layer Penta-Pipe is additionally protected against

mechanical damage in transport and use on the construction site by further external layers.

### **Pressure and temperature resistant**

Hewing PE-Xc pipes are capable of meeting surface regulation pressure and temperature requirements throughout the entire lifetime of a house. Creep strength tests show this even in significantly tougher conditions of 95 °C and 10 bar internal pressure and also prove the suitability of the pipes for radiator connections and drinking water installations.

# From detached house to production hall – Surface regulation systems are used in a broad spectrum of locations:



Surface regulation systems featuring Hewing PE-Xc pipes are used in a variety of locations, such as churches, for example ...



... and in open applications ...



... as well as industrial halls and factory buildings.

- Detached houses and apartment buildings
- Offices, retail shops
- Kindergartens, schools
- Sports, concert and event venues
- Production and industrial halls
- Airports, railway stations
- Museums, exhibitions, churches
- Undeveloped and green spaces as well as garden nurseries
- Etc.

For all these circumstances, surface regulation systems featuring PE-Xc pipes provide huge installation and utilisation benefits. The flexible pipes can rapidly and easily be installed by large drums in the (sometimes extremely large) locations. Furthermore, thanks to their corrosion resistance, they are even perfectly suitable for direct installation in soil.

## Regulation where it is required

With appropriate static and dynamic floor structures, the surface regulation systems are extremely strong. This is particularly significant in industrial constructions with high bays, machines or heavy forklift traffic, for example.

Additionally, for example in larger halls and rooms with high ceilings, they also ensure that heat or coolness is generated where it is really required: They provide pleasant temperature from head to toe whilst preventing energy wastage in the upper section of the room or hall. In addition, unpleasant dust turbulence is avoided due to the high proportion of radiation warmth.



Put through their paces: e. g. on the test facility for simulating alternating bend stresses (flexural fatigue test), which has been specially developed by Hewing.



PE-Xc pipes also provide sound insulation for radiator connections: They reduce flow and circulation pump noise to a minimum.



The special pipe solution RaFuRo makes it possible to connect both floor heating and radiators via a single heating circuit: an ideal solution for small rooms and the extension of existing systems.

## PE-Xc pipes for radiator connection

Oxygen impermeable PE-Xc pipes designed for heating applications provide all the properties required for radiator connections. They are extremely light and flexible, easy to handle and enable rapid, clean, cost-effective installation. During installation, it is merely necessary to provide for the relevant measures to compensate for thermal length changes (see Tips for users, page 14). The PE-Xc pipes are capable of meeting the high temperature and pressure resistance requirements of up to 70 °C and 10 bar in the long term – this is proven by continuous in-house and third-party monitoring tests.

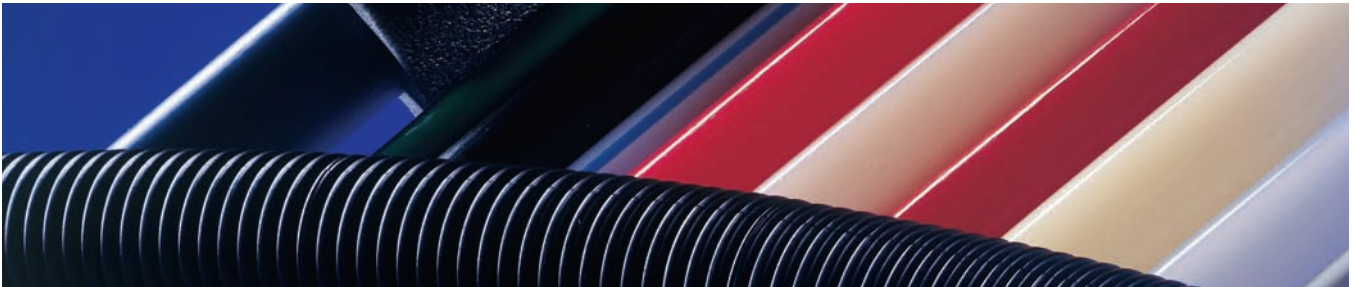
In floor distribution, the Hewing PE-Xc pipes are generally installed in protective pipes. If particular insulation regulations must be met, Hewing provides pipe solutions equipped with symmetrical or asymmetrical in-plant insulation – removing the elaborate, time-consuming insertion of pipes into insulation sleeves on the construction site. Furthermore, extensive supply lengths minimise cutting and render in-floor pipe connections superfluous. In addition, the 'cold' connection techniques used in PE-Xc pipe installation feature further benefits: Elaborate soldering or welding is unnecessary, minimising fire hazards and risk of injury.

### **A single heating circuit for surface heating and radiators**

Hewing has developed RaFuRo for an easy combination of radiator and floor heating, for example in small rooms. This is a PE-Xc heating pipe inserted into a profiled protective pipe. The air barriers between the individual corrugations of the protective pipe are incorporated as additional insulators via an external PE layer. This results in reduced surface heat output, enabling the water temperature level designed for radiators to also be deployed in floor heating.

# PE-Xc pipes in drinking water installations

## Taking no risk with our favorite food.



In domestic drinking water installations, PE-Xc pipes become the 'world's longest foodstuff package'.

Pipes used in domestic drinking water installations must have no impact whatsoever on its quality. Hewing PE-Xc pipes are ideal for this application area as they are irreproachable in terms of hygiene, do not corrode and encrust, and do not deposit harmful metal ions in drinking water.

In order to ensure the long-term durability of installations, it is also important to consider potential future changes in water properties when selecting raw materials. Even in this respect, Hewing PE-Xc pipes are the first choice. In contrast to many other materials, fluctuating pH values have absolutely no impact on them, pitting and tensile fracture corrosion do not occur and they do not react with substances dissolved in water. The PE-Xc pipes comply with the drinking water regulation (TrinkwVO) and also meet the requirements of the KTW

recommendations for health evaluation of plastics within the framework of the German Foodstuffs and Commodities Act for the drinking water sector (BGVV).

### **Proven hygienic and safe**

The proof that regulations and limit values are adhered to is provided via continuous third-party monitoring on both raw materials and finished PE-Xc pipes implemented by DIN CERTCO, Berlin, and the German Technical and Scientific Association for Gas and Water's (DVGW) Water Technology Centre, Water and Corrosion Test Laboratory, Karlsruhe (TZW). Furthermore, it is ensured the pipes adhere to requirements regarding the growth of microorganisms on materials for the drinking water sector according to DVGW work sheet W 270. Additional ongoing third-party monitoring is implemented by e.g. the

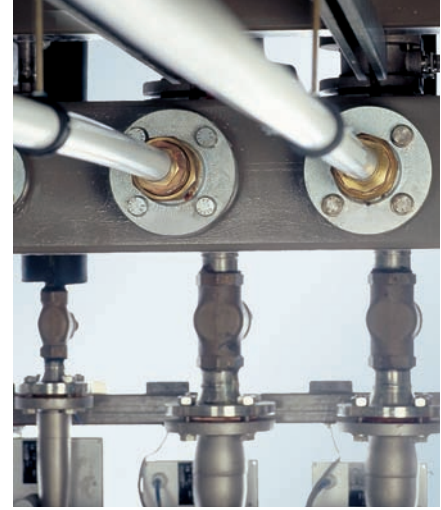
Materialprüfanstalt Darmstadt (MPA DA), the Materialprüfungsamt NRW (MPA NRW), the Süddeutsche Kunststoffzentrum (SKZ), Hygieneinstitut des Ruhrgebietes (HY) and the German Technical and Scientific Association for Gas and Water (DVGW) as well as the Dansk Teknologisk Institut (DK), KIWA (Ned.) and NSF (US).



As in radiator connections, 'cold' fitting techniques are also used in drinking water installations: soldering or welding is unnecessary.



PE-Xc pipes are subject to ongoing tests under extreme pressure on the in-house pressure surge test facility.



PE-Xc pipes provide ongoing proof of their utility in the thermal cycling test, which simulates practical requirements e.g. in drinking water installations.



Hewing PE-Xc pipes are approved for drinking water installations by DVGW, amongst others.

### Surge resistant

PE-Xc pipes can be used for multiple purposes in domestic drinking water installations: in floor, riser or cellar distribution – in concealed / masonry installations as well as front wall installations. They ensure safe water supply throughout the entire lifetime of a house. This is proven by both their excellent creep behaviour and pressure resistance: Positive surges which may not exceed a pressure of 2 bar according to DIN 1988 (measured directly prior to fitting) have just as little effect on the pipes' utility as negative surges, which must be located above 50 % of the flowing pressure. In particular, the expandability of the PE-Xc material has a positive effect in this process, enabling significant buffering of pressure loads. In comparison to metal pipes, the noise level is considerably lower.

### Easy installation

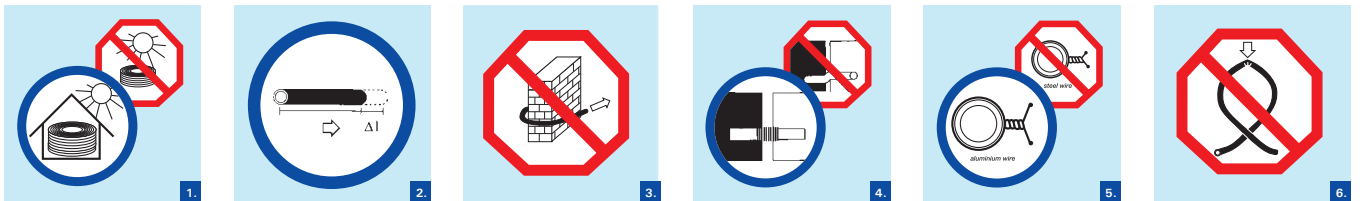
PE-Xc pipes can be installed easily, rapidly and economically from the coil. Due to their high flexibility, the PE-Xc pipes can be easily fed around corners without further component shapes or fittings. Changes of direction in small spaces do not pose problems. During installation, it is merely necessary to provide potential compensation for thermal pipe length changes (see Tips for users, page 14). PE-Xc pipes feature a particular benefit when connected to existing pipe installations: The 'flow rule' defining the sequence in which certain pipe materials must be installed in the flow direction (which must be observed when

using most metal pipes) can be disregarded – highly significant during renovation work.

For floor installation, PE-Xc pipes are generally deployed as a pipe-in-pipe solution inserted in protective pipes. Minimum condensation protection according to DIN 1988 is thus already provided. In order to adhere to special insulation regulations, Hewing also supplies pre-insulated PE-Xc pipes featuring symmetrical or asymmetrical insulation, eliminating unnecessary additional work steps on the construction site. Products adhering to the requirements of the German Energy Conservation Ordinance (EnEV) are supplied and must be installed according to construction site circumstances.

# Tips for users

## Ensuring a sustainable installation.



### 1. UV protection

PE-Xc pipes should be protected from intense sunlight during storage and installation.

### 2. Thermal length changing

Thermal length changing is a material property which should be principally observed during pipe installation. Pipes must be granted sufficient scope for potential expansion and shortening to avoid a mechanical bending-strength overload of screwed joints. Pipe-in-pipe installation featuring angular deflection represents a potential solution. Further tools include pipe guide bends in the distributor element as well as rotation aids or junction boxes on the radiator/tap which axially channel pipe loads onto connection points.

(also see relevant chapter in Hewing's Technical Manual)

### 3. Unrolling facilities

Stationary unrolling facilities should be located as close as possible to the installation area. This avoids feeding pipes around too many corners (e.g. doorways and spurs) and minimises the distance the pipe is pulled across the ground. Items with sharp edges should be removed from the area or padded.

### 4. Crossing screed joints

If pipes must cross screed joints, around 30 cm of the joint area should be covered with a slitted protective pipe or a softly elasticated insulating tube.

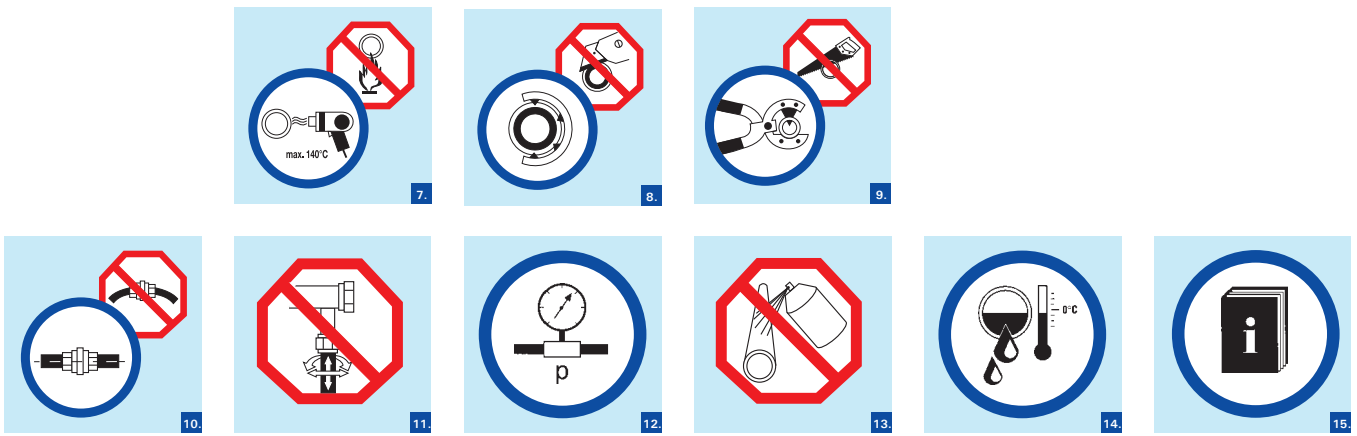
### 5. Pipe mounting

If PE-Xc pipes must be mounted for surface regulation e.g. on structural steel mats, the use of suitable clips or plastic cable ties is recommended. Plastic-coated aluminium wire represents a further alter-

native. In contrast, steel wire with tensile strength is not suitable for the mounting of PE-Xc pipes as it can damage the pipe surface.

### 6. Avoiding pipe kink points

In order to avoid kink points, PE-Xc pipes should be unrolled as little as possible during installation. If loops form, these should be removed before further tightening leads to kink points.



### 7. Removing kink points

Accidentally-caused kink points in PE-Xc pipes can be removed by warming to a maximum of 140 °C with a heat gun (featuring thermostatic temperature control, under no circumstances should a naked flame be used). Due to PE-Xc pipes' memory effect, the kink removes itself. The affected point should be cooled off prior to further processing.

### 8. Cutting the protective pipe

Protective pipes should generally be cut to length with special protective pipe cutters. If such a tool is not available, normal knives can also be used – however, the internal PE-Xc pipe should be protected by a metallic cutting sleeve whilst cutting the corrugated pipe.

### 9. Cutting PE-Xc pipes

Pipes should be cut at right angles to the pipe axis using PE-X cutting pliers. Knives or saws should not be used as they can cause burrs or deformations at the end of pipes which complicate the correct use of a fitting. If a PE-Xc pipe is cut at the wrong point, this pipe section should be removed.

### 10. Pipe fittings

Due to the generally relatively short connection length, pipe fittings shouldn't be used between the distributor and the consumption point. Furthermore, they render the potentially required replacement of a damaged pipe impossible.

If the installation of a pipe fitting is unavoidable, e.g. whilst laying remaining lengths of pipe in small spaces, it may only be positioned on a straight and not on a pipe elbow.

### 11. Distributor connection points

Pipes must always be connected axially flush and mounted on the distributor. Installation must occur under as little stress as possible, i.e. without fatigue, bending, tensile and torsional stress.

### 12. Pressure test

Following completion of installation PE-Xc pipes must undergo a pressure test according to the data of the relevant system provider and/or technological standards.

### 13. Solvent

Direct contact of PE-Xc pipes with solvents or paints, sprays, pens, tapes etc. containing solvents should be avoided as these can damage the pipe surface.

### 14. Antifreeze

Filled PE-Xc pipes must not be frozen as this can produce pipe internal pressure in excess of 120 bar. They should therefore be emptied or otherwise protected from freezing should there be a risk of frost.

### 15. Installation instructions

The installation instructions of the relevant system provider must be observed.

### 16. Utilisation opportunities in sanitation, heating and air conditioning

In Germany, the product residue, packaging material and worn-out products which accumulate on users' premises can be efficiently recycled using the Interseroh recycling system sanitation, heating and air conditioning. An Interseroh directory provides information regarding the locations of the nearest Interseroh waste disposal partner.

System providers from the sanitary and heating industry rely on Hewing as a strong OEM partner in the development and production of crosslinked polyethylene pipes and aluminium multilayer pipes. Hewing also offers and develops special solutions for different industrial applications and transport of liquid or solid matters.

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