Uniclass L73131:P7110 | EPIC J344:X721
CI/SfB (52.3) (ln6)
June 2015 PL310

Plumbing and heating

PRODUCT AND INSTALLATION MANUAL

wavin

CONNECT TO BETTER

Tigris K1
Commercial Press-fit Plumbing

CONNECT TO BETTER

Contents
Tigris K1

Introduction
Tigris K1

Tigris K1 is a press-fit plumbing system designed for potable water, sanitary and heating applications. With WRAS, DVGW and KIWA approvals, it is ideally suited for installation on commercial projects such as educational establishments, apartment blocks and hotels.

The Tigris K1 system comprises multilayer composite pipe and high quality polyphenylsulphone (PPSU) fittings with a fixed stainless steel sleeve, in sizes (outside diameter) 16mm, 20mm, 25mm, 32mm, 40mm, 50mm and 63mm. Fittings are compressed onto the pipe using a battery or mains-powered press-fit tool in an operation that takes a fraction of the time of traditional soldering techniques.

Already widely specified and accorded a design award in Europe, Wavin Tigris K1 is the proven and perfected system for commercial plumbing and heating projects.

Features and Benefits

The Tigris K1 system offers a number of advantages when compared to both traditional materials and similar products:

- Patented hexagonal head shape means low insertion force is required at assembly
- Due to the flexible nature of multilayer pipe, Tigris K1 requires minimal fittings thereby reducing installation time and cost and improving flow rates
- Metal layer in the pipe means it is resistant to oxygen diffusion and dimensionally stable
- Thermal expansion is comparable with copper
- Plastic layers in the pipe mean it is flexible and corrosion resistant
- High resistance to scale build-up and stress-cracking
- High pressure and temperature resistance
- Quick, simple and safe jointing method resulting in installed cost savings when compared to traditional systems
- Defined leak function to reveal unpressed fittings at pressure test
- Proven press-fit technique, with no soldering, welding or thread-cutting required and no costly hot works insurance permits needed.
- Metal layer in pipe can be detected in walls or floors through the use of a detecting device
- Light in weight, particularly in comparison to screwed steel products

Specifications

Multilayer composite pipes and fittings will be capable of being used on potable water, hot and cold water, heating installations and fan coil unit applications.

The multilayer composite pipe will be manufactured from PEX-c with a crosslinking coefficient of more than 60%, butt-welded aluminium and HDPE.

Pipes and fittings will be approved by WRAS and DVGW, and will be capable of operating at 6 bar at 95°C and pressures up to 10 bar at lower temperatures.

Applications

Tigris K1 can be used on potable water, hot and cold water, heating installations, and fan coil units. It is also suitable for installations where health and hygiene are of particular importance, for example in operating theatres or food preparation facilities.

The Tigris K1 system can also be used in both new build and refurbishment projects. If you would like one of our team to assess the suitability of Tigris K1 for your project, or need any more information please speak to your project sales representative or call our technical team on 0844 856 5165.

CONNECT TO BETTER

Multilayer Composite Pipe
Tigris K1

Wavin's multilayer composite pipe comprises an inner plastic layer made of cross-linked polyethylene (PEX-c), an outer plastic layer of high density polyethylene (HDPE), and a butt welded (for consistent wall thickness) aluminium layer, in between.

The aluminium layer is welded to the inner and outer plastic layers by the use of a coupling agent, producing a pipe structure with a total of five layers (see Figure 1).

This two step manufacturing process gives greater control, resulting in a consistently high quality pipe.

As well as being resistant to oxygen diffusion, the uniform plastic-metal construction offers additional advantages:

- The pipe is dimensionally stable, resistant to unwanted movement yet flexible
- Easy bending means that installation is simple and time required can be reduced to a minimum
- The permanent connection of the plastic pipes to the aluminium pipe means that the length expansion is determined by the metal. It is roughly equal to that of copper, i.e. it is minimal (see page 20 – 21 for more information)

Advantages in practice:

- Low weight
- Dimensions from 16 mm to 63 mm
- Significantly fewer fittings needed due the ease of pipe bending and long pipe coils
- Easy bending with dimensional stability is ideal for tight installation situations
- Quick and safe assembly
- Resistant to oxygen diffusion
- Suitable for all water qualities
- Free from scale build up
- Corrosion resistant
- Minimal length expansion
- Pressure and temperature resistant

Figure 1: Multilayer composite pipe structure

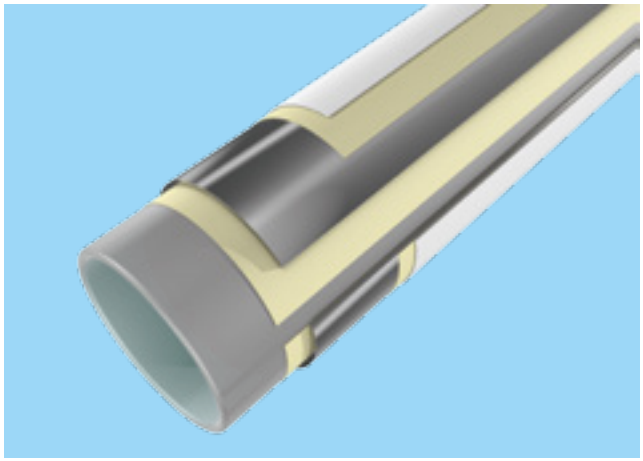


Table 1: Technical specifications

Wavin multilayer composite pipe	
Pipe material	Internal layer is electron-beam crosslinked polyethylene (PE-Xc), external layer is HDPE, with an aluminium layer between, connected by special bonding agents
Pipe colour	White
Oxygen Barrier	100%
Maximum operating pressures (according to ISO10508)	Class 1 (Sanitary / 60°C) 10 bar Class 2 (Sanitary / 70°C) 10 bar Class 4 (Underfloor heating) 10 bar Class 5 (Radiator heating) 6 bar
Max. constant operating temperature	85°C (with a max. pressure of 6 bar)
Max. short term operating temperature	100°C (max. 100h in 50 years)
Max. permanent operating pressure	10 bar (with a max. temperature of 70°C)
Coefficient of thermal expansion	0.025 – 0.030 mm/m K
Thermal conductivity	0.4 W/m K
Pipe roughness	0.007mm

Multilayer Composite Pipe
Tigris K1

The Wavin multilayer composite pipe for radiator heating and underfloor heating

Wavin's multilayer composite pipe can be used for both radiator and floor heating systems. Being 100% resistant to oxygen diffusion, temperature resistant, supple and flexible, it offers outstanding properties for all types of heating installations.

Aluminium thickness

The aluminium layer in the Wavin pipe is manufactured using butt-welding technology. This gives a secure aluminium layer with no variation in thickness of the aluminium or the finished pipe and ensures a reliable seal when the pipe is connected to the fittings.

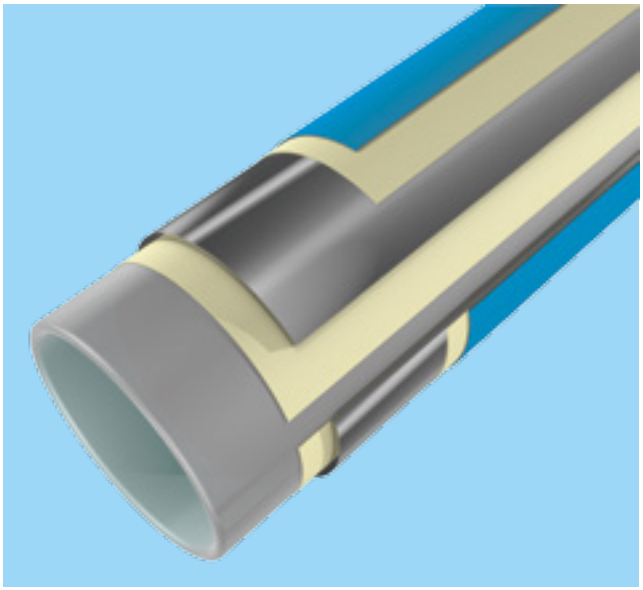
Corrosion resistance

The plastic internal and external layers offer minimal surface friction for water as a result of their low roughness. Deposits and corrosion are things of the past.

It can be safely used in mixed installations as there is no risk of electrochemical corrosion. Moreover, the plastic outer sheath allows embedding of the Wavin multilayer composite pipe directly in the screed.

Limited thermal expansion

The thermal length expansion is dictated by the (middle) aluminium layer so is very similar to that of a metal pipe.



Additional protective measures

Thermal overloading of the composite pipe network must be avoided by taking appropriate safety precautions including the use of suitably regulated equipment and monitoring equipment.

Protection from UV radiation

The plastic outer sheath of the composite pipe provides adequate protection from indirect UV radiation inside buildings and no further measures are required. However, the pipes must not be constantly subjected to direct UV radiation (solar radiation outdoors) without suitable protective sheathing.

Installation

Wavin's Tigris K1 pipe can be handled by a single installer. Optimal aluminium thickness means it can be bent by hand for pipes up to 20mm diameter. Bending springs and bending pliers may be used to assist and should always be used for diameters 25mm and above.

Accessories and tools

The pipe ends must be calibrated and de-burred using the Wavin calibration tool. The pipe can then safely be inserted and connected to all fittings.

CONNECT TO BETTER

Press Fitting System
Tigris K1

Advantages in practice:

- Adaptors included in range for easy connectivity to Wavin's Hep$_2$O system or to copper systems
- Dimensions from 16mm to 63mm
- Low insertion forces due to the patented Wavin hexagonal head shape
- Defined leak function reveals unpressed fittings at pressure test
- Quick and safe assembly
- Suitable for any water quality

Approvals and Certificates

Wavin Tigris K1 is subject to constant internal quality controls and continuous external monitoring.

Wavin Tigris K1 is approved by DVGW & WRAS and certified to EN-ISO 21003.

Table 2: Technical specifications

Wavin Tigris K1	
Pipe material (for multilayer composite pipes see pages 7 and 8)	Internal layer is electron-beam crosslinked polyethylene (PE-Xc), external layer is PE, with an aluminium layer between, connected by special bonding agents
Fitting material	polyphenylsulphone (PPSU), press sleeve in stainless steel
Pipe colour	White
Maximum operating pressures (according to EN21003)	Class 1 (Sanitary / 60°C) 10 bar Class 2 (Sanitary / 70°C) 10 bar Class 4 (Underfloor heating) 10 bar Class 5 (Radiator heating) 6 bar
Max. permanent operating temperature	85°C (with a max. pressure of 6 bar)
Max. short term operating temperature	100°C (max. 100h in 50 years)
Max. permanent operating pressure	10 bar (with a max. temperature of 70°C)
Coefficient of thermal expansion	0.025 – 0.030 mm/m K
Thermal conductivity	0.4 W/m K
Pipe roughness	0.007mm

Press Fitting System Tigris K1

PPSU Wavin Tigris K1 press fitting with defined leak function

The design of Wavin's Tigris K1 PPSU press fittings guarantee that an accidentally unpressed connection is unsealed and reliably exposed by leaking during the pressure test. Furthermore, the patented hexagonal head cross-section reduces the force required to insert the pipe, which makes the work of the installer easier.

The Wavin Tigris K1 press fitting is made of the high technical performance plastic polyphenylsulphone (PPSU), which is resistant to high temperatures (heat shape resistance > 200°C, processing temperature 360°C), corrosion and encrustation. It also has an extremely high resistance to scale build up and stress cracking, making the fitting very robust. The performance of PPSU has already been proven over many years in aircraft engineering, medical sterilisation technology, chemical plants and automotive engineering as well as in Wavin plumbing fittings.

The fittings are equipped with a fixed stainless steel press sleeve. The sleeve gives the connection additional strength and reliability. It has an observation window, through which the insert depth of the pipe can be reliably checked before pressing. The seal is with an O-ring.

Figure 2: The observation window in the stainless steel press sleeve can be used to check that the pipe is inserted to the stop

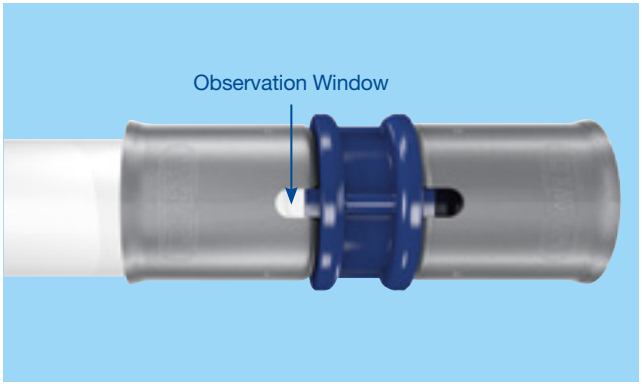


Figure 3: The new generation of PPSU press fittings with hexagonal head cross-section

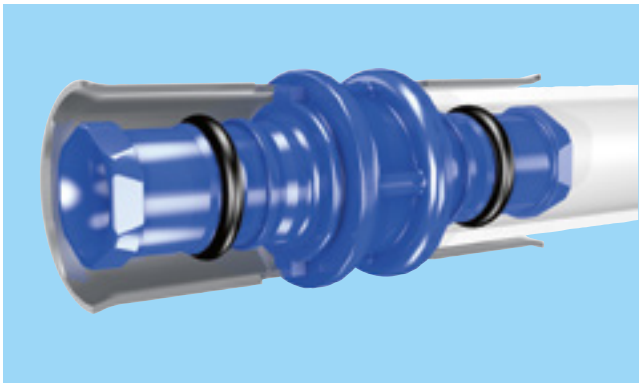
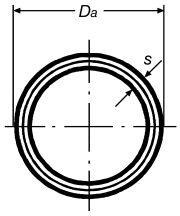


Figure 4: Safety through clever technology: the Defined Leak Function in the pressure test reveals unpressed fitting connections

Product Details
Tigris K1

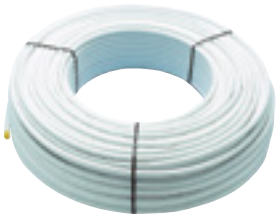
Pipe

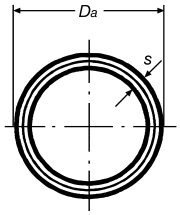


Pipes – Straight Lengths

Material: HDPE, Aluminium and PEX-c

Nominal Size (mm)	Part Number	Dimensions Dia (mm)	Size (mm)	Length (m)
16 x 2.0	3004362	16	2.00	5
20 x 2.25	3004365	20	2.25	5
25 x 2.5	3004367	25	2.50	5
32 x 3.0	3004369	32	3.00	5
40 x 4.0	3004371	40	4.00	5
50 x 4.5	3004372	50	4.50	5
63 x 6.0	3028271	63	6.00	5

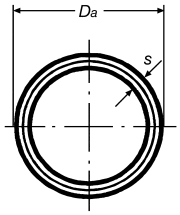




Pipes – Coils

Material: HDPE, Aluminium and PEX-c

Nominal Size (mm)	Part Number	Dimensions Dia (mm)	Size (mm)	Length (m)
16 x 2.0	3004363	16	2.00	100
20 x 2.25	3004366	20	2.25	100
25 x 2.5	3004368	25	2.50	50



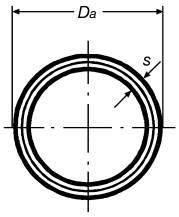
Pipes – Coils 9mm Pre-insulated

- For drinking water and heating installations
- Pipe insulation: round extruded insulation from foamed PE with co-extruded, moisture-resistant PE foil (red colour)
- 9mm insulation for cold water pipes according to DIN 1988 Part 2 and heating pipes according to the Energy Saving Ordinance (EnEV) Aging and form-resistant
- Building materials class: B2, normal flammability, according to DIN 4102
- Thermal conductivity: 0.040 W/mK
- Additional continuous insulation against impact noise is essential

Material: PE, HDPE, Aluminium and PEX-c

Nominal Size (mm)	Part Number	Dimensions Dia (mm)	Size (mm)	Length (m)
16 x 2.0	3004378	–	–	50
20 x 2.25	3004379	–	–	50

Product Details
Tigris K1



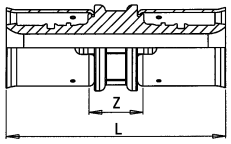
Pipes – Coils 13mm Pre-insulated

- For drinking water and heating installations
- Pipe insulation: round extruded insulation from foamed PE with co-extruded, moisture-resistant PE foil (red colour)
- 13mm insulation for cold water pipes according to DIN 1988 Part 2 and heating pipes according to the Energy Saving Ordinance (EnEV) Aging and form-resistant
- Building materials class: B2, normal flammability, according to DIN 4102
- Additional continuous insulation against impact noise is essential

Material: PE, HDPE, Aluminium and PEX-c

Nominal Size (mm)	Part Number	Dimensions Dia (mm)	Size (mm)	Length (m)
16 x 2.0	3004380	–	–	50
20 x 2.25	3004381	–	–	50

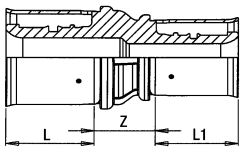
Couplers



Straight Coupler

Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	Z
16	3023348	53	13
20	3023359	62	16
25	3023360	74	18
32	3023488	83	23
40	3024665	103	26
50	3027832	108	32
63	3027847	155	35

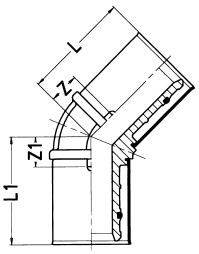


Reducing Coupler

Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	Z
20 x 16	3023525	20	19	15
25 x 16	3023526	26	19	17
25 x 20	3023527	26	20	18
32 x 20	3023528	26	20	20
32 x 25	3023522	26	21	20
40 x 32	3023529	26	26	24
50 x 32	3027833	26	26	28
50 x 40	3027834	38	38	35
63 x 40	3027852	60	38	42
63 x 50	3027850	60	38	36

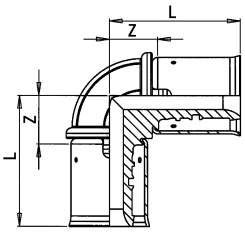
Elbows



Elbow 45°

Material: PPSU, Stainless Steel

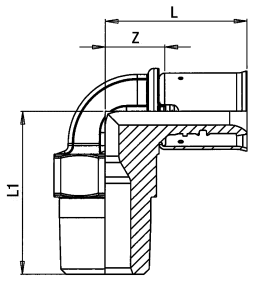
Nominal Size (mm)	Part Number	Dimensions (mm) L	Z
25	3023498	36	7
32	3023499	38	13
40	3027839	60	22
50	3024668	62	25
63	3027849	87	28



Elbow 90°

Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	Z
16	3023363	31	12
20	3023364	22	14
25	3023365	43	17
32	3023500	47	21
40	3024666	71	34
50	3024667	77	40
63	3027848	106	46

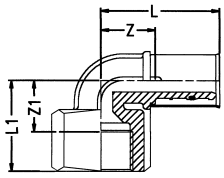


Elbow 90° – Single Male BSP Thread

Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	Z
16 x ½"	3023542	33	38	14
20 x ½"	3023543	34	41	15
20 x ¾"	3023544	37	45	18
25 x ¾"	3023545	44	47	18
32 x 1"	3023539	49	57	23

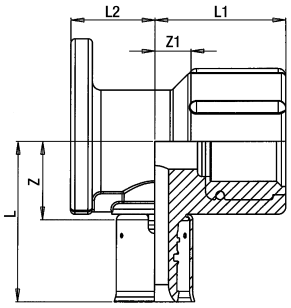
Product Details
Tigris K1



Elbow 90° – Single Female BSP Thread

Material: PPSU, Stainless Steel, Brass

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	Z	Z1
16 x ½"	3023546	38	33	19	18
20 x ½"	3023547	39	35	19	20
20 x ¾"	3023548	42	38	22	21
25 x ¾"	3023549	49	40	23	23
32 x 1"	3023540	55	47	29	28

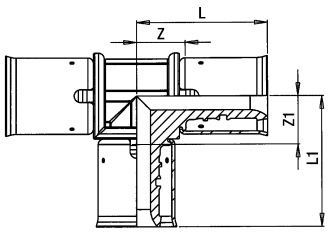


Backplate Elbow – Female BSP Thread

Material: PPSU, Stainless Steel, Brass

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	L2	Z	Z1
16 x ½"	3023344	38	30	20	21	16
20 x ½"	3023555	39	20	20	26	18
20 x ¾"	3023537	42	19	19	27	18

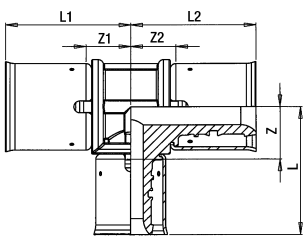
Tees



Equal Tee

Material: PPSU, Stainless Steel

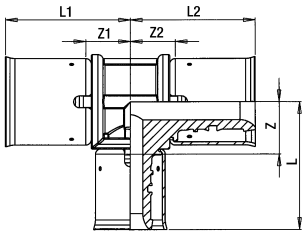
Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	Z	Z1
16	3023345	31	31	12	12
20	3023346	34	34	14	14
25	3023347	43	43	17	17
32	3023521	47	47	21	21
40	3024664	71	71	26	26
50	3027829	154	77	32	32
63	3027853	106	106	46	46



One End Reduced Tee

Material: PPSU, Stainless Steel

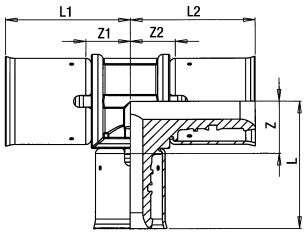
Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	L2	Z	Z1	Z2
20 x 20 x 16	3023505	35	35	32	14	14	13



Double End Reduced Tee

Material: PPSU, Stainless Steel

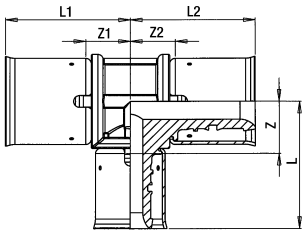
Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	L2	Z	Z1	Z2
16 x 20 x 16	3023504	34	32	32	14	14	14
20 x 25 x 20	3023510	40	36	36	15	16	16
25 x 32 x 25	3023515	42	46	46	17	21	21



Branch Reduced Tee

Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	L2	Z	Z1	Z2
20 x 16 x 20	3023506	33	33	33	14	12	12
25 x 16 x 25	3023508	35	39	39	16	13	13
25 x 20 x 25	3023511	37	41	41	16	15	15
32 x 16 x 32	3023513	39	39	39	20	32	32
32 x 20 x 32	3023514	41	41	41	20	15	15
32 x 25 x 32	3023516	47	43	43	21	17	17
40 x 25 x 40	3023518	59	67	67	33	30	30
40 x 32 x 40	3023519	59	71	71	34	34	33
50 x 25 x 50	3027830	64	68	68	39	31	31
50 x 40 x 50	3027831	79	73	73	41	35	35
63 x 25 x 50	3027856	70	91	67	45	31	30
63 x 32 x 63	3027855	71	95	95	46	35	35
63 x 40 x 63	3027854	84	95	95	46	35	35

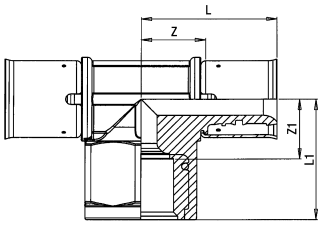


Branch and One End Reduced Tee

Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	L2	Z	Z1	Z2
20 x 16 x 16	3023507	33	33	30	14	12	11
25 x 16 x 16	3023509	34	38	30	16	13	12
25 x 20 x 20	3023512	37	41	35	17	15	14
32 x 25 x 25	3023517	47	43	42	21	17	16
40 x 32 x 32	3023520	59	70	53	34	34	28

Product Details
Tigris K1

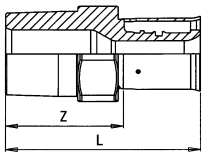


One Side Female BSP Thread Tee

Material: PPSU, Stainless Steel, Brass

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	Z	Z1
16 x ½" x 16	3023557	38	33	19	18
20 x ½" x 20	3023558	38	35	19	19
20 x ¾" x 20	3023559	42	38	22	21
25 x ¾" x 25	3023560	49	40	23	23

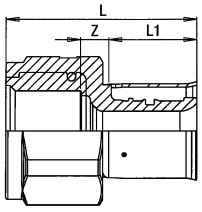
Connectors



Connector – Single Male BSP Thread

Material: PPSU, Stainless Steel

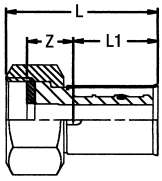
Nominal Size (mm)	Part Number	Dimensions (mm) L	Z
16 x ½"	3023495	49	30
20 x ½"	3023496	50	30
20 x ¾"	3023550	55	35
25 x ¾"	3023551	62	36
25 x 1"	3023552	68	42
32 x 1"	3023541	68	42
32 x 1¼"	3023553	74	48
40 x 1¼"	3027836	90	53
50 x 1½"	3027837	95	57
63 x 2"	4032685	108	50



Connector – Single Female BSP Thread

Material: PPSU, Stainless Steel, Brass

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	Z
16 x ½"	3023494	43	19	9
20 x ½"	3023361	44	20	10
20 x ¾"	3023497	47	20	11
25 x ¾"	3023362	54	26	12
32 x 1"	3023554	58	26	13
40 x 1¼"	3027838	77	44	13
50 x ½"	4032698	75	38	17
63 x 2"	4032699	102	59	20

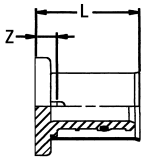


Tap Connector – Female BSP Thread

Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	L1	Z
16 x ½"	4032700	51	21	21
16 x ¾"	3023489	40	19	12
20 x ¾"	3023490	41	20	12
25 x 1"	3023491	50	26	14
32 x 1¼"	3023492	51	26	15
40 x 1½"	3023493	72	39	22

Accessories and Tools



End Cap

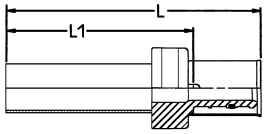
Material: PPSU, Stainless Steel

Nominal Size (mm)	Part Number	Dimensions (mm) L	Z
16	3023561	33	12
20	3023562	38	12
25	3023563	44	14

Adaptor Fitting to Hep$_2$O

Material: PPSU, Stainless Steel, Polybutylene

Nominal Size (mm)	Part Number
16 x 15	3052945
20 x 22	3052946
25 x 22	3052947
25 x 28	3052948
32 x 28	3052949



Transition Fitting to Copper

Material: PPSU, Stainless Steel, Brass

Nominal Size (mm)	Part Number	Dimensions (mm) L	Z
16 x 15	3004399	66	42
25 x 22	3004401	80	49

Product Details
Tigris K1

Pressure Stopper

Material: Brass

Nominal Size (mm)	Part Number
16	4013571
20	4013572
25	4013573

Bending Spring

Nominal Size (mm)	Part Number
16	4013553
20	4013559
25	4013562

Pipe Cutter

Nominal Size (mm)	Part Number	Description
–	4013545	Pipe Cutter – 10-63mm

Cordless Pressing Tool – Mini

- For the perfect completion of Wavin Tigris K1 press connections of 16 to 40mm
- Supplied in a case, including charger
- Jaws sold separately

Nominal Size (mm)	Part Number	Description
–	4048906	Tigris K1 Pressing Tool – Mini

Cordless Pressing Tool

- For the perfect completion of Wavin Tigris K1 press connections
- Supplied in a case, including charger
- Jaws sold separately

Nominal Size (mm)	Part Number	Description
–	4048907	Tigris K1 Pressing Tool

Pressing Jaws – Mini

- For use with 4048906

Nominal Size (mm)	Part Number
16	4046556
20	4046557
25	4046558
32	4046559
40	4046560

Pressing Jaws

- For use with 4013531

Nominal Size (mm)	Part Number
16	4046691
20	4046694
25	4046695
32	4046756
40	4046758
50	4046759
63	4035779

Calibration Mandrel – 16-32mm

Nominal Size (mm)	Part Number
16	4999998
20	4999999
25	4023364
32	4023365

Product Details
Tigris K1

Calibration Mandrel – 40-63mm

Nominal Size (mm)	Part Number
40	4031988
50	4031987
63	4035780

Hand Grip for Calibration Mandrel

Nominal Size (mm)	Part Number	Description
–	3011162	Hand Grip for Calibration Mandrel

Calibration Set

- Including transport case and power click grasp

Nominal Size (mm)	Part Number	Description
–	4013541	Wavin Kalispeed-Set 16-32mm

CONNECT TO BETTER

Installation and Assembly Information Tigris K1

Storage and handling

The Wavin system components are well protected in the original packaging. Nonetheless, all components (fittings and pipes) should be protected from mechanical and environmental damage.

Impairment due to ultraviolet radiation

Wavin multilayer composite pipes must be protected from direct, intense sunlight and ultraviolet (UV) radiation. This applies both for the storage of the pipes and for finished installation. Storage must therefore not take place in the open air. Suitable measures must be taken to protect finished systems and system components from the effects of UV rays.

Observe press and push-fit fitting assembly instructions

- Always cut the pipe to length at right angles
- Calibrate and chamfer the pipe end all round
- Push the pipe into the fitting to the stop
- Check the press fitting observation window
- Press in the case of the press fittings
- See pages 18 – 27 for detailed installation and assembly information

Potential equalisation

Building and electrical regulations such as VDI 0190 parts 410 and 540 demand potential equalisation between earth wires and “conductive“ water, waste water and heating pipes. As Wavin Hot and Cold Water Systems do not represent conductive pipe systems, they cannot be used for potential equalisation and are accordingly not to be earthed. An approved electrician must check that the installation of Wavin Tigris K1 does not impair the existing electrical protective and earthing measures.

Installation temperature

The installation temperature for Wavin pipe systems should not fall below -10°C.

The operating temperatures of the new pressing machines with the Li-ion batteries from the Wavin range must be above -15°C nor above 40°C. The optimum processing range for Wavin Tigris K1 system components lies roughly between 5°C and 25°C.

Frost protection

When using Wavin Hot and Cold Water Systems with pipe networks that require protection from frost (e.g. cold water networks, brine pipes), we recommend the use of ethylene glycol (to protect from risk of freezing). Ethylene glycol can be used up to a maximum concentration of 35%. This concentration roughly corresponds to frostproofing of -22°C. Before using alternative frost protection additives, confirm the suitability/ approval with the manufacturer or with Wavin.

Sealing

The assembly of a threaded connection must be in accordance with DIN 30 660. We strongly recommend the use of PTFE / Teflon Tape to seal the connection. Alternatively hemp may be used but only in conjunction with an approved plastic sealing compound such as Fermit. Restrict the amount of hemp as too great a quantity can result in damage to the internal threads and cross-threading. When using hemp make sure that the thread tips remain visible.

Contact with substances containing solvents

Avoid direct contact of Wavin Hot and Cold Water Systems with solvents or construction materials containing solvents (such as paints, sprays, expanding foams, adhesives).

Note: Specifically chemical sealants (e.g. Loctite) and adhesives (e.g. 2-part adhesives) must not be used. Expanding foams produced on the basis of methacrylate, isocyanate and acrylate must not be used.

Under unfavourable circumstances, aggressive chemicals that are present may cause damage to the plastic material.

The Wavin systems do not require the use of any chemical substance or additional lubrication during installation.

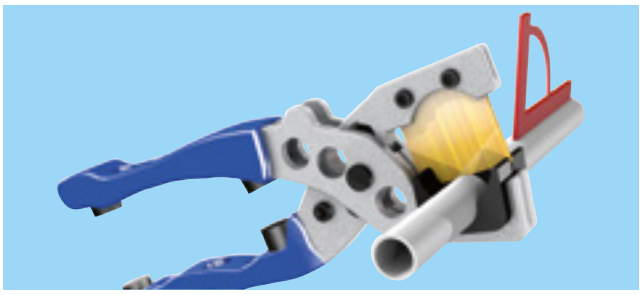
Statement on continuously operated recirculating systems

Tigris K1 may be suitable for use in continuously operated recirculating systems but operating parameters need to be approved by Wavin technical management.

Contact Wavin Technical on 0844 8565165 to discuss approval. **Definitions** – Continuously operated re-circulating systems or Secondary Hot Water Circulation/Ring main installations. These differ from conventional hot water supply and central heating systems found in domestic properties. Continuously operated re-circulating systems are water-replenished systems which are maintained at a constant high temperature to provide a constant source of hot water and are used to distribute constant hot water to draw off points that may be distant from the heat source or hot water storage vessel. Applications include multi residential properties like care homes and hotels.

Installation and Assembly Information
Tigris K1

Pipe Preparation and Assembly

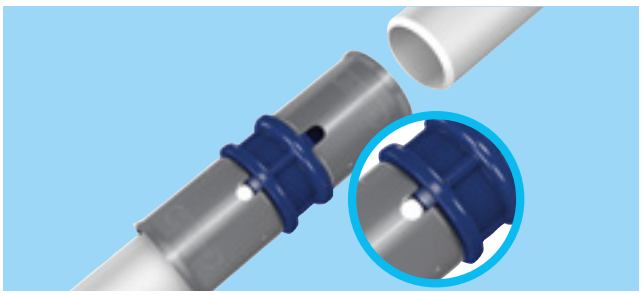


Step 1: Cut the pipe square

- Combination cutters (with pipe holder) for the dimension 16 – 25mm
- Pipe cutter for the dimension 32 – 63mm

Step 2: Calibrate and chamfer the pipe

- Dimensions 16 – 25mm: all-round chamfer of depth min. 1mm
- Dimensions 32 – 63 mm: all-round chamfer of depth min. 2mm
- Max. battery or drilling machine rotation speed should be 500 rpm
- Remove accumulated shavings from the battery calibrating pin



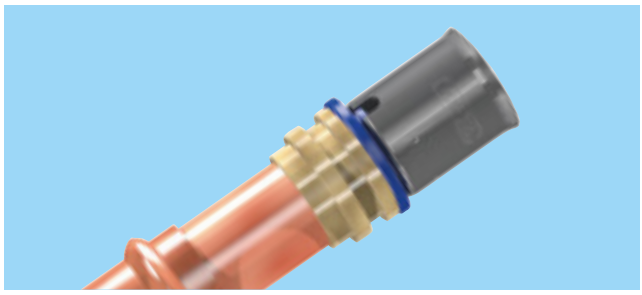
Step 3: Check fitting and insert pipe

- Check the fitting and ‘o’ ring are clean and that all components are seated in the correct position
- Push the pipe into the fitting until it is visible in the window

Step 4: Press the fitting to connect it securely to the pipe

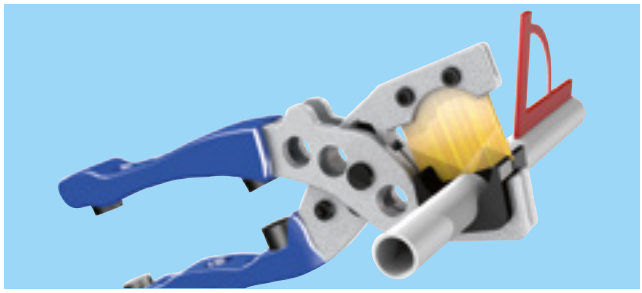
- Fit the correctly sized press-fit jaws to your press-fit tool
- The pressing jaws must be positioned on the inner stop of the press sleeve
- Activate the tool by pressing the trigger. Open the press-fit jaws and remove the pressed fitting
- The pressing process may be executed only once per connection

Assembly Instructions for Tigris K1 Press Transition to Copper



Step 1: Attach the press fitting to the copper pipe

- Slide the press connection into the copper fitting and press according to the specifications of the copper fitting manufacturer. A minimum space of 5mm must be observed between the soldered joint and outer edge of the copper fitting

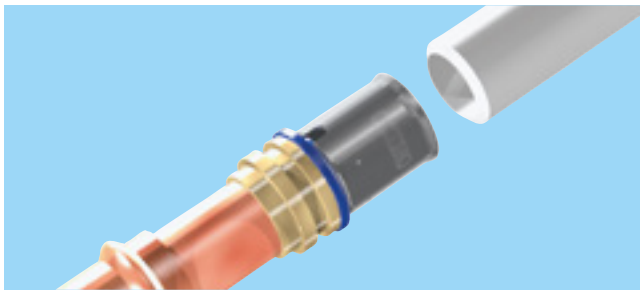


Step 2: Cut pipe

- Cut multilayer composite pipes of dimensions 16 – 25mm to length at right angles with the combination scissors

Step 3: Calibrate and chamfer the pipe

- After deburring, an all-round chamfer of at least 1 mm (Da 16 – 25) must be visible
- The maximum rotation speed when using the calibrator on the battery or drilling machine is 500 rpm. After use, remove accumulated shavings from the battery calibrating pin



Step 4: Insert the pipe into the press fitting

- Push the pipe into the fitting to the stop

Step 5: Press the fitting to connect it securely to the pipe

- The pressing jaws must be positioned on the inner stop of the press sleeve
- The pressing process must be executed only once per connection

Attention: DO NOT solder, otherwise the sealing rings on the press transition to copper may be damaged

Installation and Assembly Information
Tigris K1

Bending Wavin multilayer composite pipes

The pipe is easy to bend: by hand, with the aid of the bending spring.

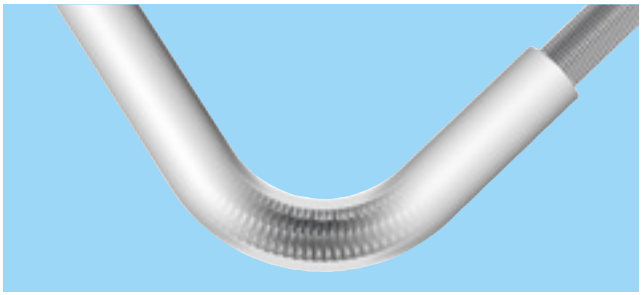


Table 3: Minimum bending radii with and without aids

Measurement Da x s (mm)	Bending radius By hand (mm)	Bending radius Bending spring (mm)
16 x 2.0	5 x ø ≈ 80	4 x ø ≈ 64
20 x 2.25	5 x ø ≈ 100	4 x ø ≈ 80
25 x 2.5	5 x ø ≈ 125	4 x ø ≈ 100
32 x 3.0	–	–
40 x 4.0	–	–
50 x 4.5	–	–
63 x 6.0	–	–

Installation and Fixing

Basics

The mountings used must be adequate for fixing the composite pipe in the respective nominal diameter. Fixing systems with a sound insulation insert are recommended.

The expected length expansion based on maximum temperature feed and line length must be taken into account. A distinction is generally drawn between fixed points and floating points as fixing methods. Fixed points divide the pipeline element into separate sections. In the case of straight pipe routes, a fixed point is to be applied at the mid-point. No fixed points should be applied directly at fittings that are used for a change of direction. Sufficient stability of the fixed points is required in order to effectively absorb the expansion forces occurring. A short distance to the ceiling must be observed.

Vertical lines, e.g. such as risers, can generally be installed only with fixed point clips. Here, fixing should be in front of or behind each storey branch. By contrast, floating point fixings guarantee expansion and movement of the pipeline concerned. For more information about this, please refer to the next chapter.

Consideration of thermally induced length expansion

All pipe materials expand on heating and contract on cooling. In the case of the piping for tap water systems (particularly with heated tap water) and heating pipes, the temperature based length expansion of the materials must always be taken into account.

The temperature difference and pipe length constructed determine the length change. On assembly, the movement possibilities for each direction change must be taken into account.

Irrespective of the pipe size, the coefficient of expansion of Wavin multilayer composite pipes is 0.025 – 0.030mm/m·K.

The length changes of Wavin multilayer composite pipes as expected in operation with different pipe lengths and temperature differences can be determined from the following diagram.

Figure 5: Length changes of Wavin multilayer composite pipes

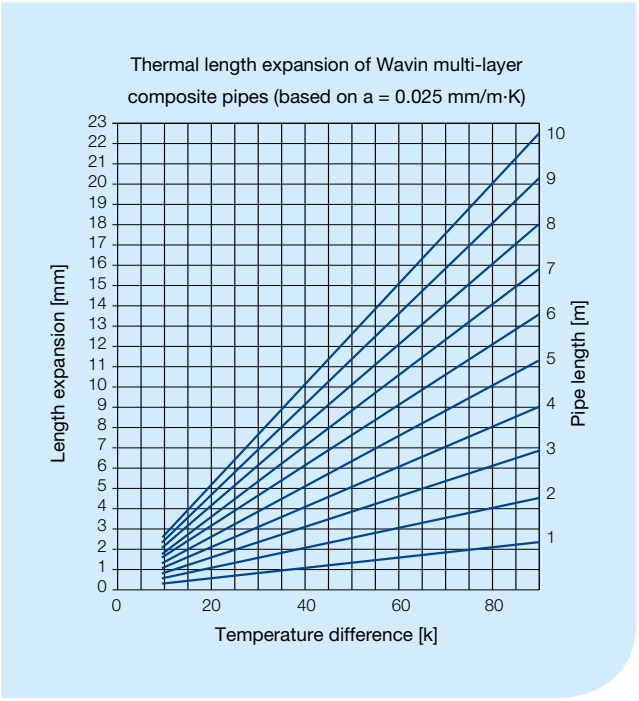


Table 4:

Formula to calculate pipe length changes	
The length changes can likewise be calculated using the following formula:	$\Delta l = a \times l \times \Delta q$ Δl = Length expansion (mm) a = Coefficient of length expansion (mm/m.K) l = Pipeline length (m) Δq = Temperature difference (K)
Sample calculation:	Wavin Tigris K1 hot water pipe
Given:	Pipe length (l) 12m Lowest ambient temperature 10°C Medium temperature 60°C
Sought:	Maximum length expansion under operating conditions $\Delta l = a \times l \times \Delta q$ 60k – 10k = 50k 0.025 mm/m.K x 12m x 50K = 15mm
Result:	Maximum length expansion under operating conditions = 15mm

Absorption of length changes by bending joints

In the case of a change of direction, the thermal length expansion of a pipeline can often be offset within the pipe layout by bending joints and expansion U-bends.

The length of the bending joint can be determined by calculation or taken from the diagram below.

$$L_B = C \sqrt{d \cdot \Delta L}$$

Key:

L_B = Length of the bending joint [mm]
d = External pipe diameter [mm]
ΔL = Length change [mm]
C = Material-dependent constant for Wavin multilayer composite pipe (= 30)

Figure 6: Bending joint classification of Wavin multilayer composite pipes

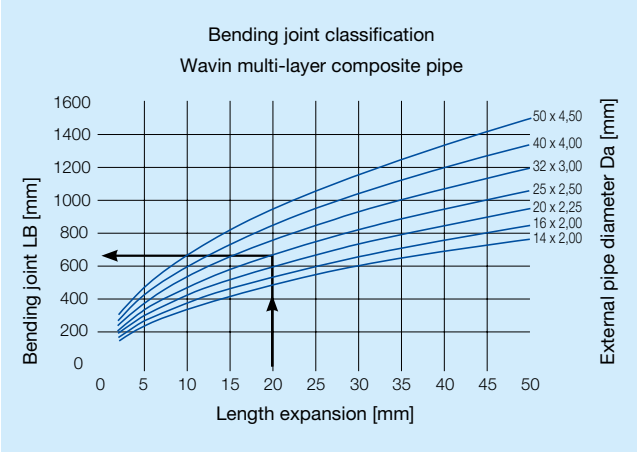
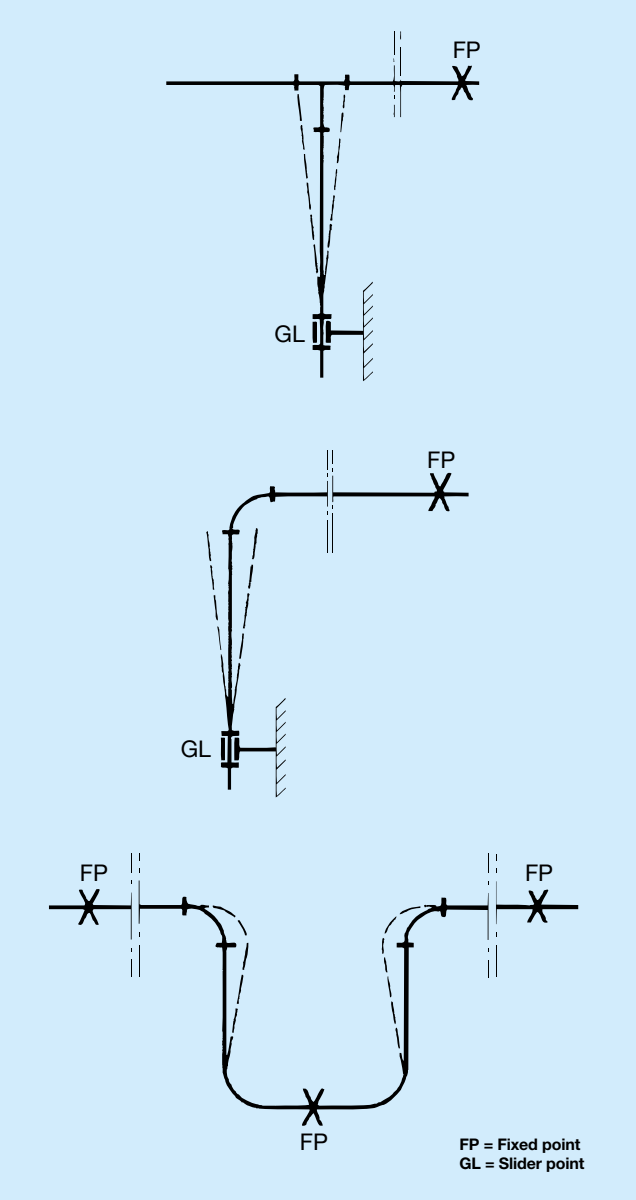


Table 5:

Sample calculation	
Given:	Length change = 20mm Pipe diameter d = 25 x 2.5mm Constant c for Tigris K1 = 30
Sought:	Length of the bending joints L_B
Result:	650mm, from diagram (see Figure 6)

Installation and Assembly Information
Tigris K1

Figure 7: Floating and fixed point mountings



Fixing intervals

Pipelines on a supporting base must be fixed in accordance with DIN 18560 part 2, section 4.1.

The number of fixing components is essentially dependent on the piping in the respective construction project. As the calculation basis with straight piping, a fixing component can be attached at approx. 1 m pipe length. In the areas of diversions, at least two fixing components are to be affixed (before and after the diversion curve).

Because of their dimensional stability, Wavin multilayer composite pipes installed in exposed locations require no supporting aids e.g. such as a supporting shell or support tube. They can be fixed at the intervals specified in the following table.

Table 6: Pipe clamp intervals for Wavin multilayer composite pipes installed in exposed locations

Dimensions (mm)	Fixing interval (m)
16 x 2.0	1.00
20 x 2.25	1.20
25 x 2.5	1.50
32 x 3.0	1.50
40 x 4.0	1.80
50 x 4.5	1.80
63 x 6.0	2.00

The type and intervals of the attachments/fixings are dependent on pressure, temperature, medium and installation situation. The pipe attachments/fixings must be properly designed according to the total mass (pipe weight + weight of the water + weight of the insulation), in accordance with the recognised codes of practice.

Table 7: Pipe masses

Dimensions (mm)	Pipe mass kg/m	Pipe mass + water kg/m	Pipe mass + water + Iso 9mm kg/m	Pipe mass + water + Iso 13mm kg/m
16 x 2.0	0.095	0.202	0.232	0.250
20 x 2.25	0.138	0.330	0.364	0.384
25 x 2.5	0.220	0.558	0.596	0.620
32 x 3.0	0.340	0.942	0.988	1.012
40 x 4.0	0.605	1.605	–	–
50 x 4.5	0.840	2.480	–	–
63 x 6.0	1.340	3.380	–	–

Pipes in screed or concrete

Due to the relatively low expansion forces, no compensation measures are required in the case of direct embedding of the pipes. Because of the slight plastic malleability of Wavin multilayer composite pipes, the length changes are absorbed by the pipe wall. Moreover, the respective requirements for heat protection (see the energy saving regulation section in this handbook) and impact noise insulation must be observed.

Pipes in the floor construction

As multilayer composite pipes can move axially within the insulation with little resistance, the expected length changes must be absorbed. Right angle diversions in the insulating layer must be arranged such that length changes that occur in the respective sections are absorbed by the insulation thickness in the curve area.

Wavin Hot and Cold Water Systems already laid in the ground are exposed to many potential impacts on site during the construction phase, from scaffolding, ladders or other objects. Damage to the pipe/fitting or even the insulation must be avoided. Before installing further floor construction, a check should therefore be conducted for damage. Any damage to the pipe insulation should be repaired in all cases in order to avoid the risk of the formation of impact noise bridges or reduced sound insulation (see also the section on sound insulation in this handbook).

Causes of damage in floating screeds are often due to several pipe strings installed under the screed plate.

The following principles should be observed when installing pipe strings in the floor construction:

- Use heat and sound insulated pipelines
- Use sound insulated pipe fixing
- Avoid pipe crossings as much as possible
- Pipeline installation parallel to walls
- Perpendicular junctions of pipelines into neighbouring walls
- Maximum width of the pipe string 120mm
- Minimum distance between pipelines and walls: 200mm in corridors, 500mm in the living area
- Piping through screed expansion joints with corrugated tube or alternatively with 6mm pipe insulation

Pipelines installed under plaster

Depending on the wall construction and masonry strength, there is a risk that the expansion forces from a multilayer composite pipe that is plastered in directly will cause damage to the wall.

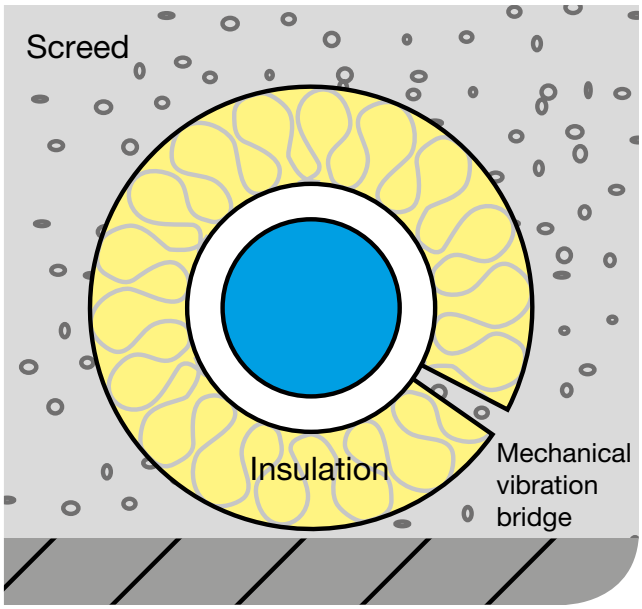
Multilayer composite pipes under plaster should therefore be installed with insulation. This pipe insulation must be able to absorb expected length changes due to heat. In the case of pipelines under plaster for which there is no need for heat insulation, we recommend the use of the Wavin multilayer composite pipe in black protective tube (see product range).

All pipes and fittings installed under plaster must be protected from direct contact with all building materials (such as masonry, plaster, cement, screed, tile adhesive) as detailed above.

Pipelines installed in exposed locations

Pipelines installed in exposed locations (e.g. basement pipes, risers etc) are fixed depending on the structural conditions and the recognised codes of practice. As appropriate, thermal length changes must be taken into account with the arrangement of bending joints in conjunction with fixed points and floating points.

Figure 8: Mechanical vibration transmission through defective pipe insulation



Installation and Assembly Information
Tigris K1

Battery and electrical pressing machines

The guarantee subject to proper use and observance of the required regular checks of the equipment is 12 months from the delivery date or 10,000 presses, whichever is the shorter. The respective operating instructions must be observed for this to apply.

The guarantee applies from the day of dispatch to the buyer. The guarantee does not cover damage caused by improper use or non-observance of the operating instructions. Services under guarantee may only be provided by the manufacturer. Complaints will be considered only if the equipment is presented to the manufacturer undismantled, with no previous interventions.

Checking and maintenance

The reliable function of the pressing machine is dependent on careful handling. This represents an important condition for making permanently secure connections. The equipment requires regular maintenance and care.

Only a clean and functioning pressing system can guarantee a permanently sealed connection. In this context, the pressing jaws should only be changed by a trained and competent worker. For a full list of our service partners please contact our Technical advice team on the number at the bottom of the page.

Attention: DO NOT open the equipment! A damaged seal will invalidate the guarantee. A service must be carried out every 12 months. A major service should be carried out every 10,000 presses or every 3 years whichever is the earlier.

Wavin Tigris K1 pressing jaws with pressing machines of other manufacturers

The following table shows the compatibility of Wavin Tigris K1 pressing jaws with the pressing machines of other manufacturers. The Wavin pressing jaws have a U shape. When using pressing machines and jaws that are not listed, proof of suitability for the Wavin Tigris K1 systems must be provided in accordance with the relevant national regulations.

The pressing machines must fulfil the following requirements:

- Only the Wavin pressing jaws (U shape) may be used
- The pressing tool must be used and maintained in accordance with the respective manufacturer's guidelines
- The Wavin assembly instructions must be observed
- The "Mini" (16 – 32mm) pressing machine must display a minimum pressing force of 15kN
- The "Battery" (16 – 63mm) pressing machine must display a minimum pressing force of 30kN
- The pin shape of the pressing machine must be suitable for the Wavin pressing jaws

The following table shows the compatibility of Wavin pressing jaws with some pressing machines of other manufacturers.

Table 8: Pressing jaw compatibility

Manufacturer	Description	Notes/ Compatible with
Novopress (Novopress / Geberit / Mapress / Milwaukee branded)	Electrical pressing machines: EFP2 (since 1996 with rotatable head), ECO1, ECO201, EFP201, EFP202 Battery pressing machine: ACO1, ACO201, AFP201, AFP202	Wavin (standard tool) pressing jaws only
Klauke (Klauke / Uponor branded)	Electrical pressing machines: UP50EL, UP75EL, UNP2 Battery pressing machine: UP75, UAP2, UAP3, UAP3L	Wavin (standard tool) pressing jaws only
Ridgid (Ridgid / VanArx Viega branded)	Electrical pressing machines: RP330C/ Pressgun4E, Typ PT3-EH/H, RP300/ Typ PT2 Battery pressing machine: Pressgun 5, RP330B/Pressgun 4B, RP300B/Typ PT3AH	Wavin (standard tool) pressing jaws only
Rems (Rems / Roller branded)	Electrical pressing machines: PowerPress, PowerPress ACC Battery pressing machine: AkkuPress, AkkuPress ACC	Wavin (standard tool) pressing jaws only
Rothenberger	Battery pressing machine: Romax 3000	Wavin (standard tool) pressing jaws only
Novopress (Novopress / Geberit / Mapress / Milwaukee branded)	Battery pressing machine: AFP101, ACO102	Tool is only compatible using Wavin Novopress Mini Jaws
Klauke (Klauke / Uponor branded)	Battery pressing machine: MAP1, MAP2L	Tool is only compatible using Wavin Klauke Mini Jaws

Flushing Wavin Tigris K1 tap water pipes

The flushing of tap water pipes is described in detail in DIN 1988 part 2.

This treatment of the pipe network ensures the quality of the tap water. All pipe sections must be free of contamination and foreign bodies at the time of initial operation. Time delays between flushing and initial operation of the tap water network must be avoided, as complete drainage is not generally carried out after flushing. According to VDI 6023 – hygiene conscious planning, execution, operation and maintenance of tap water systems – system sections that are unused for longer than 4 weeks must be flushed again.

Initial operation and handover

According to DIN 1988-2, the installer of the system must prepare relevant handover and acceptance logs. The system operator must be instructed with respect to the operation of the tap water system created. It is recommended that the instruction being completed is confirmed in writing.

Depending on the scale of the system, the presentation of written operating instructions is advised.

Checking Wavin Tigris K1 (unpressed/unsealed)

This additional test serves as an additional check for unpressed connections. When the function check is carried out with water, the leak from unpressed connections is clearly identifiable.

First a visual check on the connections (pressed/unpressed) should be carried out. A low pressure test with water should then be carried out to further check for any unpressed connections, with conditions as below. The results should be recorded and signed for.

Installation and Assembly Information
Tigris K1

Test procedure

The recommended procedure is outlined below and both tests should be carried out with a low pressure test being followed with a high pressure test.

Low Pressure Leakage Test
The system shall be filled slowly with drinking water to allow air to be expelled from the system. The pressure in the system should be raised (or lowered) to between 0.5 Bar and 1 Bar. The complete installation shall be inspected for leaks at this pressure prior to the high pressure hydraulic test. There shall be no visible leakage of water and the pressure should be maintained for 45 minutes.

High Pressure Hydraulic Test
The installation shall then 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 the test procedure below. The maximum working pressure is defined as the maximum pressure that the system will operate at, measured as the incoming mains pressure (usually no more than 3 Bar if a pressure reducing valve is fitted). Maximum incoming mains pressure should not usually exceed 10 Bar.

There shall be no visible leakage of water and the pressure shall be maintained for 45 minutes.

Test Procedure
1. Apply the required test pressure (1.5 times maximum working pressure) by pumping in accordance with fig 9, for a period of at least 15 minutes. Inspect the pipework to identify any visible leaks in the system.
2. Reduce the pressure in the pipework by bleeding water from the system to one third of maximum working pressure.
3. Close the bleed valve. If the pressure remains at or greater than, one third of the maximum working pressure the system is regarded as leak tight. Visually check for leakage and monitor for 45 minutes. The test criteria are met if there is no reduction in pressure.
4. Complete a test record sheet.

Discover our broad portfolio at
www.wavin.co.uk

Water management | Plumbing and heating | Waste water drainage
Water and gas distribution | Cable ducting

Wavin Limited
Registered Office
Edlington Lane
Doncaster | DN12 1BY
Tel. 0844 856 5152
www.wavin.co.uk | info@wavin.co.uk

For further product information visit: wavin.co.uk

wavin
CONNECT TO BETTER

PL310 – June 2015