

**Wavin Sitech+**  
Technical Manual

# Low noise soil & waste drainage



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# 1. Wavin SiTech+

## 1.1. System description

Wavin SiTech+ is a mineral reinforced polypropylene (PP) soil and waste system. The system offers increased robustness, low-noise properties and improved ease of installation.

Its flexible connectivity and push-fit system makes SiTech+ a complete plug and play solution for waste water discharge in buildings.

Quality of living is an important consideration in building design. A reduction of noise in water discharge systems improves end-experience in both living and working environments. Wavin SiTech+ meets the latest construction requirements and fulfills customers' demand for increased comfort and quality.

## Key system benefits



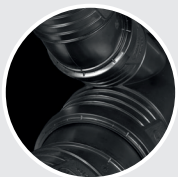
### Optimal noise performance

Wavin SiTech+ is an innovative soil and waste system with proven low noise technology. SiTech+ has an optimized 3-layer pipe structure for reduced noise levels. The fittings have an increased weight by 20% for improved acoustic comfort during water flow.



### Easy to install

Better handling during installation due to the grip features. Ribbed fittings provide enhanced grip for easy installation in complex environments. SiTech+ is perfect for any project, from small renovations to large-scale construction jobs.



### Angular rotation guidance

Angular rotation guidance to align and rotate fittings in the right direction. Fittings have different markings at 15° and 45° intervals for easy alignment. SiTech+ makes it easy to align fittings which need to be positioned at a rotated angle.



### Insertion depth check

Insertion depth check on fittings to make a secure and safe connection. These easily visible SiTech+ markings can also confirm the exact 10 mm space needed to cope with thermal expansions at long pipe lengths.



### New black color

The new black color adds to the durability and robustness of SiTech+. The black color improves protection against UV radiation when stored outside at a building site. Furthermore the matte black finish is less sensitive to dirt and gives the system a professional appearance.



## 1.2. Field of application

Wavin SiTech+ meets system requirements for soil & waste discharge systems (EN 1451-1), including noise reduction and fire resistance (EN 13501-1). The emitted noise level of SiTech+ is measured by the Stuttgart Fraunhofer Physical Constructions Institute (DIN EN 14366).

Wavin SiTech+ is the ideal solution for installation in multi-storey building and those that are particularly sensitive to noise like apartment buildings, hotels, offices, hospitals, elderly homes and libraries.

Wavin SiTech+ can be used for water discharge at temperatures up to 90°C, with peaks of to 95°C for short periods. It can also be used at low temperatures up to -20°C. This durability makes it an ideal solution for extreme-temperature drainage areas such as kitchens, laundromats and industrial waste environments.

Please contact Wavin if you have any questions about particular application environments.

The system is offered in a full range of diameters:

### DN/OD

- ⊙ 32 mm
- ⊙ 40 mm
- ⊙ 50 mm
- ⊙ 75 mm
- ⊙ 90 mm
- ⊙ 110 mm
- ⊙ 125 mm
- ⊙ 160 mm

## 1.3. Special fittings

The Wavin SiTech+ portfolio includes specialized fittings for easier and more efficient installation and use, particularly in areas where space is limited.

Shower branches provide an easy connection of both the toilet and shower to the down pipe.

Swept branches, as compared to sharp angle fittings, allow water to run more smoothly while reducing overall noise levels, improve the ventilation and increase the flow rate.

The new design of access pipes makes inspection easier.





# 2. Technical datasheet

## Range

Wavin SiTech+ offers a complete range of pipes and fittings in PP-MD, from 32 mm to 160 mm.

Diameter DN/OD	Thickness mm	Socket Length mm	Class
32	1,8-2,2	43	S16
40	1,8-2,2	45	S16
50	1,8-2,2	47	S16
75	2,6-3,1	53	S14
90	3,1-3,7	57	S14
110	3,4-4,0	64	S16
125	3,9-4,5	71	S16
160	4,9-5,6	76	S16

## Technical Specifications

### Pipe structure |

Co-extruded 3 layers pipe.

PP mineral filled for more strength and durability, even resistant at low temperatures.

### Connections |

Push-fit SBR rubber system, to obtain fast, safe and reliable installation.

### Fire behavior |

Class C-s2, d0 according to EN13501-1.

**Density |** Pipe 1,30 gr/cm<sup>3</sup>; Fitting 1,50 gr/cm<sup>3</sup>.

### Working Temperature |

90°C continuous temperature; 95°C peak temperature.

**Expansion coefficient** ≈ 0,12 mm/m/K.

**Impact Test** -20°C according to EN744.

**Ring Stiffness** > = 5,5 Kn/m<sup>2</sup> (ref. OD110)

### Conformity certification |

PIIP (n°1866 - 1867 - 1868)

DIBT (n° Z-42.1-539)

ITB (n° AT-15-7703).

## Applications

Wavin SiTech+ is the ideal solution for both residential and non-residential buildings, where customer put more attention to low-noise properties (hotels, offices, hospitals). Thanks to the mineral filled, the system can be even be installed till -20°C air temperature.

## Certifications

Wavin SiTech+ meets all standards set for soil & waste discharge systems (EN 1451-1), application EN12056-2, fire behavior EN13501, and noise protection according to the Italian Standard D.P.C.M. 05.12.1997. The low noise performance has been measured at the Fraunhofer Institute in Stuttgart, according to the EN 14366. Company meets quality requirements according to ISO 9001, and environmental requirements according to ISO 14001.

## Technical features

- Outer layer made of black polypropylene polymer. Resistant to environmental influences.
- Middle layer made of polypropylene copolymer. With mineral fillers for good soundproofing properties
- Inner layer made of grey polypropylene copolymer. Particularly resistant to aggressive waste water. Smooth inner pipe surface for good sewage drainage. Chemically resistant. Inspection-friendly thanks to the light inner pipe surface.



# 3. Acoustics

## 3.1. Sound insulation by SiTech+

Wavin SiTech+ is an innovative soil and waste system with proven low noise technology. SiTech+ has an optimized 3-layer pipe structure for reduced noise levels. The fittings have an increased weight by 20% for improved acoustic comfort during water flow.



A contribution to sound protection is made by the special product design and system solutions.

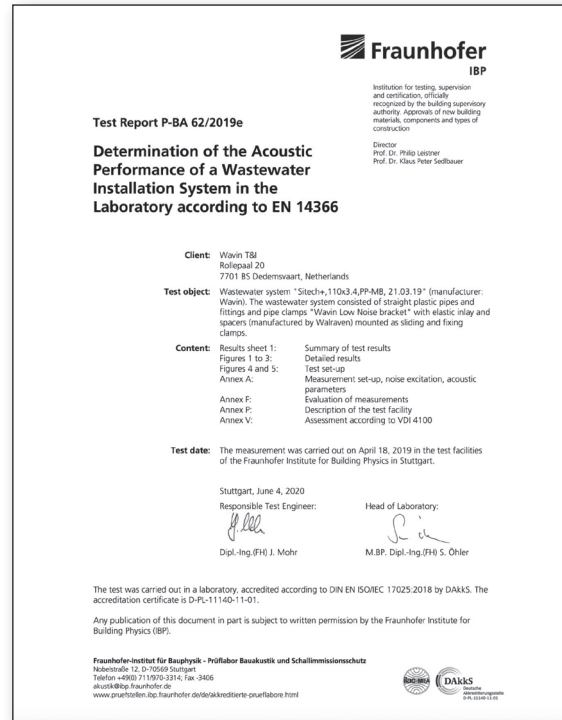
- Swept branches for minimal flow disturbance in the down pipe.
- Due to unique system bracket and high structure born sound prevention.



Fig. 1: Double branch.



Fig. 2: Wavin System bracket.



In studies conducted at the Fraunhofer Institut für Bauphysik (Fraunhofer Institute for Building Physics), Stuttgart, Wavin SiTech+ has proven optimal sound absorption. The tests were performed in a laboratory accredited by the German Accreditation System for Testing (DAP, file no. PL-3743.26) according to standard EN ISO/IEC 17025.

The measurements in this test were performed following German standard DIN EN14366 and DIN 52219:1993-07; noise excitation by stationary water flow with 0.5 l/s, 1.0 l/s, 2.0 l/s, 3.0 l/s and 4.0 l/s.

## 3.2. Noise calculation software

Determination of the sound level as conducted by Fraunhofer Institut Bauphysik is in general useful to determine the noise level of a pipe system in a static situation. The test method is, however, based on a laboratory set up in which all building parameters are kept the same except for a change in water flow. As a result it is impossible to obtain by this test a realistic figure of the noise levels for the protect chambers of actual projects.

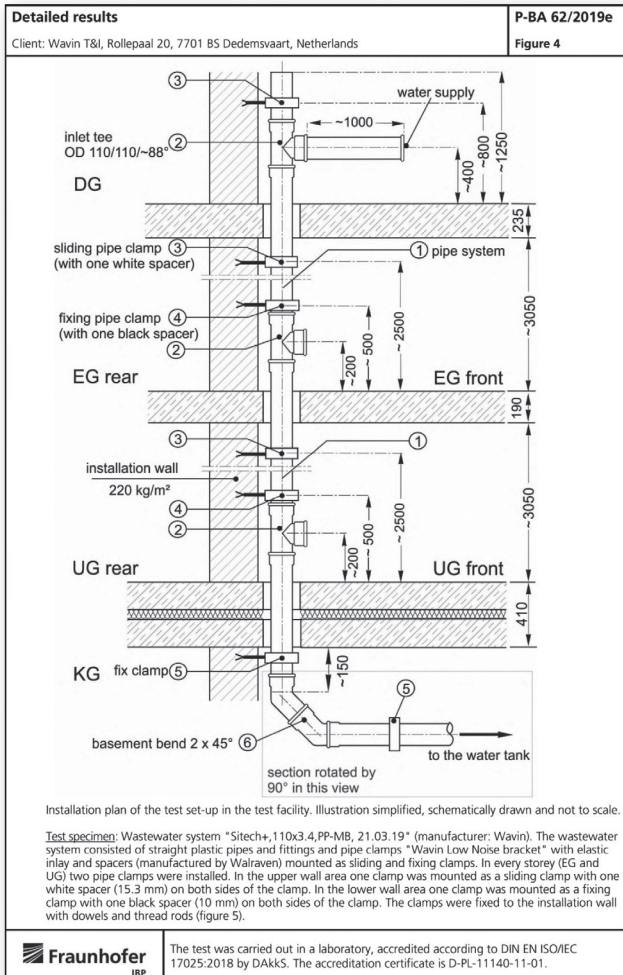
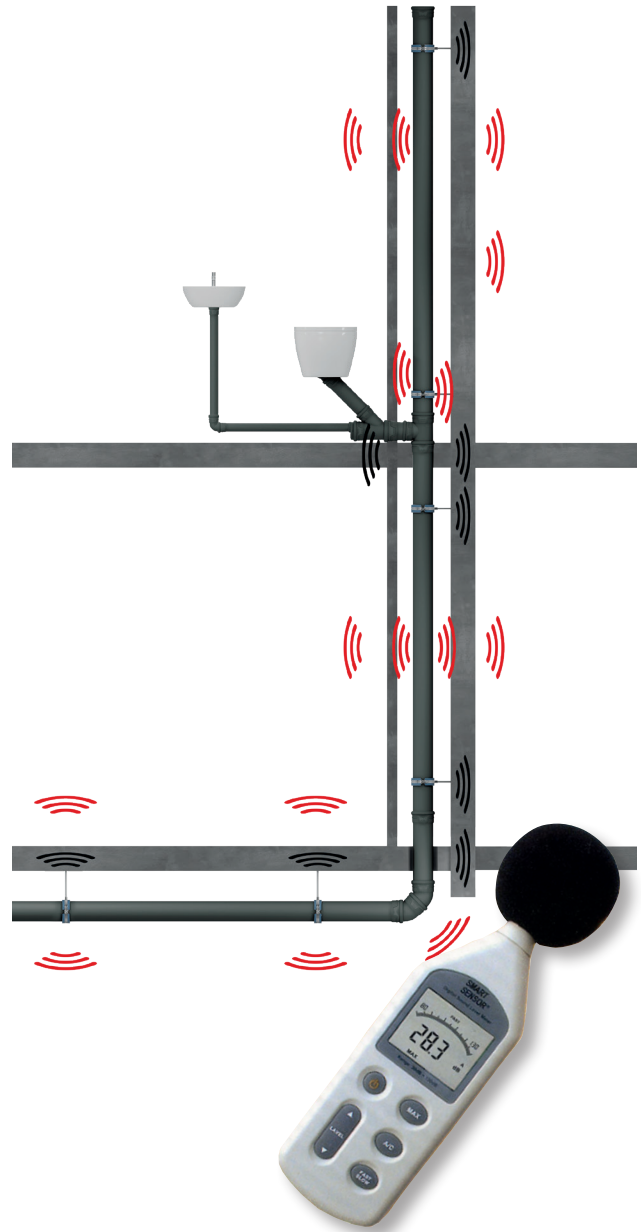


Fig. 3: FRAUNHOFER Test set up for determination of the installation sound level in the laboratory.

To actually determine real noise emission of the pipe system into a room requires a more dynamic test set up in which at least the following parameters can be modified.

- ⦿ Pipe system characteristics
- ⦿ Building design
- ⦿ Shaft characteristics
- ⦿ Suspended ceiling criteria
- ⦿ Structural characteristics of the building
- ⦿ Flow parameters
- ⦿ Installation requirements
- ⦿ Insulation requirements



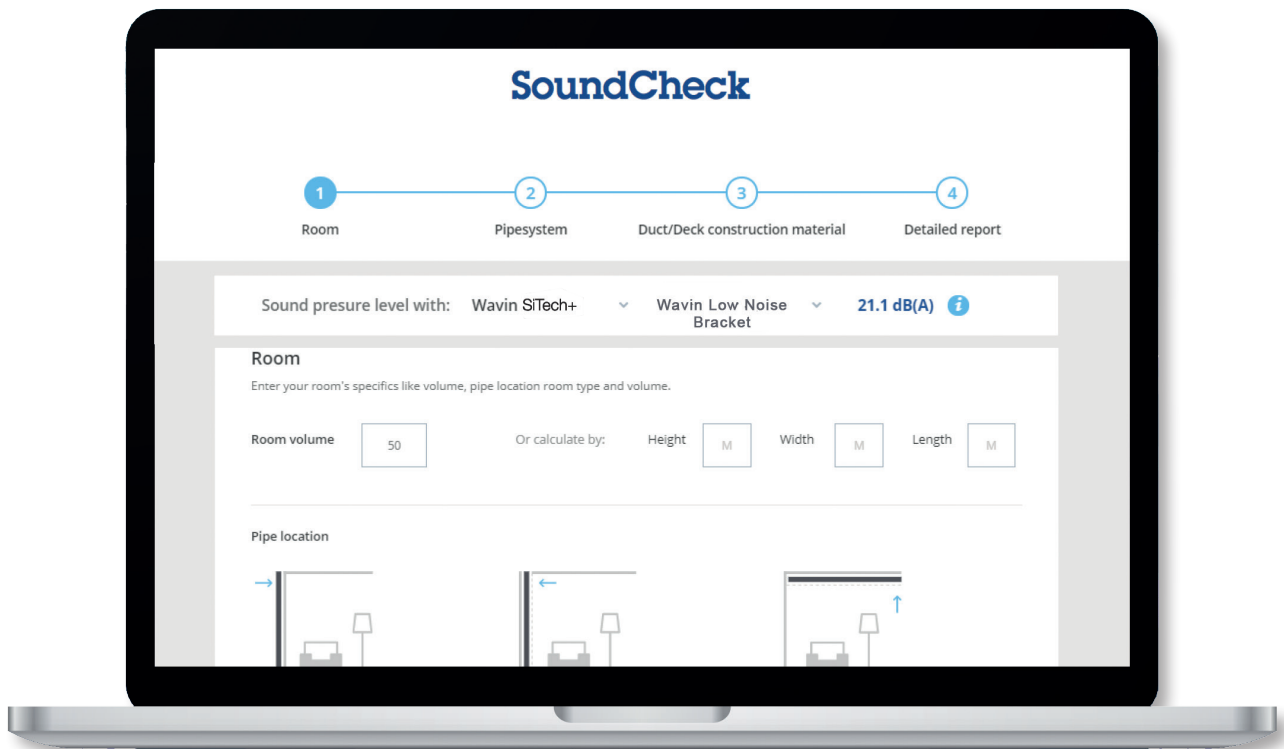


### 3.2.1. Wavin SoundCheck tool

#### Calculating system acoustic just got easier

With noise regulations continuously being updated, calculating noise levels to ensure your design meets requirements can be a complex exercise. Wavin's online SoundCheck Tool is designed to relieve some of that stress.

Unique to Wavin, the SoundCheck Tool simulates system acoustics in a final installation and calculates noise levels based on individual parameters. In just four clearly defined and intuitive steps, you can get the answers you need to see if your design meets regulations.



### 3.3. Optimal noise reduction

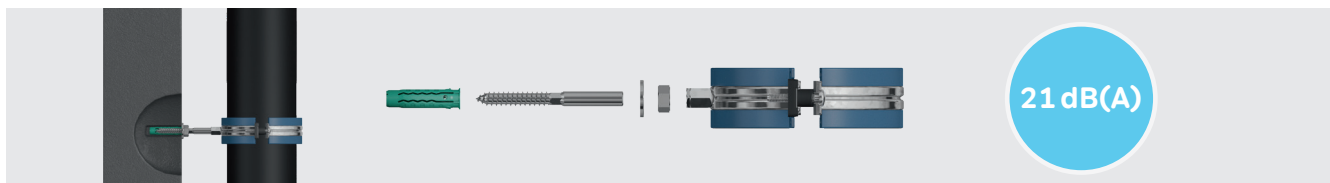
Wavin SiTech+ is an innovative soil and waste system with proven low noise technology. In order to further reduce sound, Wavin has developed a unique Wavin Low Noise bracket. It is a single bracket that can be used in multiple configurations in order to optimize noise performance of the system. It can be used in fix point and sliding point, horizontal and vertical installation, low noise and no noise application. It meets the increased requirements of DIN 4109-5 2020-08.



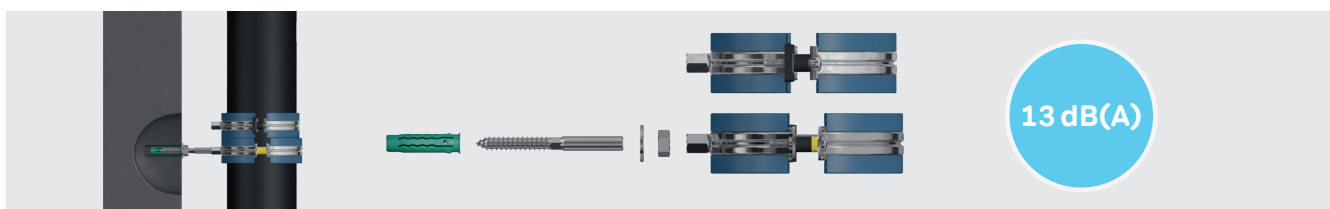
DIN 4109 (public minimum legal requirement) specification 30 dB(A)	Volumetric flow rate		Meets standard
	2 l/s	4 l/s	
Wavin Low Noise bracket (P-BA 62/2019)	21 dB(A)	25 dB(A)	✓
Wavin No Noise bracket (PA-BA 9/2020)	13 dB(A)	16 dB(A)	✓

VDI 4100 sound insulation level II / III specification 27 / 24 dB(A)	Volumetric flow rate		Meets standard
	2 l/s	4 l/s	
Wavin Low Noise bracket (P-BA 62/2019)	18 dB(A)	21 dB(A)	✓
Wavin No Noise bracket (PA-BA 9/2020)	10 dB(A)	12 dB(A)	✓

Wavin Low Noise bracket installation offering sound performance as low as 21 dB(A)\* behind the wall according to DIN4109



Wavin No Noise bracket installation offering sound performance as low as 13 dB(A)\* behind the wall according to DIN 4109



\* DIN4109 behind the wall with 2,0 l/s Fraunhofer Testreport 62/2019 an 9/2020

### 3.4. About sound

Sound is a sensation felt, a perception of what takes place around us, caused by various compression waves which cross the eardrum and are captured and transformed by the brain; it is composed of different frequencies. The acuteness or intensity of the perception depends on the frequency and range.

#### Sound is a wave that is:

- ④ Elastic (it needs a medium to be propagated)
- ④ Longitudinal (perturbation takes place parallel to the direction of propagation).

#### To exist it requires:

- ④ A source (vibrating body)
- ④ An elastic propagation medium (air, water, etc.)

A sound is therefore a method of transmitting mechanical energy. To propagate, a sound needs a medium: any means, whether solid, liquid or gassy, like air, is able to transport sound, influencing its speed according to density.

Sound is propagated through the exchange of air-solid-air or solid-air vibrations (in the second case the solid is the source of the sound). With respect to soundproofing soil and waste systems, we need to think in two different directions: (1) the noise created in the pipes and transmitted by them and (2) noise which is transmitted by the walls or surrounding media.

Sound is measured with a phonometer, an instrument which filters noise and measures intensity at its different frequencies. It is expressed in decibels.

The decibel is the logarithm of the ratio between the measured sound pressure and a reference sound pressure, multiplied by ten.

#### **dB = 10 log (P/Pa)**

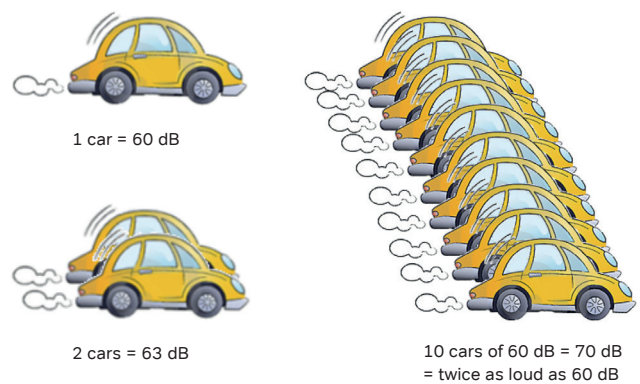
We need to remember that sound is an energy (just think of when you stand in front of the stereo speakers and you can "feel" the basses) but what we perceive is a processed sensation.

The human ear is sensitive to pressure in a NON LINEAR manner; therefore twice the pressure does not correspond to twice the sensation.

**The doubling of acoustic power corresponds to an increase of 3 dB.**

**Every 10 dB increase is perceived by the human ear as twice as loud** (10 cars are perceived as twice as loud as 1 car).

**60 dB + 50 dB + 40 dB = 60.5 dB** →  
**The highest dB is in a sum the most important**



Sound intensity follows an inverse square law with distance from the source; doubling the distance from a noise source reduces its intensity by a factor of four, or 6 dB.

### 3.5. Noise

Noise can be described as unwanted sound. In relation to sound, noise is not necessarily random.

Acoustic noise can be anything from quiet but annoying to loud and harmful causing permanent irreversible hearing damage.





Based on the World Health Organization (WHO) guidelines, European countries have maximized the noise level (in houses, apartments, hospitals, elderly homes, hotels, etc.) during the night to:

**LA max night = 30 to 35 dB(A).**

Community noise (also called environmental noise, residential noise or domestic noise) is defined as noise emitted from all sources except noise at the industrial workplace.

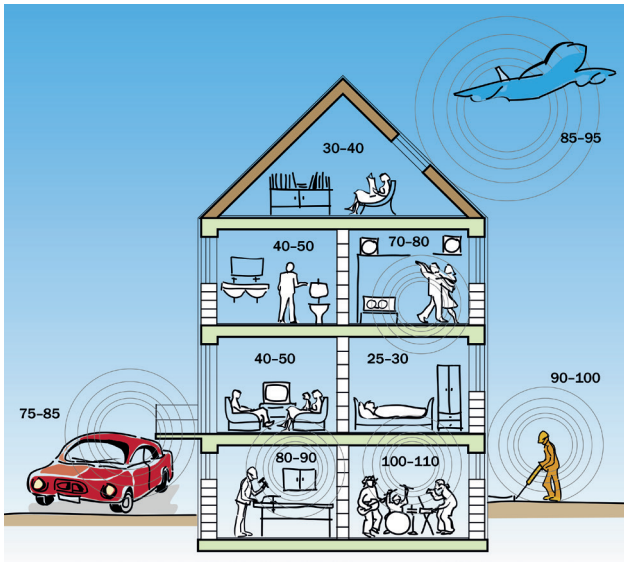


Fig. 4: Example of community noise.

In the European Union about 40% of the population is exposed to road traffic noise with an equivalent sound pressure level exceeding 55 dB(A) daytime, and 20% are exposed to levels exceeding 65 dB(A). When all transportation noise is considered, more than half of all European Union citizens is estimated to live in zones that do not ensure acoustical comfort to residents. At night, more than 30% are exposed to equivalent sound pressure levels exceeding 55 dB(A), which are disturbing to sleep. Noise pollution is also severe in cities of developing countries.

In contrast to many other environmental problems, noise pollution continues to grow and it is accompanied by an increasing number of complaints from people exposed to the noise. The growth in noise pollution is unsustainable because it involves direct, as well as cumulative, adverse

health effects.

For instance sleep disturbance: measurable effects of noise on sleep begin at sound levels of about 30 dB. However, the more intense the background noise, the more disturbing is its effect on sleep. Sensitive groups mainly include the elderly, shift workers, people with physical or mental disorders and other individuals who have difficulty sleeping.

Table 1 presents the WHO guideline values arranged according to specific environments and critical health effects. The guideline values consider all identified adverse health effects

Specific environment	Critical health effect(s)	L <sub>Aeq</sub> [dB(A)]	Time base [hours]	L <sub>Amax</sub> fast [dB]
Outdoor living area	Serious annoyance, daytime and evening	55	16	-
	Moderate annoyance, daytime and evening	50	16	-
Dwelling, indoors	Speech intelligibility & moderate annoyance, daytime & evening	35	16	-
Inside bedrooms	Sleep disturbance, night-time	30	8	45
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	8	60
School class rooms & pre-schools, indoors	Speech intelligibility, disturbance of information extraction, message communication	35	during class	-
Pre-school bedrooms, indoor	Sleep disturbance	30	sleeping-time	45
School, playground outdoor	Annoyance (external source)	55	during play	-
Hospital, ward rooms, indoors	Sleep disturbance, night-time	30	8	40
	Sleep disturbance, daytime and evenings	30	16	-
Hospitals, treatment rooms, indoors	Interference with rest and recovery	#1		
Industrial, commercial shopping and traffic areas, indoors and outdoors	Hearing impairment	70	24	110
Ceremonies, festivals and entertainment events	Hearing impairment (patrons:<5 times/year)	100	4	110
Public addresses, indoors and outdoors	Hearing impairment	85	1	110
Music and other sounds through headphones/earphones	Hearing impairment (free-field value)	85 #4	1	110
Impulse sounds from toys, fireworks and firearms	Hearing impairment (adults)	-	-	140 #2
	Hearing impairment (children)	-	-	120 #2
Outdoors in parkland and conservations areas	Disruption of tranquillity	#3		

#1: As low as possible.

#2: Peak sound pressure (not LAF, max) measured 100 mm from the ear.

#3: Existing quiet outdoor areas should be preserved and the ratio of intruding noise to natural background sound should be kept low.

#4: Under headphones, adapted to free-field values.

Table 1: Guideline values for community noise in specific environments (Source World Health Organization).

for the specific environment. An adverse effect of noise refers to any temporary or long-term impairment of physical, psychological or social functioning that is associated with noise exposure. Specific noise limits have been set for each health effect, using the lowest noise level that produces an adverse health effect (i.e. the critical health effect).

It is not enough to characterize the noise environment in terms of noise measures or indices based only on energy summation (e.g., LAeq), because different critical health effects require different descriptions.

It is equally important to display the maximum values of the noise fluctuations, preferably combined with a measure of the number of noise events. A separate characterization of night-time noise exposures is also necessary.

For indoor environments, reverberation time is also an important factor for things such as speech intelligibility. If the noise includes a large proportion of low-frequency components, still lower guideline values should be applied.

Supplementary to the guideline values given in Table 1, precautions should be taken for vulnerable groups and for noise of certain character (e.g. low-frequency components, low background noise).

### 3.5.1. Sources of noise in buildings

The noise generated by the building and its utilities may be classified as follows:

- ⦿ Noise due to filling operations
- ⦿ Noise generated by control equipment
- ⦿ Intake noise
- ⦿ Discharge noise
- ⦿ Noise due to impact or shock

Noise is generated by moving parts or by flowing media. Waste water discharge pipes are prone to vibration, particularly where water flows through downpipes, or is forced to change direction in joints and elbows (noise due to impact or shock). Experience shows that the greatest problems are typically caused by the transmission of structural noise, particularly in the area of pipe clamps and brackets or where pipe-work is run through walls or ceilings.

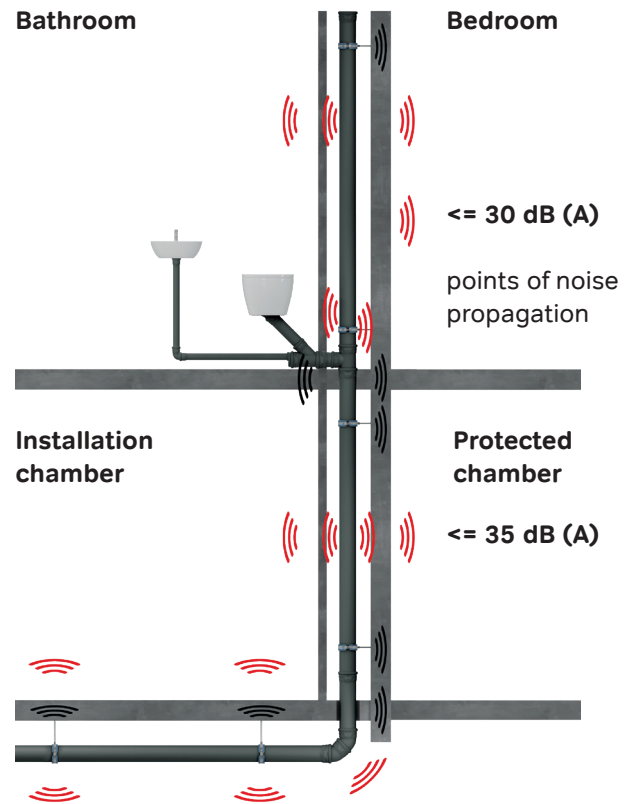


Fig. 5: Example of noise propagation during drainage.

The noise created from waste systems obviously depends greatly on the vertical piping. Here the falling water clashes against the wall of the pipes and fittings. The generated noise is transmitted directly to the pipes and indirectly through the ducts and installation walls. Therefore, the thickness and mass of the solid materials are of great importance, just like the fixing brackets and other elements which connect pipes to their supports.

### 3.5.2. How noise is measured

If we consider the “installation chamber” to be the room in which the pipes are installed (generally the bathroom), the room next door divided by the installation wall is called the “protected chamber”. The noises emitted are measured in the protected chamber according to EN 14366.

### 3.6. Acoustic design

#### 3.6.1. Advantageous layout

An important factor for the assurance of acoustic insulation is the design and implementation of an acoustically advantageous layout.

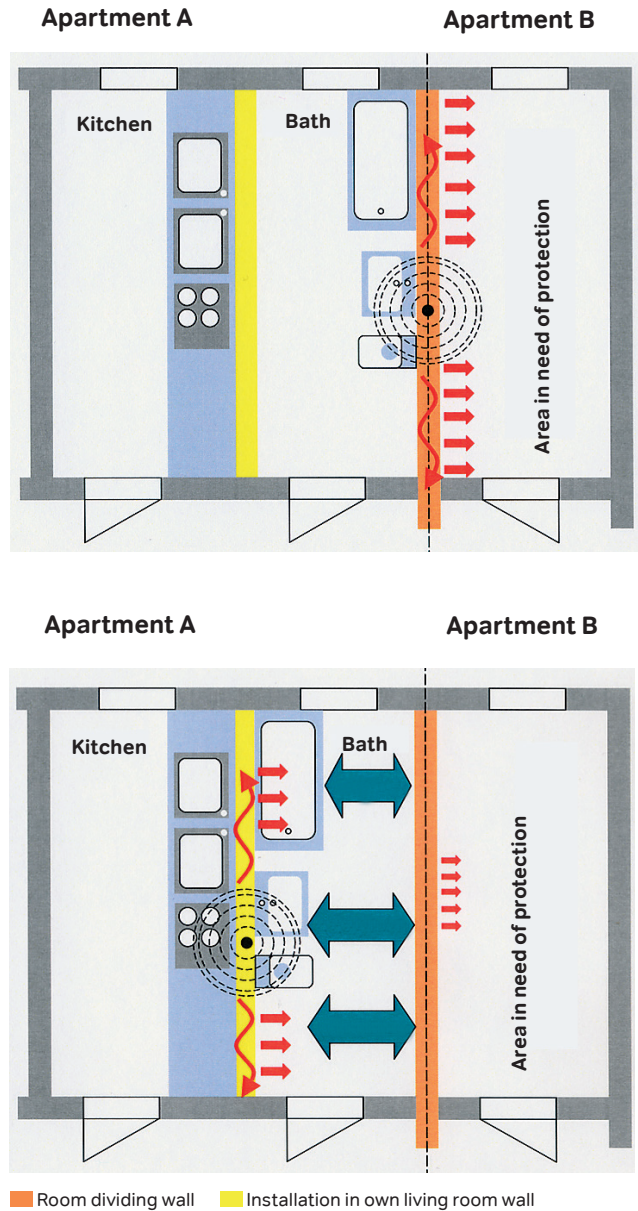
The following measures have proven to be of significant influence to the level of noise generated from the soil system inside the building:

- Noise-sensitive areas should be kept away, as far as possible, from sources of noise.
- Non-sensitive areas should, wherever possible, be used as “buffer zones”.
- Noise-sensitive areas should not be positioned in the direct vicinity of bathrooms, toilets or stairwells.
- Potential sources of noise should be “bundled together” in the same area.

The comparison between the two examples of layout shown above demonstrates how the acoustically advantageous layout in the second example contributes to a clear reduction in the acoustic pressure of the systems in the room which demands acoustic insulation.

However, even using highly efficient low-noise waste systems like Wavin SiTech+, one always has to seek for the best possible acoustic decoupling. This goes for the whole drainage system and its points of contact with the building (collars, crossings through walls and floors, plaster residues between the pipe and the building, etc...).

In designing piping, moreover, we need to avoid positioning waste pipes in the partition walls between apartments. Special noise-reduction measures also need to be adopted when fixing drain pipes to the partition walls between apartments. Protect the pipes from the propagation of intrinsic noise.



The comparison of the floor plans above demonstrates how good acoustic design in the lower building example can significantly reduce the noise levels to which areas requiring noise protection are exposed.

Fig. 6: Examples of good acoustic practice in building design.



### 3.6.2. Acoustic plumbing design

Wavin SiTech+ shows optimal noise performance. However, when installing high-performance sound-insulating waste water piping systems it is still necessary to consider how effectively the system can be sound-isolated. This applies to the waste water discharge system as a whole, including its points of contact with the building structure (pipe brackets and clamps, the running wof pipework through walls and ceilings, mortar droppings between pipes and wall surfaces, etc.).

When planning pipe installation, waste water discharge pipes should not be allowed to run inside the walls separating living areas. The attachment of waste water discharge pipes to partition walls in living areas should only be carried out under application of special noise protection measures. DIN 4109 requires that single-skin walls to which, or in which, water installations or equipment (i.e. waste water pipes) are to be attached must have an area-related mass of at least 220 kg/sq.m. Walls having an area-related mass of less than 220 kg/sq.m may only be used where prior testing has demonstrated that the walls exhibit acceptable properties with respect to the transmission of noise.

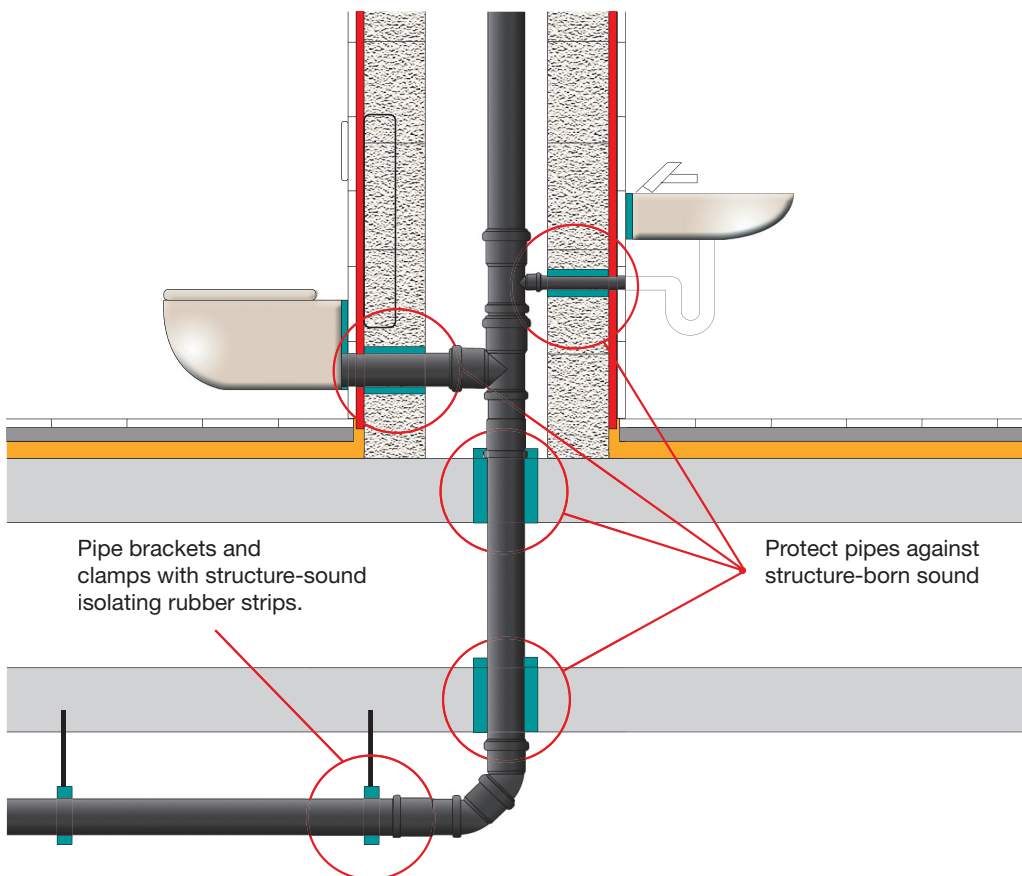


Fig. 7: Sound insulation of waste water systems.

# 4. Installation and jointing

Wavin has designed its low-noise systems to reduce noise emissions in concealed and visible installations. However, to ensure the system is leak-tight and to achieve a high level of soundproofing it is strongly recommended to follow the instructions given below.

## 4.1. Connecting Wavin SiTech+ fittings and pipes

**Wavin SiTech+ connections are fitted as follows:**

- ⦿ Check position and condition of the seal in the socket. You may have to clean the socket and the seal.
- ⦿ Clean the spigot-end of the pipe and/or fitting.
- ⦿ In case of pipes : mark the insertion depth (socket length) on the spigot-end.
- ⦿ Push the spigot-end into the socket according the insertion depth.

**For pipes  $\geq$  2 meters:**

- ⦿ Pipes & fittings connected to horizontal and vertical pipes  $\geq$  2 meters to be retracted 10 mm to allow for thermal expansion.
- ⦿ For vertical pipes, directly secure position with brackets to prevent slipping and eliminating the 10 mm dilatation space.

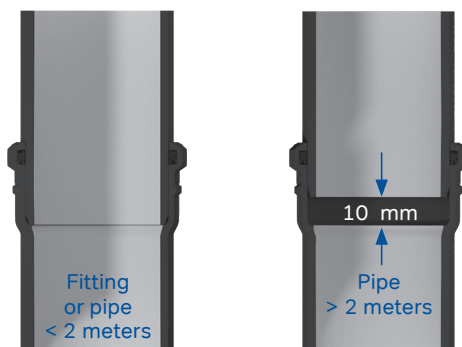


Fig. 8: 10 mm space for thermal expansion.

## Cutting pipes to size

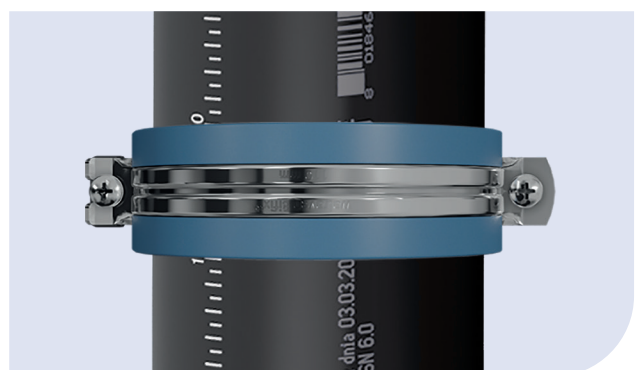
Pipes can be cut to size using standard pipe cutters. When cutting pipes to length, do so at an angle of 90° to their axis. Remove any burrs or unevenness from the cut ends and rub down sharp edges.



For connections to Wavin SiTech+ fittings or sockets the pipe end needs to be chamfered. Its is recommended to chamfer over a length of 5 mm under a 15 degrees angle. This can be done by using standard chamfer tooling.

## Fixing

In principle, Wavin SiTech+ soil and waste water pipe systems should be installed tension-free and able to withstand changes in length. The pipes should be secured with sound-absorbing brackets that are compatible with the external diameter of the pipes and completely surround the circumference of the pipes. We recommend the use of Wavin low noise brackets, designed for securing to the brickwork with screws and plastic wall plugs. Metal anchors may also be used, although these do not favour sound insulation.



## 4.2. General bracketing rules

### 4.2.1. Bracket Fixing Instructions

#### Fixed Bracket

The fixed bracket creates a fixed point in the pipe system. The pipe or fitting cannot be moved through the bracket after the screws are tightened (no longitudinal movement is possible).

Use sound absorbing brackets, dimensionally compatible to the pipe diameter. Screw-pipe brackets with rubber inserts are recommended, which are fixed to the wall by screws and plastic plugs.

#### Sliding Bracket

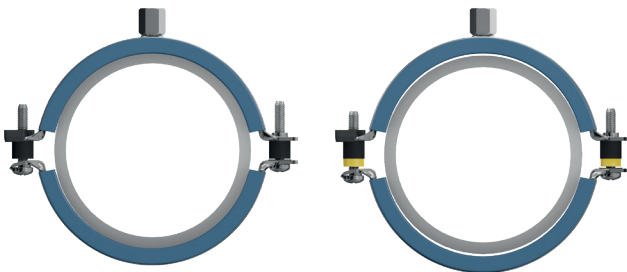
By using sliding brackets, the pipe can still expand and contract due to temperature changes after the screws are tightened. This make sure longitudinal movement is still possible once installed.

#### Changing from sliding to fixed

Wavin low noise brackets are usable as sliding and as fixed bracket. All brackets provided by Wavin are sliding as standard.

To change the bracket from sliding to fixed, a distance washer is removed from the bracket before installation. The sliding and fixed brackets can both be completely tightened until the bracket ears touch the distance washers. The distance washers make sure that in any situation, the clamping force on the pipe is perfect. This results in minimal structure borne sound transmission.

The distance washers also prevent over-tightening of the brackets, which could otherwise result in a reduction of sound performance.

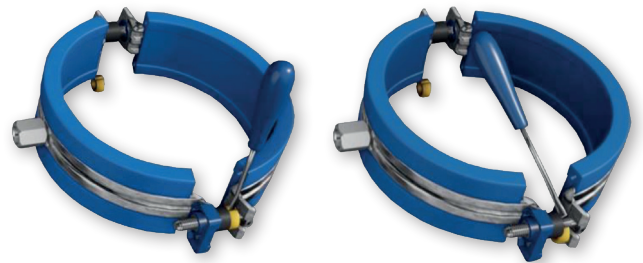


Fixed bracket

\* removed distance washer

Sliding bracket

\* distance washer in place



Changing from sliding to fixed: Remove the distance washer.



Removeable distance washer.



#### 4.2.2. Bracket Arrangement

During installation of Wavin SiTech+ pipes, the following should be considered:

##### Vertical pipes:

- ⦿ To prevent the vertical stack sliding down, each pipe section between floors must be secured by one fixed bracket at the spigot-end.
- ⦿ All remaining pipe brackets at subject pipe must be sliding brackets.
- ⦿ The table 2 prescribing the maximum distance between brackets is to be respected.

##### Horizontal pipes:

- ⦿ Every horizontally installed pipe length  $\geq 2$  meters should always be fixed with one fixed bracket at the spigot-end.
- ⦿ All remaining pipe brackets at one pipe must be sliding brackets.
- ⦿ The table 2 prescribing the maximum distance between brackets - is to be respected .

##### Notes:

- ⦿ For all changes of direction - e.g. a bend at the bottom of a down pipe - 1 bracket directly before and after the change of direction.
- ⦿ In case multiple fittings are assembled, additional bracket(s) before/after this assembly might be required to ensure:
  - A downward slope in flow direction is in place (in case of horizontal pipes).
  - The center of the assembly cannot be excessively displaced (in case of vertical pipes).
- ⦿ Ensure the materials are installed tension-free by properly aligning the brackets.
- ⦿ To achieve a high level of sound proofing, generally pipe brackets should not be installed in impact areas (e.g. diameter reductions and changes of directions in the system).
- ⦿ Pipe brackets to be fixed to building materials with high specific area weight.
- ⦿ In multiple storey buildings (from 3 storeys and more) the stack pipes of 110mm must be secured by additional fixing (stack pipe support) to prevent sliding. In this case we advise using the Wavin SiTech+ socketed short length with a fixed bracket.

Nominal outer diameter DN/OD	Max distance between brackets	
	horizontal	vertical
	(mm)	(mm)
50	750	1250
75	1125	1875
90	1350	2000
110	1500	2000
125	1625	2000
160	2000	2000
200	2000	2000

Table 2: Pipe bracket spacing.

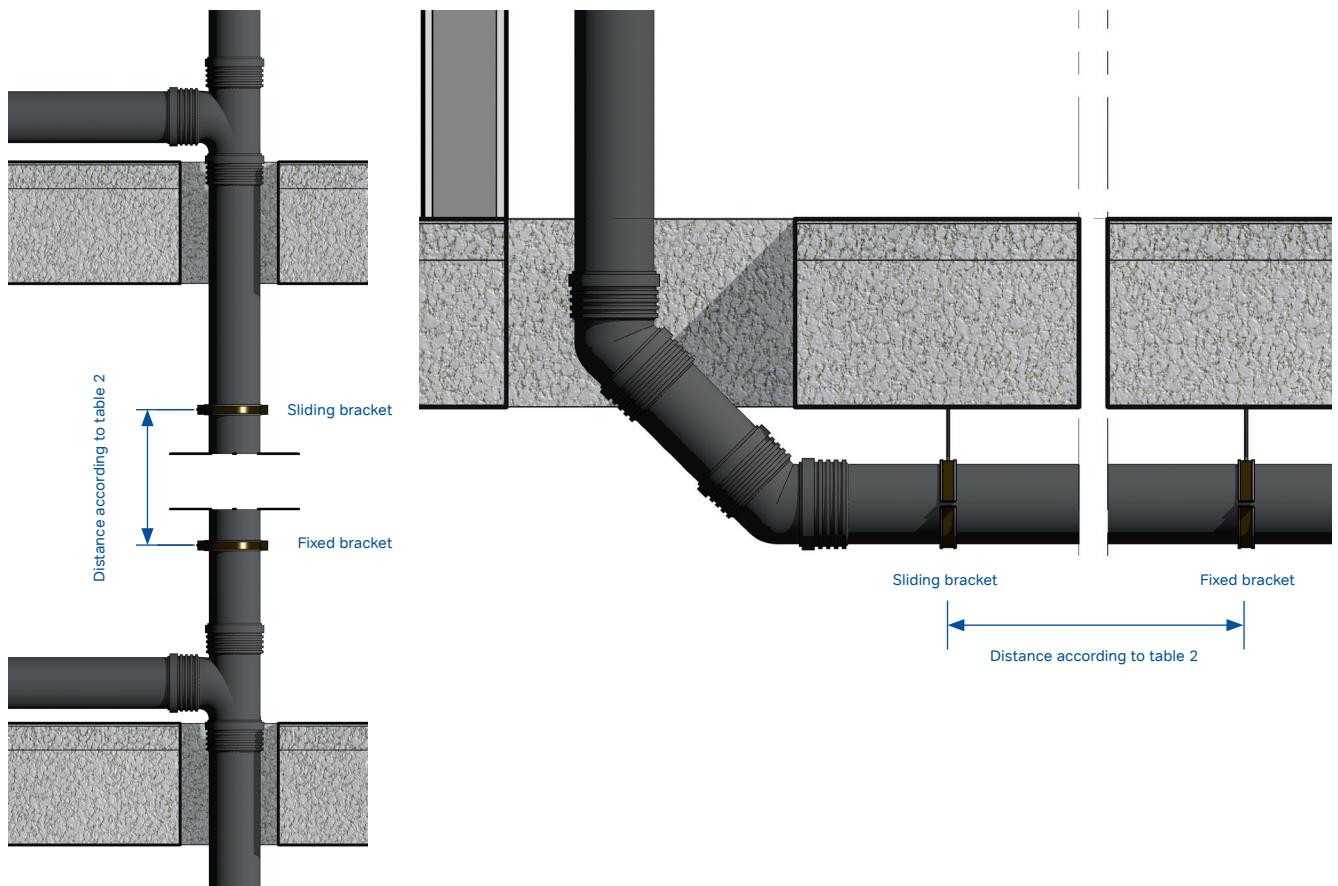


Fig 9: Example horizontal and vertical installation.

### 4.2.3. Max length of threaded rod

In the development of Wavin SiTech+ the product has fulfilled all testing procedures to ensure high quality. Wavin SiTech+ pipes and fittings comply to system tests as specified in EN1451-1. Wavin SiTech+ is approved via Type Testing (internal) as well as independently tested by accredited testing facilities.

System requirements for leak tightness are prescribed in standards. Wavin SiTech+ is meeting leak-tightness requirements as set in the following standards:

- ⦿ EN ISO 1451-1 : leak-tight for 15 minutes with angular deflection of 2° at 0.5 bar.
- ⦿ EN ISO 13257 : leak-tight for 15 minutes at 0.5 bar when filled after Temperature Cycle Test (1.500 cycles).

These requirements do not take into account fixation to a wall or ceiling. A proper installation is key to leak-tightness. A poor installation cannot be compensated by a perfect system. Threaded rods are commonly used for suspension and fixing pipe brackets. It is important to keep in mind that threaded rods are designed to be used in tension and not to withstand bending moments.

For this reason, threaded rods to be used in SiTech+ installations have predefined maximum lengths. If the strength class is unknown, the maximum length can be retrieved from Table 3a and 3b. These tables were created, based on strength class 4.6.

Regarding internal pressure it is important to know what the impact can be in case maximum lengths are exceeded. In case the system gets clogged or otherwise is filled with water, an internal pressure builds up, the resulting forces cause the rods to bend and the joints might be pushed apart till leakage occurs.

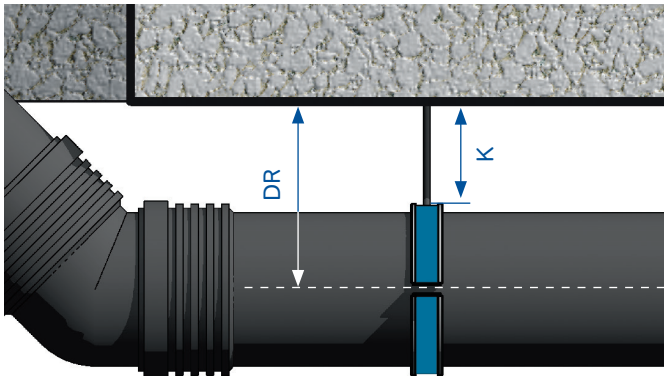
The maximum pressure that can occur when the system gets clogged is determined by the vertical distance between the horizontal line and the lowest sanitary application to which this horizontal line is connected. In most cases, this distance is  $\leq 1$  meter.

Therefore, the maximum lengths of the threaded rods in Tables 3a and 3b are such that they can withstand bending moments due to 0.1 bar internal pressure.

In the following cases, a heavier fixation needs to be applied – especially at changes of direction where resulting forces cause treaded rods to bend – to ensure the system remains leak-tight.

- ⦿ The distance between bracket and wall / ceiling exceeds the maximum lengths as given in the table.
- ⦿ The maximum pressure in the system can exceed 0.1 bar in case of clogging.
- ⦿ There is a wish to hydrotest the installed system at a pressure  $> 0.1$  bar.

In these cases it is advised to follow the method of statement for soil & waste pressure testing procedure or consult Wavin or bracket supplier.



**Horizontal**

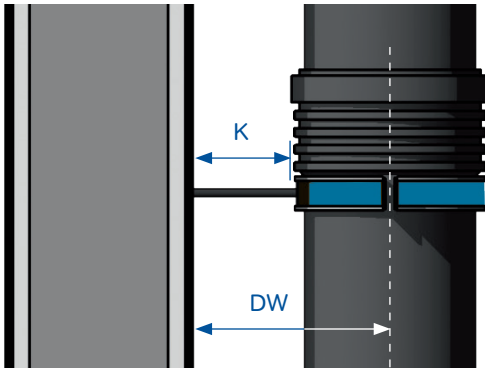
Maximum (DR) distance to the ceiling and maximum length (K) of threaded rod or threaded pipe

	M8		M10		M12		1/2"		1"	
	DR	K	DR	K	DR	K	DR	K	DR	K
DN/OD50	120	85	195	160	315	280	1535	1500	1535	1500
DN/OD75	110	60	170	120	260	210	1300	1250	1550	1500
DN/OD90	105	50	150	95	225	170	1055	1000	1555	1500
DN/OD110	105	40	145	80	205	140	915	850	1565	1500
DN/OD125	100	30	135	60	180	105	725	650	1570	1500
DN/OD160			135	45	175	85	590	500	1590	1500
DN/OD200			150	40	175	70	510	400	1360	1250

Note: for M12 threaded rods, 1/2" and 1" threaded pipes, adapter pieces are needed to connect to brackets.

Table 3a: Fixing distance to the wall - Horizontal.





### Vertical

Maximum (DW) distance to the wall and maximum length (K) of threaded rod or threaded pipe

	M8		M10		M12		1/2"		1"	
	DW	K	DW	K	DW	K	DW	K	DW	K
DN/OD50	95	60	155	120	245	210	1285	1250	1535	1500
DN/OD75	90	45	130	85	195	150	895	850	1545	1500
DN/OD90	85	30	115	60	165	110	705	650	1555	1500
DN/OD110			115	50	150	85	565	500	1565	1500
DN/OD125			105	35	140	70	470	400	1320	1250
DN/OD160			120	30	140	50	390	300	1090	1000
DN/OD200					150	40	370	260	960	850

Note: for M12 threaded rods, 1/2" and 1" threaded pipes, adapter pieces are needed to connect to brackets.

Table 3b: Fixing distance to the wall - Vertical.

#### 4.2.4. Extended wall distance

If the distance from the wall to the pipe is bigger than you can solve with a single threaded rod according to the table 3a and 3b with the general fixing distances, or in case the internal pressure might exceed 0,1 bar then there are multiple options to increase the distance.

It is important to know what the impact can be in case maximum lengths are exceeded. In case the system gets clogged, an internal pressure builds up, the resulting forces cause the rods to bend and the joints might be pushed apart till leakage occurs. In these cases the following options could be considered:

1. An option could be to consider suspended bracketing for socket support. Bracket assemblies are available for suspended sanitary and drainage installations in a building.
2. Another option is to use a 'wall bracket' to extend the distance between wall and pipe.
3. A third option could be to mount the pipe brackets to a mounting rail, that is installed parallel to the complete installation of the pipe.
4. A fourth option could be securing the connection via a LKS clamp. The joints at changes of flow direction need to be secured to prevent them from detaching. The Wavin LKS clamp guarantees this for internal pressures of up to 2 bar.

### 4.3. Low noise installation – bracketing types

Low noise installation is all about minimizing the transfer of sound (vibration) to connecting rooms. Two types of sound can be distinguished; airborne and structure borne sound. Airborne sound is reduced by the mass of the SiTech+ pipe, and structure borne sound is reduced by low noise bracketing. For more information about noise reduction, please refer to chapter acoustics.

Wavin offers two types of installation using the Wavin low noise bracket. The single bracket installation offering sound performance as low as 21dB(A), and the No-noise installation offering sound performance lower than 13dB(A).

#### 4.3.1. Low noise bracketing – single bracket – 21 dB(A)

The low noise installation makes use of a single “Wavin low noise bracket” that can be used as a sliding and a fixed bracket. The pipe bracket can be changed from sliding to fixed, by removing the distance washer. See 4.2.1. “changing from sliding to fixed”

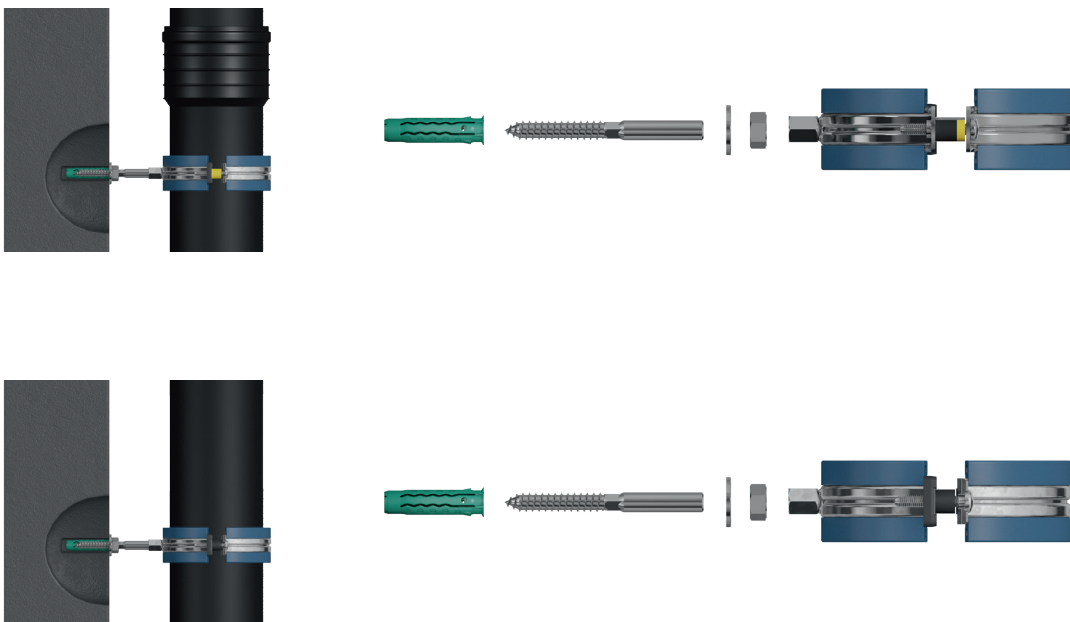


Fig. 10: Low noise bracketing – 21dB(A).

#### 4.3.2. No-noise bracketing – double bracket – 13 dB(A)

The no-noise type installation makes use of the same “Wavin low noise bracket”, only difference in this installation is the stacked installation of the fixed bracket. The sliding bracket is the same as in the Low noise installation (see paragraph 4.2.1.). Each Wavin low noise bracket contains a rubber inlay that has foam sidewalls. The stacked installation offers further acoustic decoupling, for increased noise performance. The stacked installation consists of a sliding bracket that is mounted to the wall (not exceeding the treaded rod distances in table 3) and a fixed bracket that is mounted to the pipe. In final installed form, the fixed bracket is carried by the sliding bracket.

In the no-noise installation, the distance washers make sure that in any situation, the clamping force on the pipe is perfect. This results in minimal structure borne sound transmission. The distance washers also prevent over-tightening of the brackets, which could otherwise result in a reduction of sound performance.

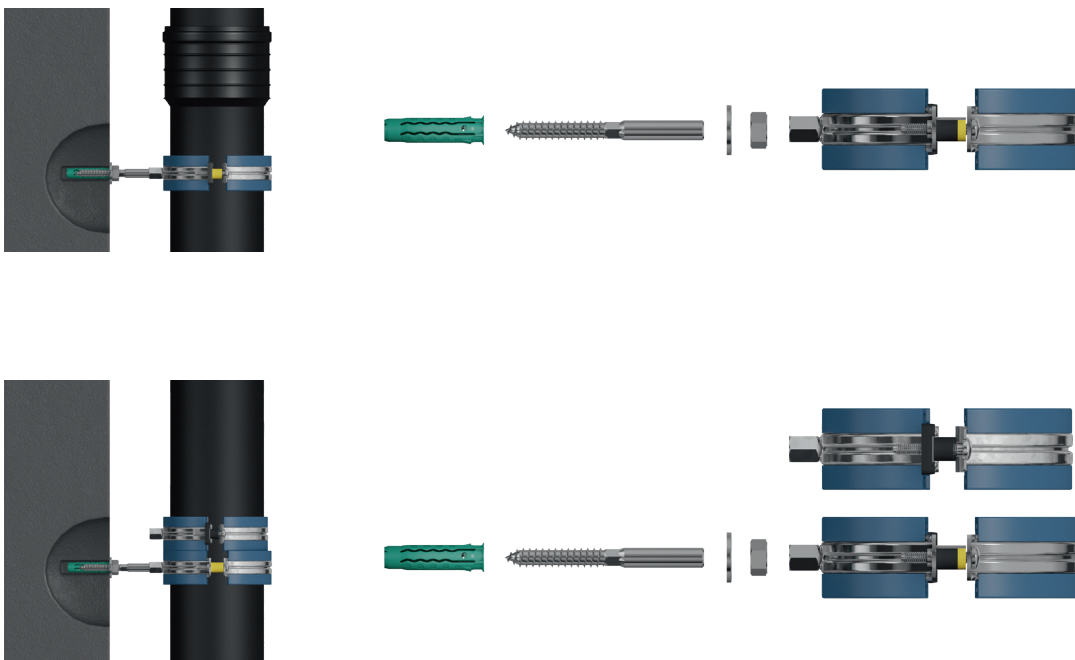


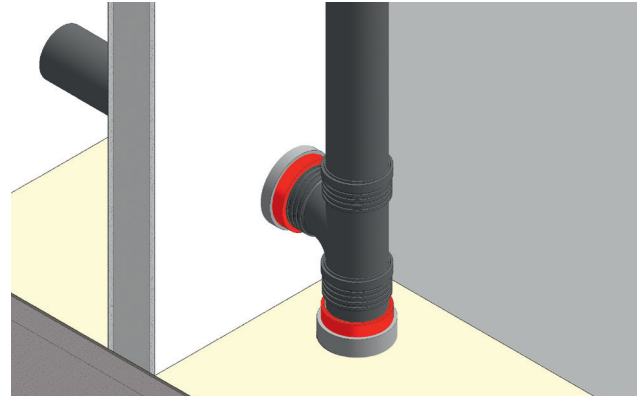
Fig. 11: No-noise bracketing – 13dB(A).

#### 4.4. Floor and ceilings crossings

- ⦿ Floor and ceiling crossings must be made both moisture-resistant and soundproof using e.g. mineral wool or foam material.

#### Shower branch

- ⦿ For an economic and easy installation of a toilet and waste pipes separately to the soil stack you can use a Shower branch (1).



#### Tensile resistant connection

Gravity drainage systems (for rain or waste water) can be subject to both planned and unplanned pressure surges. If Wavin SiTech+ is used as a pressure line for a pump station, for example, the resulting pressure surges are planned. If an overloaded rainwater pipe is subject to hydrostatic pressure, however, this counts as an unplanned pressure surge.

For both types of pressure surge, the joints at changes of flow direction need to be secured to prevent them from detaching. The Wavin LKS clamp guarantees this for internal pressures of up to 2 bar.

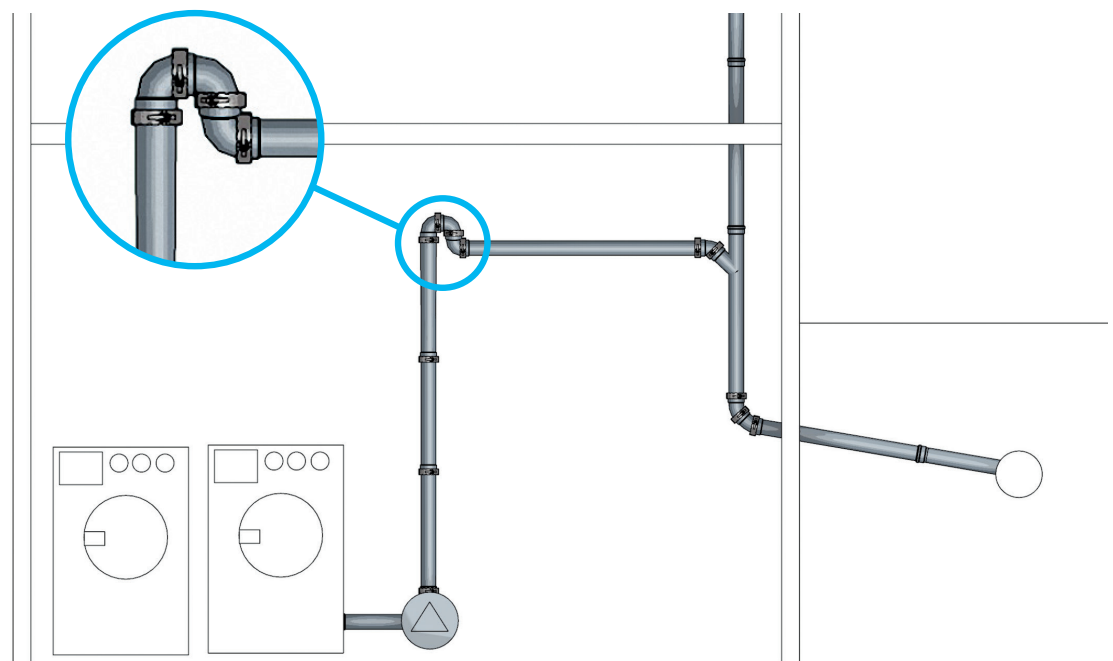
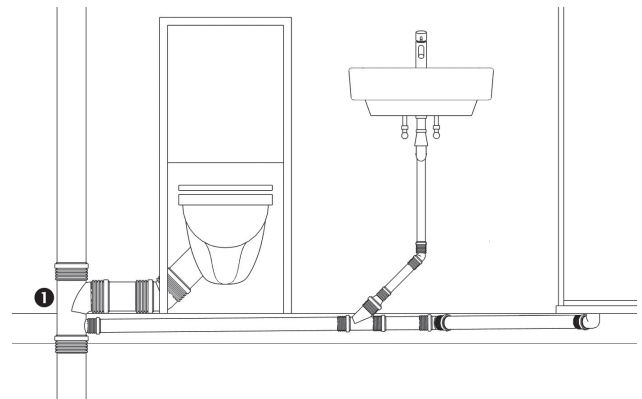


Fig. 12: Tensile resistant connection.



Pressure surges may occur in any part of systems located downstream of pumps and pump stations. All fittings should therefore be secured using LKS clamps. Ensure that the fixings used are able to withstand such pressure surges. The system must be able to transfer dynamic loads to the supporting structure.

In the case of rainwater drainage systems, fittings located at changes of direction are critical. These fittings must therefore be equipped with LKS clamps. Vertical pipes (downpipes) do not require separate LKS clamps. Provided that the fixing specifications provided by us in this manual are observed, the joints on these sections will be suitably secured by the LKS clamp fitted where the change of direction occurs.

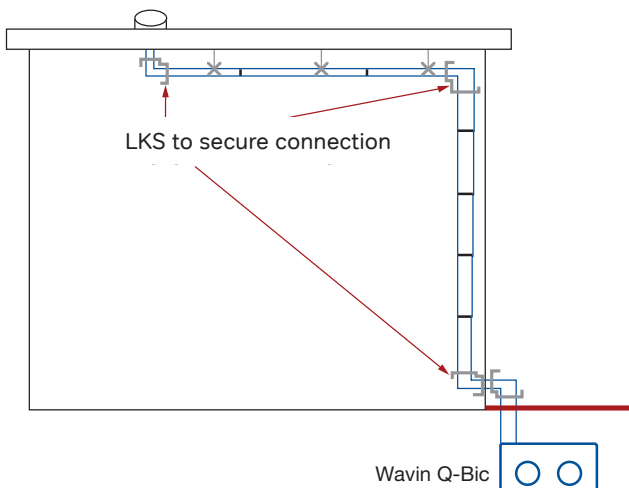


Fig. 13.

Wavin LKS clamps are available for use with SiTech+ in sizes 32 mm up to 160 mm.

For details of the required collar sizes and corresponding article numbers, please refer to page 50 of our SiTech+ range.

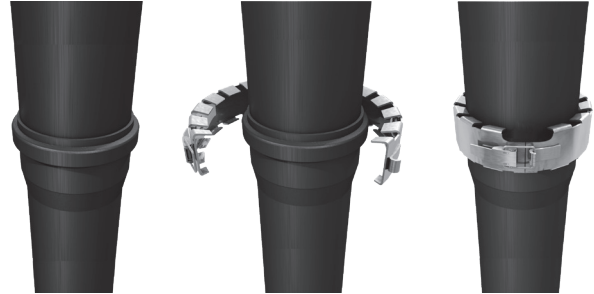


Fig. 14: Wavin LKS Clamp.

### Soundproofing

If interior spaces are subject to the technical provisions of DIN 4109 (sound insulation in buildings), with pipe-borne noise not exceeding 30 dB(A), all work must conform to the technical building regulations applying to in-building systems with respect to the configuration of pipes in the context of the corresponding floor plan. Waste water pipes that run through living areas must not be exposed. If they are to run adjacent to such living areas, they may only be installed inside walls with a minimum specific area weight of 220 kg/m<sup>2</sup> (See DIN 4109-5).

The same conditions apply when installing in brickwork recesses conforming to DIN 1053, with pipes running along the other side of an adjacent wall subject to protection measures, where minimum wall dimensions of 220 kg/m<sup>2</sup> apply in the area of the recess. Shafts or recesses in brickwork must then be fitted with a supporting structure (matting or metallic mesh) that allows them to be plastered over to a minimum depth 1.5 cm. There must be no sound bridges between the pipe and plaster covering. Preventive measures in this respect include pipe lagging of material classes A1, A2, B1, B2 (e.g. glass fibre, mineral wool or plastic).

As the routing of the pipe has a considerable influence on both the generation and reduction of noise, measures should be taken to minimise its impact. Falling waste water should therefore be directed downwards in stages where possible, i.e. not abruptly, as this would be technically unfavourable. In the case of buildings with more than three storeys (> 10 m), a noise-damping length of 250 mm is fitted between the downpipe and the horizontal pipe. This can take the form of two 45° bends and a corresponding length of pipe (see Fig. 15).

Alternatively, the use of one extended 45° bend and one normal 45° bend is recommended. The waste water pipes should likewise be dimensioned and installed in such a way that allows air to circulate freely around the water being drained. Pipe clamps designed to comply with noise-prevention requirements must be fitted with a suitable rubber insert. In the case of bricked-up pipes, note that these must be secured to the underlying structure and not to the new brickwork. Wall and ceiling penetrations must be flexible.

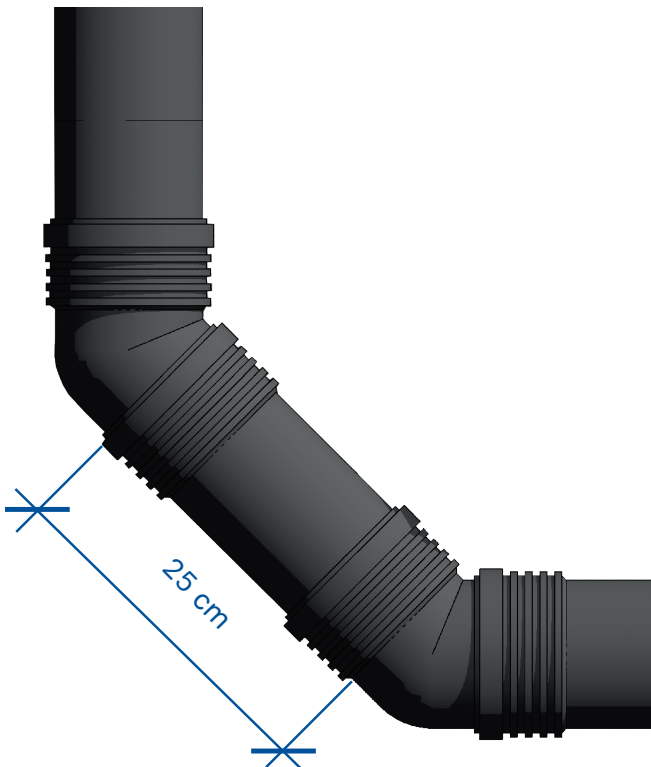
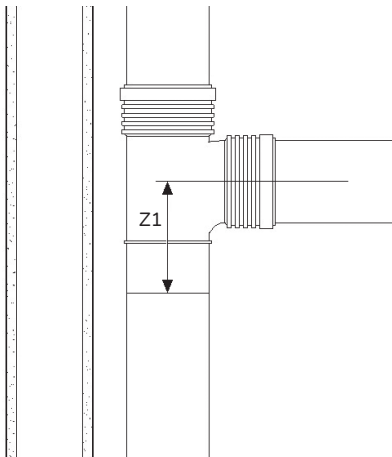


Fig. 15: Extended 45° bend.

## Repairs using repair couplers

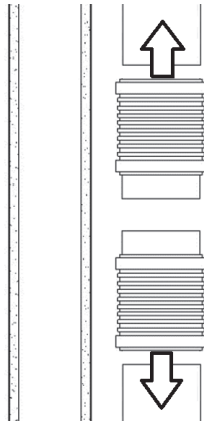
If a pipe section needs to be replaced or a branch needs to be added to the pipe system, please follow the following procedure.

1. Cut out the part which needs to be replaced. When inserting a branch at a later stage, please secure that the level of the branch is located at the right height. The Z1 value is mentioned for each branch in the product overview.



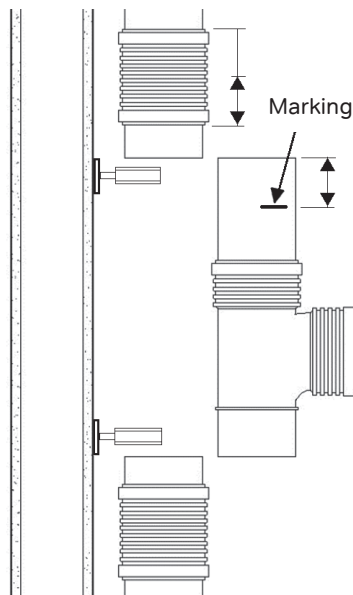
2. Install a short piece of temporary pipe halfway onto the repair coupler to secure a correct positioning of the rubber seal.

3. Install the free half of the coupler onto the existing pipe and slide the repair coupler completely over the existing pipe.



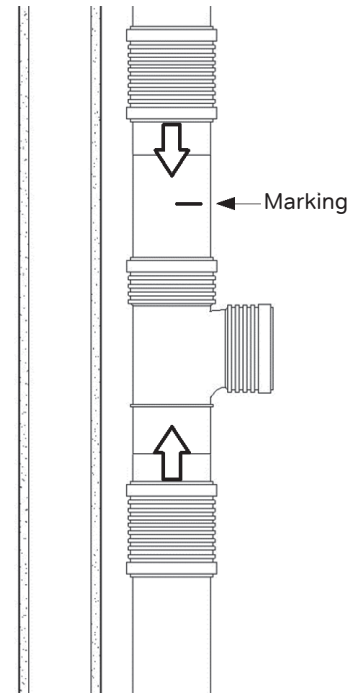
4. Secure that the pipe (or pipe and Branch) has the same length as the part which has been cut out.

5. Measure half of the repair coupler length. Measure the same length from the new pipe ends and mark the pipe.



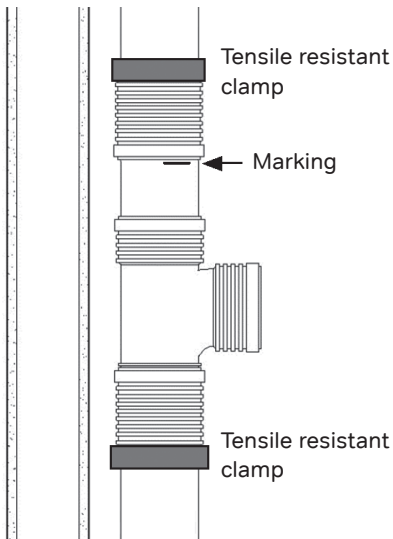
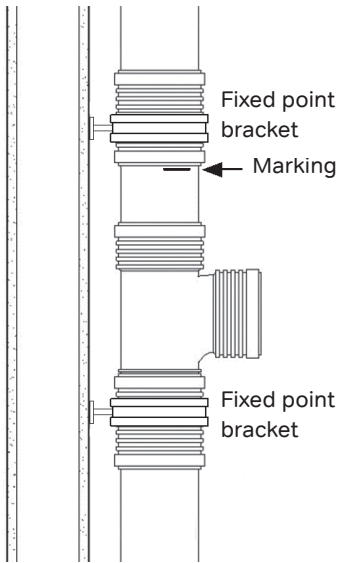
6. Install as close as possible to the two pipe ends wall plates for the fixed-point brackets and mount the threaded rod and back part of the brackets. When fixing the repair couplers with tensile resistant clamps this step can be skipped.

7. Install a tensile resistant clamp on each repair coupler to ensure no movement.

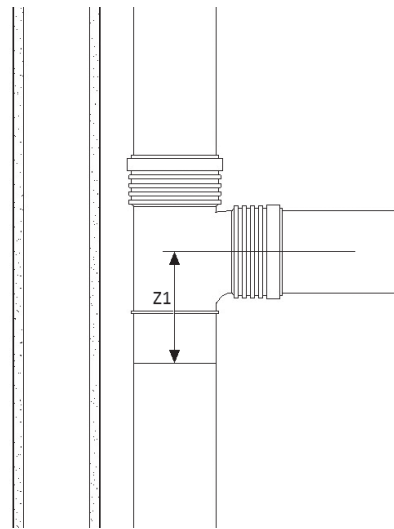


### Repairs using a long socket and repair coupler

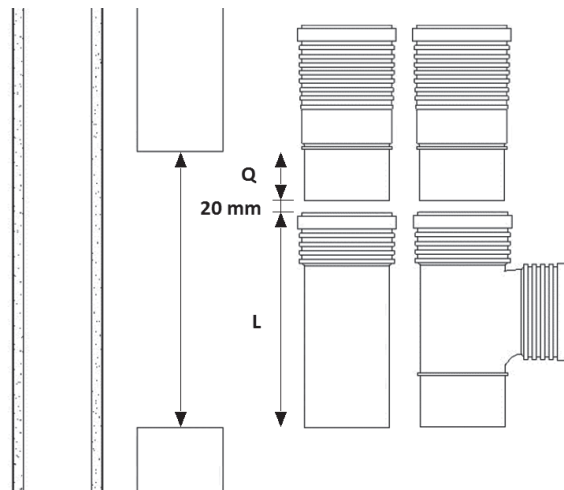
8. Finalise the installation of the fixed-point brackets or install a tensile resistant clamp on each repair coupler to ensure no movement.



1. When inserting a branch at a later stage, please secure that the level of the branch is located at the right height. The Z1 value is mentioned for each Branch in the product overview.

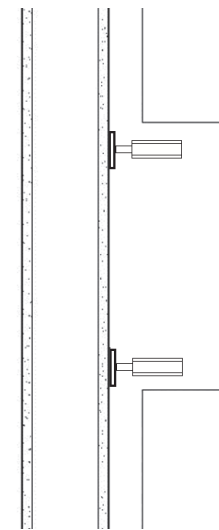


2. When inserting a branch, the length of the part to be cut out should have the length of the branch (L) + 20 mm + the length of the spigot of the long socket (Q).



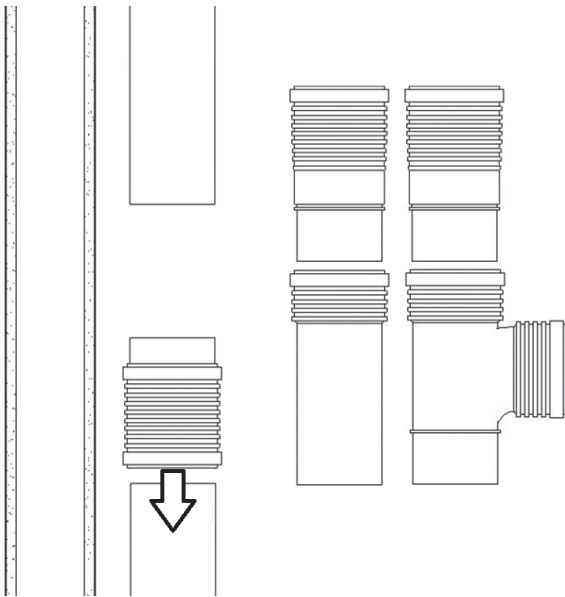
When replacing a piece of pipe, secure that the total length of the new socketed pipe (L) equals the length of the part cut out minus the length of the spigot of the branch (Q) minus 20 mm.

3. Install close to the two pipe ends wall plates for the fixed-point brackets and mount the threaded rod and back part of the brackets. When fixating the repair couplers with tensile resistant clamps this step can be skipped.

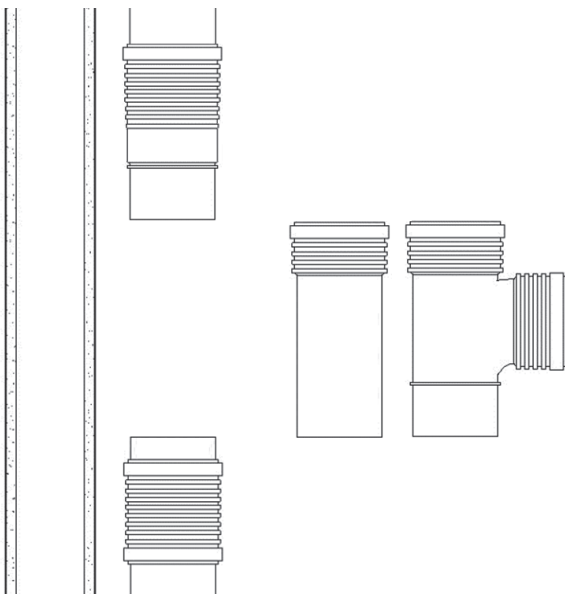




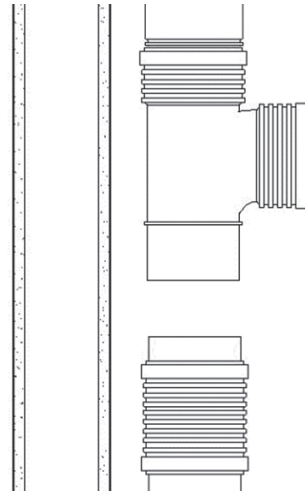
4. Install a short piece of temporary pipe halfway onto the repair coupler to secure a correct positioning of the rubber seal.
5. Install the free half of the coupler onto the existing pipe and slide the repair coupler completely over the existing pipe.



6. Slide the long socket over the other pipe end.



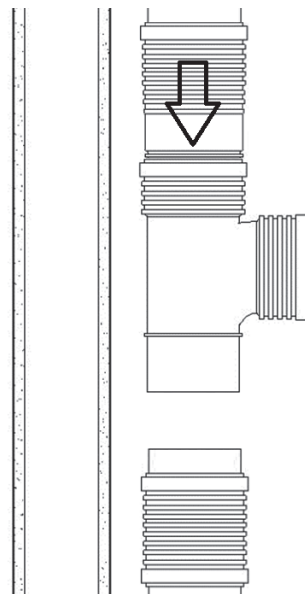
7. Push the socketed end of the branch or pipe on to the long socket.



8. Push the long socket with the branch or pipe till the two pipe ends meet.

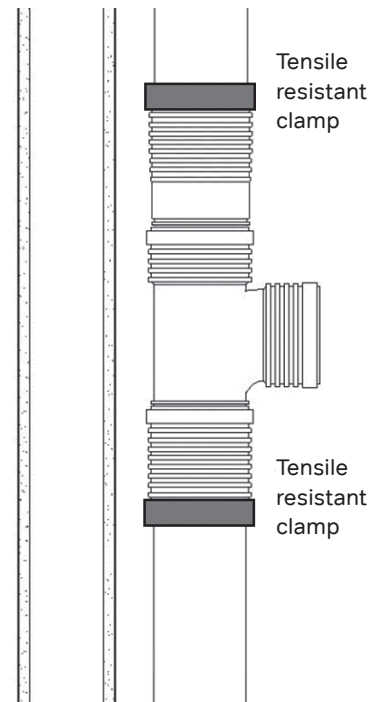
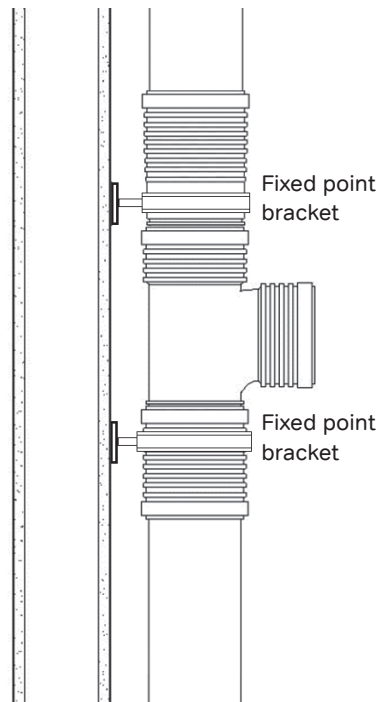
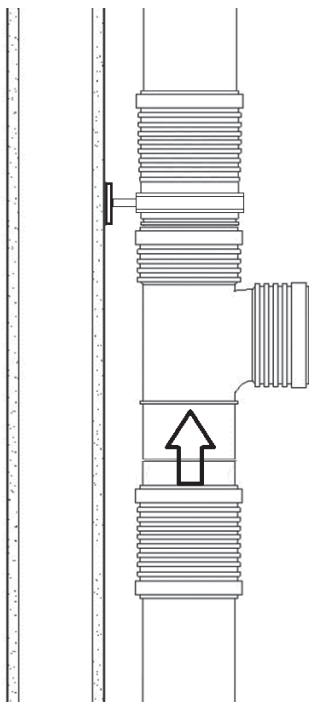
9. Finalise the installation of the fixed-point brackets or install a tensile resistant clamp on the long socket to ensure no movement.

10. If a pipe is inserted, measure half of the repair coupler length. Measure the same length from the new pipe end and mark the pipe.



**11.** Slide the repair coupler over the spigot end of the branch or to the marking on the pipe.

**12.** Finalise the installation of the fixed-point bracket or install a tensile resistant clamp on the repair socket to ensure no movement.



# 5. Fire protection

## 5.1. Fire behavior classification

Fire behavior of construction materials, e.g. piping systems and isolation materials, have been defined in fire classification classes as per DIN 4102-1. Construction materials are classified as combustible and non-combustible materials. According to EN 13501-1, PP, and thus Wavin SiTech+ is listed as Class C-s2, d0 according to EN13501-1.

Criteria	Old Classification as per DIN 4102-1	New European classification according to DIN EN 13501-1		
		Additional criteria		
Non-combustible	A1	A1	-	-
	A2	A2	s1	d0
Non-readily ignitable (low flame spread)	B1	B	s1	d0
		C	s1	d0
		A2	s2/s3	d0
		B	s2/s3	d0
		C	s2/s3	d0
		A2	s1	d1/d2
		B	s1	d1/d1
		C	s1	d1/d2
		A2	s3	d2
		B	s3	d2
C	s3	d2		
Normally ignitable (normal fire behavior)	B2	D	s1/s2/s3	d0
		E	-	d0
		D	s1/s2/s3	d2
		E	-	d2
Readily ignitable	B3	F	-	-

Table 4: Fire behavior classification according to DIN 4102-1 and DIN EN 13501-1.

In line with European standardization, the fire classification classes as per DIN 4102-1 are translated into the European DIN EN 13501. The accreditation is based on the standardized Singl-burning-Item-Test (SBI) in conformity with DIN EN 13823.

## 5.2. Fire resistance classification

The fire resistance classification provides the fire resistance duration of a specific construction material.

Fire resistance classification	Fire resistance duration in minutes
F30	≥ 30 = fire retardant
F60	≥ 60 = high fire retardant
F90	≥ 90 = fire resistant
F120	≥ 120 = high fire resistant
F180	≥ 180 = extreme fire resistant

Table 5: Fire resistance classification.

Possible additions to these fire resistance classes, e.g. z.B. F90 A or F90 AB, can be explained as follows:

- A made of non-combustible materials
- B made of combustible materials
- AB in principle made of non-combustible materials

### 5.3. Wavin fire protection concept

Wavin Fire Protection Collar is in practice the best available solution. The Wavin Fire Protection Collar BM-R90 fully seal the wall or ceiling corridor in case of fire, due to special fire protection material which strongly expands by increased temperature.

The BM-R90 Fire Protection Collar (for Wavin SiTech+) is especially for sloped piping, suitable up to 45 degrees, and applicable for passages by sleeved pipes or fittings. In practice the collar is suitable to seal off almost any possible configuration.

#### Fire Protection Collar BM-R90

- For wall and ceiling crossings
- Suitable for pipes with or without sockets and fittings
- Also suitable for angled passages (up to 45 degrees)
- Approved for ceiling installation
- Fire classification F90



Fig. 16: Fire Protection Collar BM-R90.

### 5.4. Assembly instructions

When the system is applied to a fire-resistant vertical (wall) or horizontal installation (floor) which separated a fire-risk area, only one Fire Protection collar is required. If the system is applied to a fire resistant vertical (wall) or horizontal (floor) installation which separated two fire-risk areas, use a Fire Protection collar on both sides.

#### Hole

Drill a circular hole into the wall or floor with a diameter of 2 mm greater than the external diameter of the plastic pipe to be used.

#### Installing the pipe

Insert the PVC, PP, PE etc. pipe in the hole and clean the part the collar is to be applied to.



### Closing and sealing against fumes and gas

If there are any gaps between the pipe and the wall, seal these using putty or intumescent strips according to the thickness, to prevent the passage of fumes in the event of a fire.

### Cleaning the pipe

The expansion of the intumescent material in the collar completely closes the plastic pipes by a mechanical action. If the pipes are very dirty or have mortar residues, this may delay the action. Clean the surface of the plastic pipe in the point of installation of the fire protection collars.

NB: the fire protection collar can only prevent the passage of fire if it is properly installed

### Precautions

In the case of contact of the intumescent material with the eyes, wash delicately with soap and water. Keep out of the reach of children.

### Installation manual Wavin fire protection collar BM-R90

Wavin BM-R90 is a new fire protection sleeve designed for use with Wavin domestic waste water removal piping systems according to DIN 4102-11. It is suitable for use on piping with external diameters of up to 200 mm and is able to provide a secure seal for use in all conceivable installation situations:

- ⦿ Right-angled wall and ceiling penetration
- ⦿ Lightly-constructed partition walls
- ⦿ Angled wall and ceiling penetration to 45°
- ⦿ For sealing over pipe collars (to 45°)
- ⦿ For installation under ceilings and in front of walls
- ⦿ Installation flush with ceiling surface

### BM-R90 installation instruction

The BM-R90 fire collar provides fire resistant sealing for wall and ceiling installation of SiTech+ and other selected Wavin soil and waste systems.

### General recommendations

#### (1) Positioning of the collars:

On both sides of a wall; on one side under/in a ceiling.

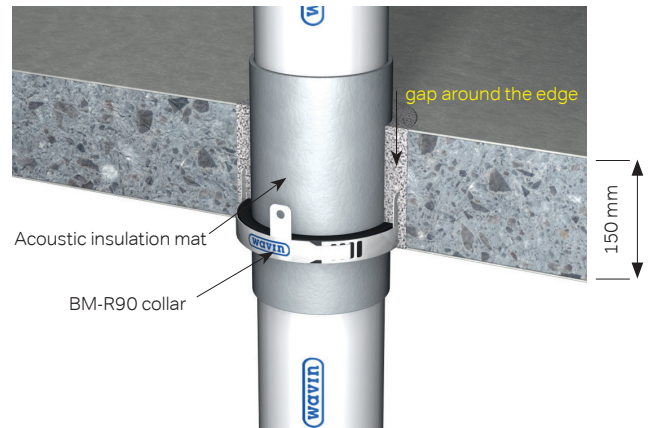


Fig. 17: Straight installation with / without sleeve / socket.

#### (2) Wall & ceiling types:

At least 10 cm thick solid concrete, aerated concrete and sand-lime brick walls as well as light dividing walls (stud walls: both sides clad with 12.5 mm plasterboard) and solid concrete and aerated concrete ceilings at least 15 cm thick.

#### (3) Structural acoustic insulation:

The acoustic insulation mat provided must be wrapped around the pipe where it passes through the wall or ceiling.

#### (4) Joint sealing between pipe and wall/ceiling:

To be packed to the full thickness of the wall or ceiling using mineral materials such as concrete, cement or plaster.



Fig. 18: BM-R90 fire collar.

## Components

The fire collars are made from powder coated sheet steel with a push-in fastening and tab fixings with an integrated intumescent material for reliable closure in the event of fire. Also included:

- ⊕ Insulation mat
- ⊕ Fixing kit
- ⊕ Identification label

## Selection table

Wavin SiTech+ pipes DN/OD	d mm	s mm	straight installation	straight installation with collar	angled installation:*) with sleeve or socket $\leq 45^\circ$ mm
32	32	2,0	32	40	50
40	40	2,0	40	50	63
50	50	2,1	50	63	75
75	75	2,6	75	90	110
90	90	3,1	90	110	125
110	110	3,6	110	125	140
125	125	4,0	125	140	160
160	160	5,0	160	180	200

1) The shape of the sleeve must be turned oval by pushing on both sides. In that way the shape of the collar can be adapted when leading-through the pipes (see also figure below)

Table 6: BM-R90 selection table for various types of Wavin SiTech+ pipe installation.

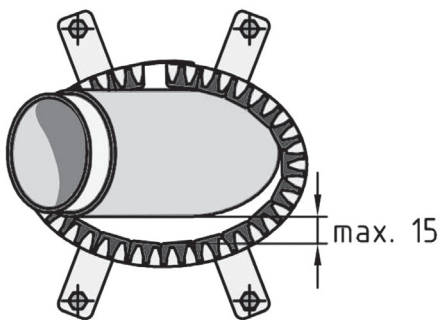


Fig. 19: Maximum allowable gap between pipe and fire protection collar.

## Types of installation

### I. Ceiling installation

Minimum requirements of the ceiling: min. 150 mm thick concrete ceiling.

#### Flush ceiling installation

Wrap insulating mat around the pipe.

Open the collar and position it around the pipe, whilst hooking in the push-in fastening. Bend or angle the collar mounting tabs. Then install the collar flush with the ceiling. Fill the remaining ceiling gap with cement or concrete (see general recommendations (4)).

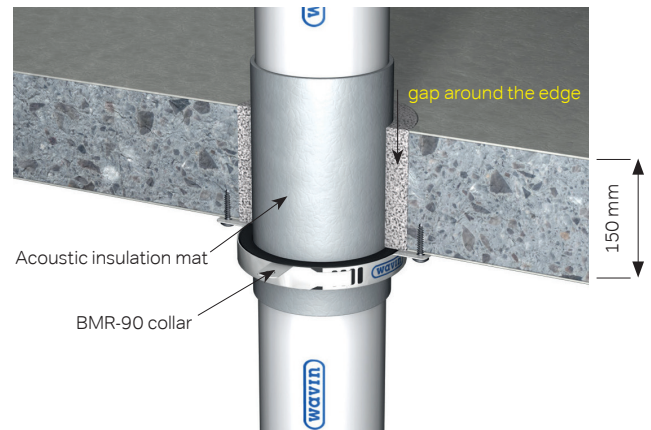


Fig. 20: Straight installation without sleeve / socket up to 160 mm.

### II. Installation under the ceiling

#### Straight ceiling installation

Wrap insulating mat around the pipe. Open the collar and position it around the pipe, whilst hooking in the push-in fastening. Fill the remaining gap with cement or concrete (see general recommendations (4)). Hold the collar firmly against the ceiling and mark the positions of the mounting holes.

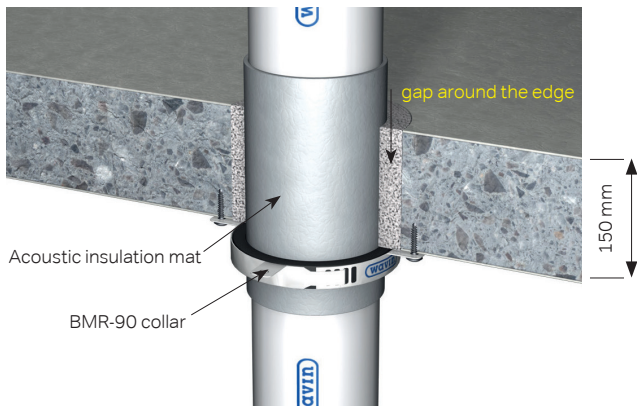


Fig. 21: Straight installation with / without sleeve / socket.

Rotate the collar and drill the holes.

Insert plugs and fix the collar using screws and washers. (Mounting the collar using the washers, plugs and screws provided).

**Angled ceiling installation**

Wrap insulating mat around the pipe.

Open the collar and position it around the pipe, whilst hooking in the push-in fastening. Fill the remaining gap with cement or concrete (see general recommendations (4)).

Hold the collar firmly against the ceiling and mark the positions of the mounting holes.

Rotate the collar and drill the holes.

Insert plugs and fix the collar using screws and washers. (Mounting the collar using the washers, plugs and screws provided).

**Installation distances between BM-R90 fire protection collars eg to external systems**

The distance to external, tested systems (inspected and approved) must be at least 50 mm between partitioned sections.

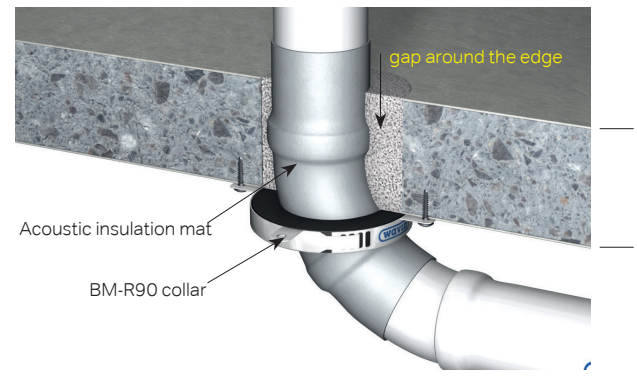


Fig. 22: Angled ceiling installation  $\leq 45^\circ$  with / without sleeve socket.

If two Wavin BM-R90 feedthroughs are installed next to each other, the distance between the pipes must be at least 100 mm in the case of special partitioned sections (sloping pipes, partition via sleeve/socket or for ceiling installations). In the case of straight pipes without sleeve/ socket in the partition area, the collar casings can adjoin each other (distance 0 mm).

**III. Wall installation**

Minimum wall specifications: wall must be at least 100 mm thick, made from concrete, aerated concrete, lime sandstone or lightweight partition walls (two-layer panelling on both sides with 12.5 mm plasterboard panels and mineral wool infill). The pipe must be clamped on both sides at a distance of  $\leq 50$  cm. For wall feedthroughs, a collar should always be fitted on both sides of the wall.

Wrap insulating mat around the pipe. Open the collar and position it around the pipe, whilst hooking in the push-in fastening. Fill the remaining gap with cement or concrete (see general recommendations (4)). Hold the collar firmly against the ceiling and mark the positions of the mounting holes. Rotate the collar and drill holes.

Insert plugs and fix the collar using screws and washers. (Mounting the collar using the washers, plugs and screws provided).

Repeat the steps described for the second collar required on the opposite side.

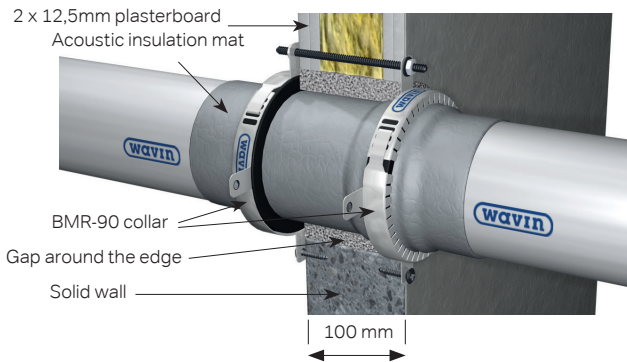


Fig. 23: Straight installation with sleeve / socket.

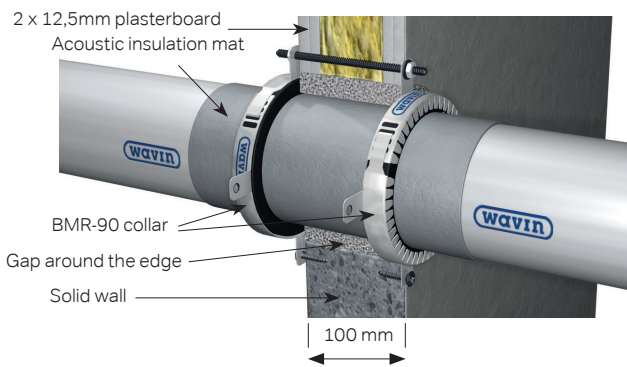


Fig. 24: Straight installation without sleeve / socket.

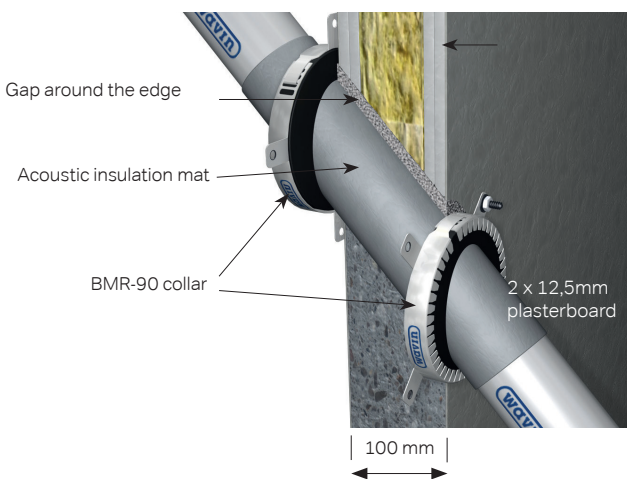


Fig. 25: 45° angled installation with / without sleeve / socket.

The distance to external, tested systems (inspected and approved) must be at least 50 mm between partitioned sections.

If two Wavin BM-R90 feedthroughs are installed next to each other, the distance between the pipes must be at least 100 mm in the case of special partitioned sections (sloping pipes, partition via sleeve/socket or for ceiling installations). In the case of straight pipes without sleeve/ socket in the partition area, the collar casings can adjoin each other (distance 0 mm).

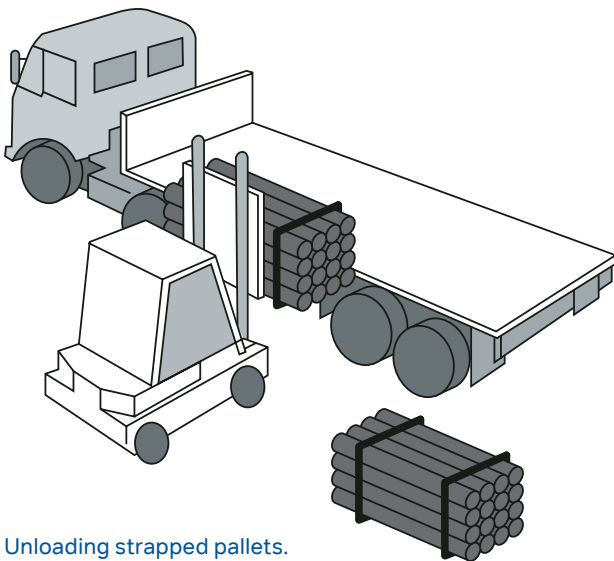
**Note**

The presented data, especially recommendations for the processing and use of our products are based on our knowledge and experience. Due to differences in material and working conditions that are outside the scope of our influence, we recommend that sufficient internal trials be conducted in each case to ensure the suitability of our product to the intended method and processing purposes. No liability will be accepted either on the basis of these instructions or from an oral advice, unless we are accused of gross negligence or deliberate malice.

# 6. Packing, transport & storage

## Handling

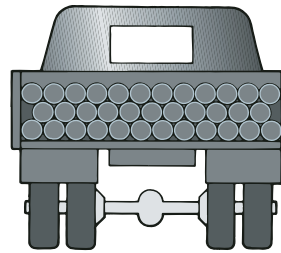
- ⦿ Handle pipes and fittings with care. Excessive scratching or impact stress on the pipe may damage the external structure or affect the seal properties.
- ⦿ Loose pipes need to be unloaded by hand. When pipes are inserted one inside the other, always remove the inside pipe first.
- ⦿ When bundles of pipes are unloaded by fork truck, we recommend the wrap nylon sheaths around metal forks or use plastic forks. Metal forks, hooks and chains may not come in contact with the pipes. Do not use forks with an extension.
- ⦿ If the loading or unloading is carried out with a crane and excavator arms, the pipes must be raised in the central area with a sling of adequate width.



## Unloading strapped pallets.

## Transport

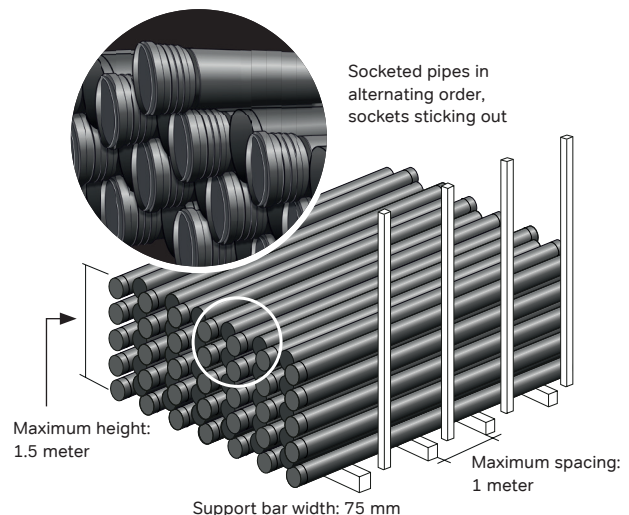
- ⦿ Wavin SiTech+ pipes, when no longer packed in original packaging, must be stored fully supported over their total length on a clean surface during transport.
- ⦿ Bending of the pipes should be avoided.
- ⦿ Impact stress on pipe and fittings must be prevented.



Transport of loose Wavin pipes.

## Storage

- ⦿ Always store pipes on a flat surface.
- ⦿ Pallets must be stored at a maximum height of 1.5 m without additional supports or side barriers.
- ⦿ Loose pipes:
  - must have at least 2 side supports equally spread over the pipe length,
  - maximum height of storing loose pipes is 1.5 m.,
  - the ideal situation is to support the loose pipes along their whole length. If this is not possible, place wooden supports of at least 75 mm wide under the pipe at a distance of maximum 1 m.,
  - stack the different sizes of pipes separately or, if this is not possible, stack them with the largest diameters on the bottom,
  - socketed pipes should be stacked in an alternating order to secure support over the full pipe length (see picture).
- ⦿ Fittings are supplied in carton boxes and must be stored indoors. Deformation resulting from excessive loads on the fittings should always be avoided.
- ⦿ Store lubricant in a cool place, away from heat sources or direct sunlight.



Socketed pipes in alternating order, sockets sticking out

Maximum height:  
1.5 meter

Maximum spacing:  
1 meter

Support bar width: 75 mm



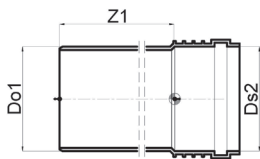
# Wavin SiTech+ Product range





# 7. Wavin SiTech+ Product range

## SiTech+ Pipe STEM S/PL

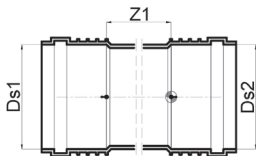


Diameter	Article code	Do1=Ds2	Z1
32 L=0,25 S/PL	3074111	32	250
32 L=0,5 S/PL	3074112	32	500
32 L=1 S/PL	3074113	32	1000
32 L=1,5 S/PL	3074114	32	1500
32 L=2 S/PL	3074115	32	2000
40 L=0,25 S/PL	3074116	40	250
40 L=0,5 S/PL	3074117	40	500
40 L=1 S/PL	3074118	40	1000
40 L=1,5 S/PL	3074139	40	1500
40 L=2 S/PL	3074140	40	2000
50 L=0,15 S/PL	3078869	50	150
50 L=0,25 S/PL	3078870	50	250
50 L=0,5 S/PL	3074142	50	500
50 L=1 S/PL	3074143	50	1000
50 L=1,5 S/PL	3074144	50	1500
50 L=2 S/PL	3074145	50	2000
50 L=3 S/PL	3074146	50	3000
75 L=0,15 S/PL	3085647	75	150
75 L=0,25 S/PL	3074148	75	250
75 L=0,5 S/PL	3074149	75	500
75 L=1 S/PL	3074150	75	1000
75 L=1,5 S/PL	3074151	75	1500
75 L=2 S/PL	3074152	75	2000
75 L=3 S/PL	3074153	75	3000
90 L=0,15 S/PL	3074154	90	150
90 L=0,25 S/PL	3085671	90	250
90 L=0,5 S/PL	3074156	90	500
90 L=1 S/PL	3074157	90	1000
90 L=1,5 S/PL	3074158	90	1500
90 L=2 S/PL	3074159	90	2000
90 L=3 S/PL	3074160	90	3000
110 L=0,15 S/PL	3075739	110	150
110 L=0,25 S/PL	3078871	110	250
110 L=0,5 S/PL	3074163	110	500
110 L=1 S/PL	3074164	110	1000
110 L=1,5 S/PL	3074165	110	1500
110 L=2 S/PL	3074166	110	2000
110 L=3 S/PL	3074167	110	3000
125 L=0,25 S/PL	3074168	125	250
125 L=0,5 S/PL	3074169	125	500
125 L=1 S/PL	3074170	125	1000
125 L=1,5 S/PL	3074171	125	1500
125 L=2 S/PL	3074172	125	2000
125 L=3 S/PL	3074173	125	3000

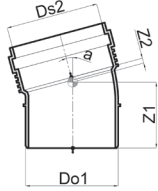
# Wavin SiTech+ Product range

Diameter	Article code	Do1=Ds2	Z1
160 L=0,25 S/PL	3085673	160	250
160 L=0,5 S/PL	3074175	160	500
160 L=1 S/PL	3074176	160	1000
160 L=2 S/PL	3074178	160	2000
160 L=3 S/PL	3074179	160	3000

## SiTech+ Pipe STEM S/PL

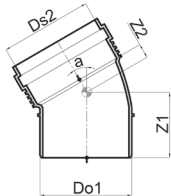


Diameter	Article code	Do1=Ds2	Z1
32 L=0,5 S/S	3074180	32	500
32 L=1 S/S	3074181	32	1000
32 L=2 S/S	3074182	32	2000
32 L=3 S/S	3074183	32	3000
40 L=0,5 S/S	3074184	40	500
40 L=1 S/S	3074185	40	1000
40 L=1,5 S/S	3074186	40	1500
40 L=2 S/S	3074187	40	2000
40 L=3 S/S	3074188	40	3000
50 L=0,5 S/S	3074189	50	500
50 L=1 S/S	3074190	50	1000
50 L=1,5 S/S	3074191	50	1500
50 L=2 S/S	3074192	50	2000
50 L=3 S/S	3074193	50	3000
75 L=0,5 S/S	3074194	75	500
75 L=1 S/S	3074195	75	1000
75 L=1,5 S/S	3074196	75	1500
75 L=2 S/S	3074197	75	2000
75 L=3 S/S	3074198	75	3000
90 L=0,5 S/S	3074199	90	500
90 L=1 S/S	3074200	90	1000
90 L=1,5 S/S	3074201	90	1500
90 L=2 S/S	3074202	90	2000
90 L=3 S/S	3074203	90	3000
110 L=0,5 S/S	3074204	110	500
110 L=1 S/S	3074205	110	1000
110 L=1,5 S/S	3074206	110	1500
110 L=2 S/S	3074207	110	2000
110 L=3 S/S	3074208	110	3000
125 L=0,5 S/S	3074209	125	500
125 L=1 S/S	3074210	125	1000
125 L=2 S/S	3074211	125	2000



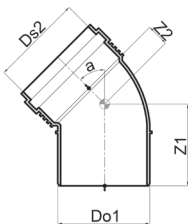
### SiTech+ Bend STB 15°

Diameter	Article code	Do1=Ds2	Z1	Z2
32	3067708	32	49	8
40	3067709	40	52	8
50	3067710	50	55	9
75	3067711	75	63	13
90	3067712	90	69	15
110	3067713	110	79	16
125	3067714	125	88	20
160	3067715	160	97	25



### SiTech+ Bend STB 30°

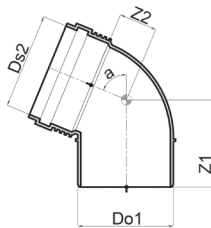
Diameter	Article code	Do1=Ds2	Z1	Z2
32	3067716	32	51	10
40	3067717	40	55	11
50	3067718	50	58	13
75	3067719	75	68	18
90	3067720	90	76	22
110	3067721	110	88	24
125	3067722	125	96	29
160	3067723	160	109	36



### SiTech+ Bend STB 45°

Diameter	Article code	Do1=Ds2	Z1	Z2
32	3067724	32	54	13
40	3067725	40	56	15
50	3067726	50	65	17
75	3067727	75	75	22
90	3067728	90	85	26
110	3067729	110	96	33
125	3067730	125	105	38
160	3067731	160	121	48

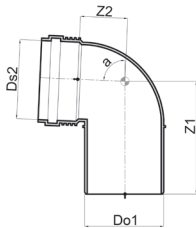
# Wavin SiTech+ Product range



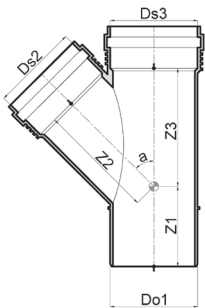
## SiTech+ Bend STB 67,5°

Diameter	Article code	Do1=Ds2	Z1	Z2
32	3067732	32	58	17
40	3067733	40	63	20
50	3067734	50	70	21
75	3067735	75	84	34
90	3067736	90	95	41
110	3067737	110	108	47
125	3067738	125	123	55

## SiTech+ Bend STB 87,5°



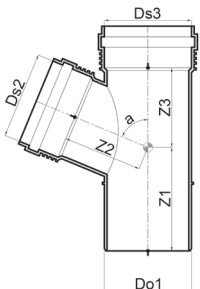
Diameter	Article code	Do1=Ds2	Z1	Z2
32	3067739	32	62	21
40	3067740	40	68	26
50	3067741	50	78	31
75	3067742	75	95	45
90	3067743	90	108	54
110	3067744	110	128	64
125	3067745	125	141	74
160	3067746	160	166	94



### SiTech+ Branch STEA 45°

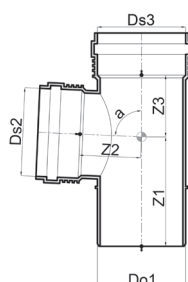
Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3
32x32	3067747	32	32	54	42	42
40x32	3067748	40	32	58	81	52
40x40	3067749	40	40	58	52	52
50x40	3067750	50	40	55	59	57
50x50	3067751	50	50	64	71	71
75x50	3067752	75	50	56	82	77
75x75	3067753	75	75	74	96	96
90x40	3076499	90	40	46	95	86
90x50	3067754	90	50	56	106	96
90x75	3067755	90	75	77	141	121
90x90	3067756	90	90	83	115	115
110x40	3076498	110	40	52	95	85
110x50	3067757	110	50	63	105	93
110x75	3067758	110	75	71	122	113
110x90	3067759	110	90	82	129	124
110x110	3067760	110	110	108	138	138
125x75	3067761	125	75	70	133	121
125x110	3067762	125	110	95	149	146
125x125	3067763	125	125	106	156	156
160x110	3067764	160	110	82	175	164
160x160	3067765	160	160	120	200	200

### SiTech+ Branch STEA 67,5°



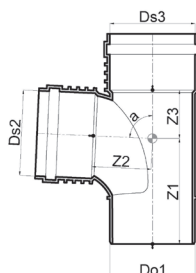
Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3
50x50	3067766	50	50	69	40	40
75x50	3067767	75	50	70	55	46
90x90	3067768	90	90	94	70	70
110x50	3067769	110	50	77	76	54
110x75	3067770	110	75	101	147	96
110x110	3067771	110	110	87	87	68

# Wavin SiTech+ Product range



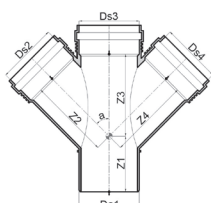
## SiTech+ Branch STEA 87,5°

Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3
40x40	3067772	40	40	69	28	28
50x40	3067773	50	40	71	33	28
50x50	3067774	50	50	82	35	36
75x50	3067775	75	50	82	45	35
75x75	3067776	75	75	95	49	49
90x50	3067777	90	50	87	53	36
110x50	3067778	110	50	96	63	37
110x75	3067779	110	75	135	66	52
125x110	3067780	125	110	133	77	71
125x125	3067781	125	125	141	80	79
160x110	3067782	160	110	165	103	103
160x160	3067783	160	160	165	111	101



## SiTech+ Branch STEA 87,5° Swept

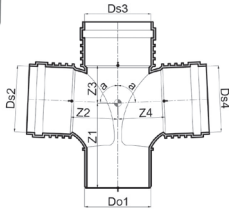
Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3
90x90	3067833	90	90	126	74	52
110x90	3067834	110	90	137	86	53
110x110	3067835	110	110	144	143	64



## SiTech+ Double Branch STDA

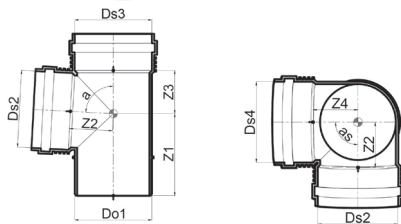
Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3
90x50x50	3074216	90	50	56	106	96
110x50x50	3074217	110	50	96	63	37





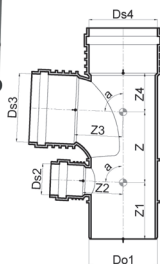
### SiTech+ Double Branch STDA 87,5°

Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3
75x50x50	3067832	75	50	80	45	35
90x90x90	3075996	90	90	125	125	55
110x110x110	3067838	110	110	144	143	64



### SiTech+ Corner Branch STED 87,5°

Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3
90x90x90	3075995	90	90	125	63	45
110x50x50	3067831	110	50	96	63	37
110x110x110	3074399	110	110	145	63	55



### SiTech+ Shower Branch 87,5°

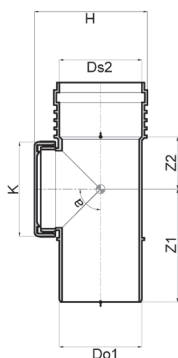
Diameter	Article code	Do1=Ds3	Ds2	Z	Z1	Z2	Z3	Z4
90x90x50	3071186	90	50	91	96	53	74	52
90x90x50 Left	3076751	90	50	91	96	53	74	52
90x90x50 Right	3076752	90	50	91	96	53	74	52
110x110x50	3071187	110	50	111	96	63	79	64
110x110x50 Left	3076749	110	50	111	96	63	79	64
110x110x50 Right	3076750	110	50	111	96	63	79	64



### SiTech+ Parallel Branch

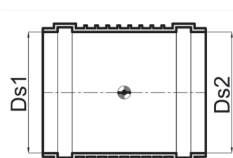
Diameter	Article code	Do1=Ds3	Ds2	Z1	Z2	Z3	E
110x110x110	3074400	110	110	110	30	140	133

# Wavin SiTech+ Product range



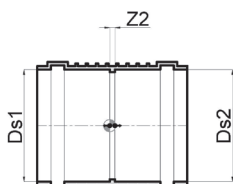
## SiTech+ Access pipe STRE

Diameter	Article code	Do1	Z1	Ds2	Z2	H	K
50	3067784	50	83	50	36	80	65
75	3067785	75	102	75	50	111	93
90	3067786	90	118	90	60	132	110
110	3067787	110	135	110	72	155	128
125	3067788	125	142	125	74	162	146
160	3074215	160	200	160	121	236	141



## SiTech+ Repair Coupler STU

Diameter	Article code	Do1=Ds2
40	3067790	40
50	3067791	50
75	3067792	75
90	3067793	90
110	3067794	110
125	3067795	125
160	3067796	160



## SiTech+ Double Socket Coupler STMM S/S

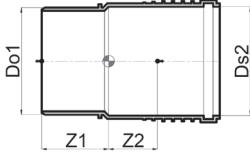
Diameter	Article code	Do1=Ds2
32	3067797	32
40	3067798	40
50	3067799	50
75	3067800	75
90	3067801	90
110	3067802	110
125	3067803	125
160	3067804	160



## SiTech+ Floorgully

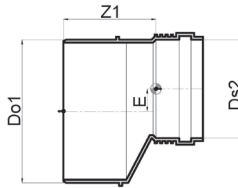
Diameter	Article code	Do1=Ds3	Ds2=Ds4	Ds3=Ds5
110/75/50	3086119 3086121*	110	75	50

\*Sparepart Bulkhead for Floorgully



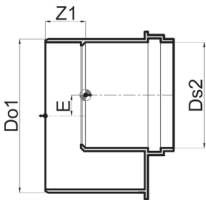
### SiTech+ Double Long Socket STLL

Diameter	Article code	Do1=Ds2	Z1	Z2
40	3074798	40	50	53
50	3074809	50	52	56
75	3074810	75	59	64
90	3085677	90	63	70
110	3067809	110	152	79
125	3074812	125	171	91
160	3074813	160	187	99



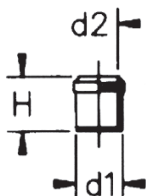
### SiTech+ Reducer STR TYPE A

Diameter	Article code	Do1	Ds2	Z1	E
40x32	3067812	40	32	60	3
50x32	3067813	50	32	66	9
50x40	3067814	50	40	63	5
75x50	3067815	75	50	77	12
110x50	3067816	110	50	106	27
110x75	3067817	110	75	98	17
125x110	3067818	125	110	98	7
160x110	3067819	160	110	121	24
160x125	3067820	160	125	117	16



### SiTech+ Reducer STR TYPE B

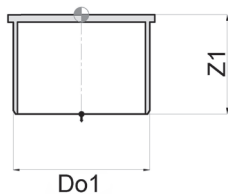
Diameter	Article code	Do1	Ds2	Z1	E
90x50	3067821	90	50	27	17
90x75	3067822	90	75	22	4
110x50	3076497	110	50	23	7
110x75	3076496	110	75	24	9
110x90	3067823	110	90	26	6



### SiTech+ PP Reducer

Diameter	Article code	Do1	Ds2	H
940x32	3072601	40	32	65
50x40	3080421	50	40	55

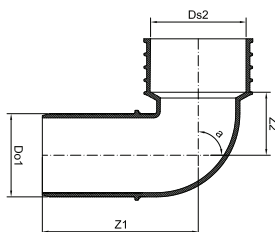
# Wavin SiTech+ Product range



## SiTech+ Endcap STM

Diameter	Article code	Do1	Z1
32	3080961	32	45
40	3067824	40	47,5
50	3067825	50	48,5
75	3067826	75	54,5
90	3067827	90	37,4
110	3067828	110	69,5
125	3067829	125	69
160	3067830	160	98,2

## SiTech+ Trap bend STSW



Diameter	Article code	Do1	Ds2	Z1	Z2
32/46	3067841	32	46	70	24
40/46	3078802	40	46	79	30
50/53	3078803	50	53	79	35
40/46 prolonged	3078804	40	46	125	30

## SiTech+ Trap coupler STS



Diameter	Article code	Do1	Ds2	Z1
32/46	3067843	32	46	52
40/46	3067844	40	46	54
50/53	3067845	50	53	55



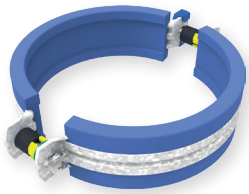
### Rubber for Traps

Diameter	Article code	Do1	Ds2
46 - 1"	4026398	46	1"
46 - 1¼"	4026399	46	1 1/4"
46 - 1" / 1¼"	4009859	46 1"	1 1/4"
46 - 1½"	4009860	46	1 1/2"
53 - 1" / 1¼"	4024657	53 1"	1 1/4"
53 - 1½"	4024658	53	1 1/2"



### Gasket

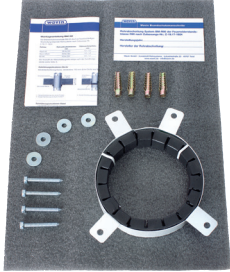
Diameter	Article code
32	4029792
40	4029793
50	4025545
75	4025784
90	4024428
110	4029796
125	4024430
160	4029798



### Wavin system bracket

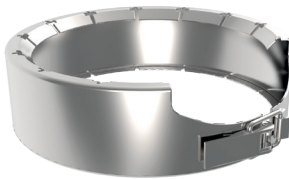
Diameter	Article code
32	4066447
40	4066448
50	4066449
75	4066450
90	4066451
110	4066452
125	4066453
160	4066454

# Wavin SiTech+ Product range



## Firecollar BM-R90

Diameter	Article code
32	4059802
40	4026101
50	4026102
63	4026103
75	4026104
90	4026105
110	4026106
125	4026107
140	4026108
160	4026109
180	4026110
200	4026111



## Wavin SiTech+ LKS-Clamp

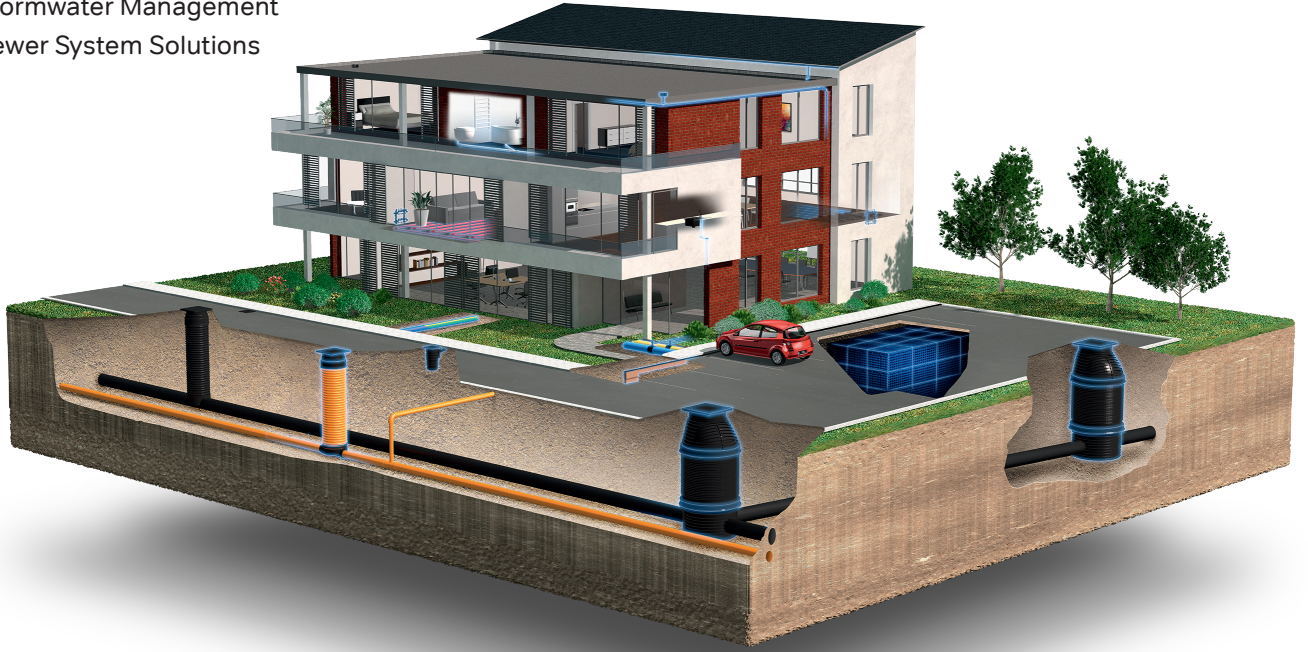
Diameter	Article code
32	4048918
40	4048917
50	4065138
70	4065139
90	4065140
110	4065141
125	4065142
160	4065143





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Wavin Middle East | Tiffany Tower no. 2408W Cluster JLT Dubai / United Arab Emirates  
Tel: +97 14 276 6968 | E-mail: [wavin.me@wavin.com](mailto:wavin.me@wavin.com) | <https://wavin.com/en-ae>

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