

Specialist Drainage Systems

dB*lue* Acoustic Soil & Waste System

Specification manual
2013

Drainage is ever more called upon to go beyond basic waste water disposal. Vertical living and increased living standards have made acoustic comfort increasingly more important. It requires a solution beyond what has been traditionally available.

This is specialist drainage.

In this Specification Manual you will find the complete dBlue Acoustic Soil & Waste product range. It is the latest addition to the Akatherm range of Specialist Drainage Systems.

The Akatherm dBlue system is made from a state-of-the-art combination of plastic and sound absorbing mineral filler (PP-MD) to maximise absorbance of sound. It offers a unique combination of acoustic performance, weight, resistance and mechanical strength.

In addition to pipes, fittings, connection fittings, transition fittings and traps, you will find all required information on acoustic performance, planning and design, installation, bracketing and relevant standards and approvals.

This manual also comprises substantial technical details of the material properties and chemical resistance of the Akatherm dBlue system. It will assist you with the application, design and installation.

Enjoy Silence with the Akatherm dBlue Acoustic Soil & Waste System.



Applicability

This Specification Manual is applicable for Australia and New Zealand.

Validity

This Specification Manual 2013 is valid from November 2013. With the appearance of this manual previous manuals are no longer valid. The actual technical documentation can be downloaded at www.akatherm.com.

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This Specification Manual is produced with extreme care. All measurements and weights are approximate and errors and changes reserved. Akatherm BV does not accept any liability for damage caused by not or incorrect mentioned data in this manual.

Important information and pictograms

This manual contains pictograms to emphasize important or beneficial information.

 Important information to take into account

 Consult Akatherm dBlue sales office

 Benefit

Disclaimer

Follow all applicable national and international assembly, installation, accident prevention, safety regulations and the information in this technical manual during the installation of drainage systems.

Also follow the applicable laws, standards, guidelines, regulations and instructions for environmental protection, professional associations and the local utility companies.

Applications not covered in this specification manual (special applications) require consultation with our technical department. For specific advice consult the Akatherm dBlue sales office.

The planning and installation instructions are directly related to the respective Akatherm dBlue products. The reference to standards or regulations is on a general level. Be aware of the current status of guidelines, standards and regulations. Other standards, regulations and guidelines regarding the planning, installation and operation of drainage or building systems need to be taken into account also and are not part of this specification manual.

Safety and operating instructions

- Completely read the safety and operating instructions for your own safety and the safety of others before the start of installation
- Store these instructions and keep them available
- If the safety instructions or installation instructions are unclear please contact the Akatherm dBlue sales office

General precautions

- Keep your work area clean and free of obstructing objects
- Provide adequate lighting of your work area
- Keep unauthorized persons away of tools and the work area, especially at renovations in inhabited areas
- Use only Akatherm dBlue system components. The use of non-system components can lead to leakage or other problems

During assembly

- Always read and follow the operating instructions of the used tool
- Improper use of tools can cause severe cuts, bruising or dismemberment
- Improper use of tools can damage components and cause leaks
- Pipe cutters have a sharp blade. Store and handle without risk of injury
- Note the safety distance between your hand and cutting tool when cutting the pipes
- Never grip the cutting zone of the tool or moving parts during the cutting process

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1 System information

1.1 Intended use

Akatherm dBlue is an innovative noise-attenuated soil & waste drainage system designed to be installed in accordance with AS/NZS 3500.2. It is suitable for use in multi-occupancy applications as well as hospitals and hotels and other commercial applications, where reduced noise levels are preferred.

Akatherm dBlue is available in nominal diameters DN40 to DN160 with a full range of socketed pipes, a comprehensive range of fittings including brackets, transition adaptors as well as the Akavent high-rise solution for single stack downpipes.



The system has the following features:

- Complete rubber ring joint system with excellent sound-insulation properties
- Made from a state-of-the-art combination of polypropylene and sound absorbing mineral filler (PP-MD) for air-borne noise reduction
- A triple layer pipe which is rigid, noise-attenuated with a smooth bore that resists incrustation and blockages
- Dedicated dBlue brackets with rubber lining dampen vibrations and reduce structure-borne noise
- Fast and easy installation without special equipment
- Robust fittings that resist onsite and transit damage
- Installation inside the building and embedded in concrete (wrapped connections)
- Akavent high-rise solution for single stack downpipes
- Green system which is 100% recyclable



Illustration 1.1

1.2 Applications

Akatherm dBlue is designed to be installed in accordance with AS/NZS 3500.2. Akatherm dBlue meets the requirements of the Building Code of Australia (BCA) for use in residential and commercial buildings.

Residential buildings

Its excellent sound insulation properties result in a high noise reduction without lagging and is an ideal and cost effective alternative for insulated PVC in single and multi-occupancy buildings whilst meeting BCA requirements.

Commercial buildings

Akatherm dBlue is an innovative and professional soil & waste drainage system and its many distinct features and high quality make it suited for a wide range of commercial application like:

- Hotels, spas, luxury resorts
- Multi occupancy buildings
- High-rise buildings
- Multi-storey buildings
- Concert halls, museums and cinemas
- Hospitals
- Office buildings
- Professional kitchens

Akatherm dBlue is designed for noise reduction and allows you to enjoy urban living with increased living standards.

Application parameters

The pipes, fittings and seals can be operated continuously at 90°C and up to 95°C for brief periods. They are suitable for the drainage of chemically aggressive waste water with a pH value of 2 (acidic) to 12 (basic).

Behaviour in fire corresponds to B2 normal combustibility according to DIN 4102 and E according to EN 13501-1.

Akatherm dBlue is suited for installation down to -10°C.

For installations in applications not listed in this manual or with chemicals not listed in the appendix of this manual please contact your local office for further advice.

Where not to use

Although Akatherm dBlue is very versatile, it is not a true chemical drainage system and is not recommended for industrial chemical drainage and laboratory drainage.

The preferred solution for these applications is a homogenous welded PE or PP system using butt-welding and electrofusion technology like Akatherm HDPE.

1.3 Triple-layer pipe

The triple-layer pipe structure is produced using the latest co-extrusion technology. Each layer has its own function optimised to reduce sound levels, increase mechanical characteristics and improve the drainage flow.

The grey inner layer improves the drainage flow with a low friction smooth surface that is abrasion resistant and resistant to high temperatures. The middle layer is mineral filled and provides the pipe its excellent air borne noise absorption as well as a high pipe stiffness. The outer layer is impact resistant, has increased UV-resistance and allows installation down to -10°C.

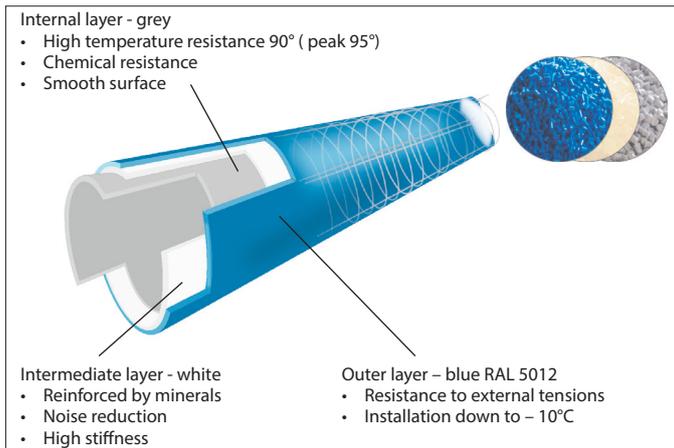


Illustration 1.2

Combined the three layers provide the dBlue system with a pipe suited for a wide range of applications.

One end of each pipe has an integrated socket with rubber ring whilst the other side has a chamfered end which makes the pipe ready to install.

1.4 Uniform fittings

The dBlue fittings have been designed for noise reduction and have many on-site benefits. All fittings are injection moulded (exceptions noted) from PP-MD in a uniform single layer. This provides the fittings with their excellent sound-insulation properties and a constant production quality. The fittings have a mat surface finish and the snap cap rubber ring containment make it a robust fitting.

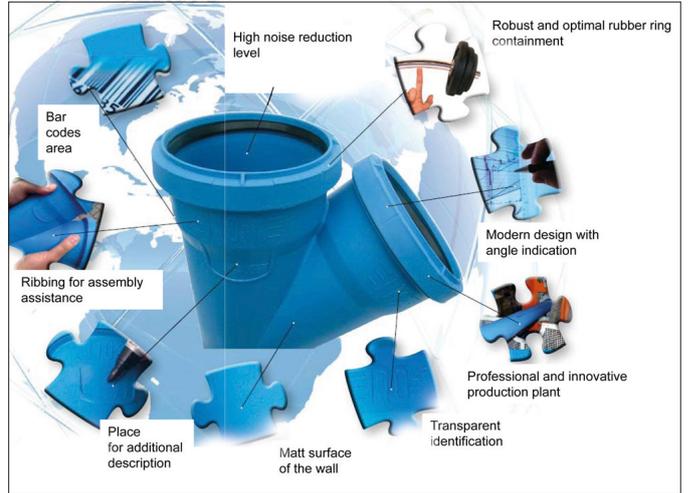


Illustration 1.3

+ Installation and inspection friendly

The snap cap contains an angle indication for correct positioning. The fitting body has a dedicated area where the installer can mark its position during pre-fabrication. The marking on the fitting is large and highly visible during inspection.

1.5 Acoustic brackets

dBlue acoustic brackets support the system and contain a rubber lining to dampen the structure-borne noise vibrations.

The bracket is a single solution for guide and anchor points in the installation. Use the provided spacers to create a guide bracket in open position. Without spacers the quick close mechanism fully tightens the bracket around the pipe to create a fixed point.

The bracket is installed to the building with a M10 connection nut firmly welded to the bracket.

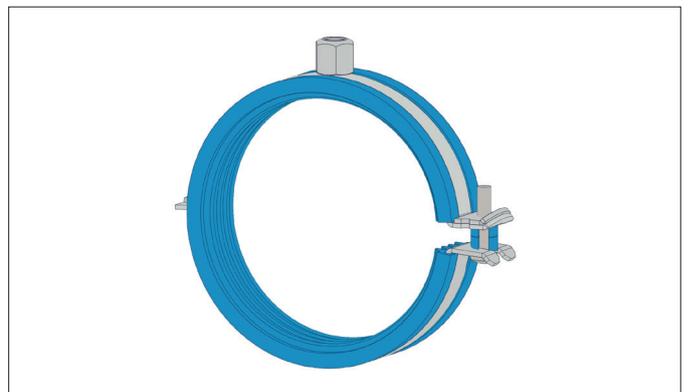


Illustration 1.4

1.6 Sound insulation

Increased living standards and vertical living have shaped modern installation regulations of drainage systems. In modern urban life noise is around us all the time and this requires proven sound reduction results in each building aspect.

The Australian "Deemed-to-Satisfy Provisions" for sound insulation rating of services are outlined in NCC/BCA Volume One Part F5 paragraph F5.6:

"F5.6 Sound insulation rating of services

If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ not less than:

- I 40 if the adjacent room is a habitable room (other than a kitchen); or
- II 25 if the adjacent room is a kitchen or non-habitable room."

Traditional installation systems don't offer enough acoustic performance and additional lagging is labour intensive.

+ Akatherm dBlue has been independently tested and meets the requirements without additional lagging.

1.7 Packaging, transport and storage

Packaging

Pipes up to 500 mm and fittings are packed in cardboard boxes. Where required, supplementary items in the cardboard boxes will be packed in a plastic bag.

Pipes longer than 500 mm are packed on wooden pallets and fastened with straps.

+ For optimal storage each pallet has additional support spacers (combs) installed to avoid shape deviation of the pipes. Two combs are installed for pipe lengths between 1 and 2 m, and three combs for 3 m long pipes.

The pipes are packed socket end next to spigot end for the proper shape retention.

+ All pallets are wrapped with UV resistant white plastic stretch film, shielding the pipes from UV radiation, dirt, dust and (light) rain.

Transport

Pipes and fittings still packed in their original packaging (cardboard box or pallet) must be secured against movement and deflection.

Individual lengths of pipe transported loose should be transported 'side by side'; socket end next to spigot end for proper shape retention. The pipes must be firmly supported over the entire length and secured from movement and defect.

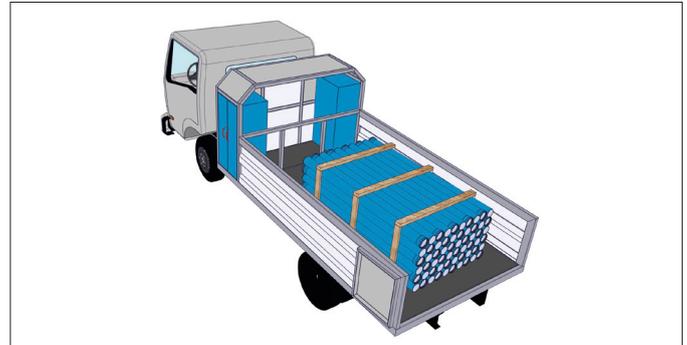


Illustration 1.5

During the transportation of pipes and fittings exposure to rain and snow should be limited.

Storage

Pipes should be stored in their original lengths in stacks on a flat and clean area. Ensure that the wood frames are aligned squarely when stacking. The first level of the stack should always be laying on the wooden blocks of the pallets.

The maximum safe height of the stack shouldn't exceed 2,5 m.

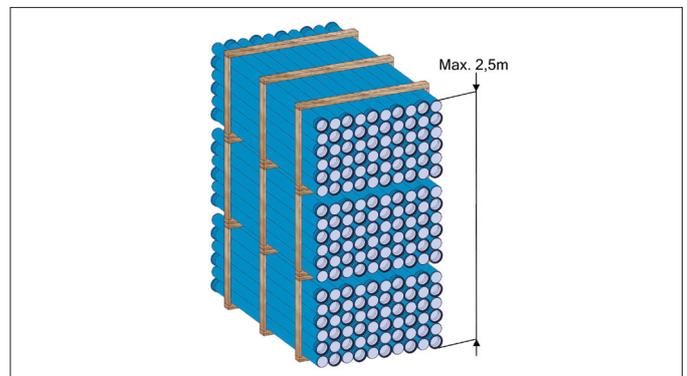


Illustration 1.6

Outside storage of pipe crates is possible when the following guidelines are followed:

- Pipes are protected from direct sunlight (with proper ventilation)
- Storage up to 12 months is possible when the pipes are kept packaged in the original UV resistance stretch foil
- Storage up to 6 months is possible when the pipes are not protected by the original UV resistance stretch film
- Storage temperature should not exceed 60°C

Pipes which have been exposed to UV radiation over a longer period of time can fade in colour. It has no negative effect on the pipe's structure and mechanical resistance.

Store pipes in such a manner that no objects are placed on top of the sockets and spigot ends to ensure that these are not deformed.

Fittings should be kept in their original packaging in a dry covered area and be protected against moisture, dirt, solids and UV radiation.

1.8 Marking

dBlue pipes and fittings are marked with:

- Manufacturer's mark or brand
- Material type
- Nominal diameter
- Area of application
- Conformity of dimensions
- Resistance to low temperatures
- Fire resistance class
- Approvals information
- Information on recycling
- Production year

- Production month and day (pipe only)
- Wall thickness (pipe only)
- Time, shift number and production line number (pipe only)

- EAN barcode (fittings only)
- Angle indication (fittings only)

1.9 Recycling

dBlue pipes and fittings are 100% recyclable.

Left over dBlue materials should be recycled as following:

- Remainder pipe : residual waste
- Remainder fittings : residual waste
- Lubrication : residual waste
- Cleaning cloths : residual waste

- Wood crating : recycled wood
- Plastic spacers : residual waste

- Carton boxes : recycled paper



Illustration 1.7

2 System and material properties

The Akatherm dBlue system is made from a state-of-the-art combination of plastic and sound absorbing mineral filler (PP-MD). The material formula is developed by the Aliaxis R&D laboratory and offers a unique combination of acoustic performance, weight, resistance and mechanical strength. The triple-layer pipe structure is produced using latest co-extrusion technology. Each layer has its own function optimised to reduce sound levels, increase mechanical characteristics and improve the drainage flow.

2.1 Technical specifications

Property	Value
Material	PP-MD mineral-reinforced (pipes and fittings)
Size range	DN40 to DN160
Wall thickness	DN40-50 -> 1,8 mm, DN75 -> 2,3 mm DN90 -> 2,8 mm, DN110 -> 3,4 mm DN125 -> 3,9 mm, DN160 -> 4,9 mm
Area of application	Drainage pipes in buildings and above ground installation
Chemical resistance	Polypropylene basis No waste water containing benzene Seals made of SBR
Application	Waste water with pH value 2 - 12 Waste water temperature up to 90°C (continuous load) and 95°C for brief periods
Density	External layer: 1,2 g/cm ³ Internal layer: 1,4 g/cm ³
Coefficient of thermal expansion	0,10 mm/mK
Ring stiffness	> 4 kN/m ²
Colour	Internal layer: light grey (RAL7040) Middle layer: cream white (natural without any dye) External layer: blue (RAL5012)
Structure	Triple-layer pipe Uniform fitting
Connection	Rubber ring joint socket with factory-installed lip sealing ring
Fire behaviour	B2 (normally inflammable) DIN 4102-1 E (normally inflammable) EN 13501-1
System compatibility	Adaptors from PVC system and copper are available
Standards and approvals	System tested according to AS/NZS 7671 Watermark WMK25729
Sound insulation	Fullfils BCA/NCC requirement of $R_w + C_{tr}$ 40 for habitable rooms Tested to ISO 140 methodology. Sound insulation performance rated according to ISO 717
Independent monitoring	Süddeutsches Kunststoffzentrum (SKZ), Germany

Table 2.1

2.2 Properties and benefits

	Properties dBlue	Benefits
	Combined plastics and minerals	High degree of noise reduction
	Impact-resistant and tough	Unbreakable temperatures > 5°C
	Thermal resistant	Application possible between -10°C and 95°C
	Smooth internal wall	Low blockage risk due to low deposit/residue effects
	Wear resistant	Lower costs due to relatively long life
	Chemical resistant	Suitable for transport of polluted waste water
	Poor heat conductivity	No condensation during short periods of cooling
	Recyclable	Environmentally friendly
	Insulating	Non-conductive
	Light in weight	Cost-saving in transport and handling

Table 2.2

2.3 Chemical resistance

The current state of knowledge about chemical resistance of plastics is based on long-lasting laboratory tests and practical experience. The following evaluation can be an initial indicator of the possibilities of Akatherm dBlue application for fluid transportation including transport at elevated temperatures. dBlue pipes and fittings and rubber gaskets are meant for transporting waste water ranging from acids (pH 2) to alkalis (pH 12) present in households. In case of industrial waste water, its chemical composition and concentration should be analyzed. The table covers a set of chemicals and determination of Akatherm dBlue chemical resistance. The following evaluation criteria were adopted:

Used symbols:

+	Resistant; in general Akatherm dBlue is a suitable material for this application
/	Limited resistance; further research necessary
-	No resistance
Empty field	No data available

Abbreviations:

Sat. sol	Saturated aqueous solution; prepared at 20°C
Sol	Aqueous solution at a concentration higher than 10% but not saturated

Component	Concentration	Temperature		
		20°C	60°C	100°C
Acetic acid	Up to 40%	+	+	
Acetic acid	50%	+	+	/
Acetic acid, glacial	>96%	+	/	-
Acetic anhydride	100%	+		
Acetone	100%	+	+	
Acrylonitrile	100%	+		
Allyl alcohol	100%	+	+	
Ammonia, aqueous	Sat. sol	+	+	
Ammonia, dry gas	100%	+		
Ammonia, liquid	100%	+		
Ammonium acetate	Sat. sol	+	+	
Ammonium chloride	Sat. sol	+	+	
Ammonium nitrate	Sat. sol	+	+	+
Ammonium sulphate	Sat. sol	+	+	+
Aniline	100%	+	+	
Beer		+	+	
Benzene	100%	/	-	-
Benzoic acid	Sat. sol	+	+	
Borax	Sol	+	+	
Boric acid	Sat. sol	+		
Bromine, liquid	100%	-	-	-
Butane, gas	100%	+		
Butanol	100%	+	/	/
Butyl acetate	100%	/	-	-
Calcium carbonate	Sat. sol	+	+	+
Calcium nitrate	Sat. sol	+	+	
Carbon dioxide, dry gas		+	+	
Chlorine, dry gas	100%	-	-	-
Chlorine, liquid	100%	-	-	-
Chloroform	100%	/	-	-
Chlorosulphonic acid	100%	-	-	-
Chromic acid	Up to 40%	+	/	-
Citric acid	Sat. sol	+	+	+
Copper (II) chloride	Sat. sol	+	+	
Cyclohexanone	100%	/	-	-

System and material properties

dBlue Acoustic Soil & Waste System

Chemical or Product	Concentration	Temperature		
		20°C	60°C	100°C
Dextrin	Sol	+	+	
Dichloroethylene (A and B)	100%	/		
Dichloromethane	100%	/	-	
Ethanolamine	100%	+		
Ethyl alcohol	Up to 95%	+	+	+
Ethyl ether	100%	+	/	
Ethylene glycol	100%	+	+	+
Formaldehyde	40%	+		
Formic acid	10%	+	+	/
Gasoline, petrol (aliphatic hydrocarbons)		-	-	-
Glycerine	100%	+	+	+
Glycolic acid	30%	+		
Hexane	100%	+	/	
Hydrochloric acid	Up to 20%	+	+	+
Hydrochloric acid	30%	+	/	/
Hydrogen peroxide	Up to 30%	+	/	
Hydrogen sulphide, dry gas	100%	+	+	
/actic acid	Up to 90%	+	+	
Magnesium chloride	Sat. sol	+	+	
Magnesium sulphate	Sat. sol	+	+	
Milk		+	+	+
Monochloroacetic acid	>85%	+	+	
Nitric acid	Up to 30%	+	-	-
Nitric acid	From 40 to 50%	/	-	-
Oleic acid	100%	+	/	
Oleum (sulphuric acid with 60% of +o3)		+	/	
Oxalic acid	Sat. sol	+	/	-
Oxygen, gas		+		
Phenol	90%	+		
Potassium bromate	Up to 10%	+	+	
Potassium chlorate	Sat. sol	+	+	
Potassium chromate	Sat. sol	+	+	
Potassium cyanide	Sol	+		
Potassium dichromate	Sat. sol	+	+	+
Potassium ferricyanide	Sat. sol	+	+	
Potassium hydroxide	Up to 50%	+	+	+
Potassium nitrate	Sat. sol	+	+	
Potassium permanganate	(2 N) 30%	+		
Propane, gas	100%	+		
Pyridine	100%	/		
+eawater		+	+	+
+odium chlorate	Sat. sol	+	+	
+odium hydroxide	From 10 to 60%	+	+	+
+odium hypochlorite	From 10 to 15%	+		
+odium sulphite	40%	+	+	+
+ulphuric acid	Up to 10%	+	+	+
+ulphuric dioxide, dry or wet	100%	+	+	
Tartaric acid	Sat. sol	+	+	
Tin (IV) chloride	Sol	+	+	
Tin (II) chloride	Sat. sol	+	+	
Toluene	100%	/	-	-
Trichloroethylene	100%	-	-	-
Urea	Sat. sol	+	+	
Vinegar		+	+	
Wines		+	+	
Xylene	100%	-	-	-

Table 2.3

3 Sound insulation

3.1 Noise in a soil & waste system

Noise is all around us all the time. In modern urbanised life there are few places left to enjoy the comfort of silence. In many building constructions like multi-storey apartment blocks, hospitals or luxurious spas, the sound of the sanitary and drainage systems have become a significant source of noise. Modern standards require the noise to stay within acceptable limits for everyday use.

Every object in motion makes noise transmitting its vibrations to the surrounding air as pressure waves. There are two types of noise in soil and waste systems:

Air-borne noise

This is sound that travels through the air from its source. The source causes the air to vibrate. Air-borne noise can pass through structures and is reduced by using absorbent materials.

Structure-borne noise

This is sound that first occurs through a solid structure generated from a vibrating source or impact event. The vibrations pass through the structure and reach the human ear as air-borne noise at different locations within the building. The building structure acts as an acoustic bridge. Structure-borne noise is reduced by using soft material to acoustically uncouple the vibrating source or impact event.



Illustration 3.1

3.2 Sound insulation requirements

The Australian “Deemed-to-Satisfy Provisions” for sound insulation rating of services are outlined in NCC/BCA Volume One Part F5 paragraph F5.6:

“F5.6 Sound insulation rating of services

If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ not less than:

- I 40 if the adjacent room is a habitable room (other than a kitchen); or
- II 25 if the adjacent room is a kitchen or non-habitable room.”

R_w stands for a weighted sound reduction index and is a single-number quantity sound insulation rating. It basically indicates the effectiveness of a system as noise insulator. A higher number is a better performance.

C_{tr} is a spectrum adaption term introduced to take into account a lower frequency range. C_{tr} is always a negative number which will lower the weighted sound reduction index of R_w .

The index values are in decibels (dB) and A-weighted (dBA) in effort to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies.

3.3 Sound reduction with Akatherm dBlue

Noise in a soil & waste system is caused by waste water flowing inside a drainage pipe system. The waste water is turbulent and causes noise as well as vibrations in the pipe structure.

The vibrations are emitted directly from the pipe surface as air-borne noise and as structure-borne noise to the wall through the fixing system. Akatherm dBlue has been designed to reduce both air-borne and structure-borne noise.

How Akatherm dBlue reduces air-borne noise

Air-borne is reduced using absorbent materials. The plastic PP-MD used for Akatherm dBlue is a special formula adding sound-dampening mineral fillers with increased weight to maximise the absorbance of air-borne sound waves. The triple layer pipe and rubber ring joints further reduce acoustic vibration in the system.

How Akatherm dBlue reduces structure-borne noise

Structure-borne noise is reduced by using soft material to acoustically uncouple the vibrating source or impact event. The dBlue acoustic bracket has a special rubber lining designed to best uncouple any vibrations from the pipe system.

The combination of all these features is what makes Akatherm dBlue a system that takes reduction of soil & waste noise to the next level.

Non-system specific installation practice will also benefit a lower noise level, like to install the pipe systems to the heaviest wall and to properly insulate a pipe section passing through building slabs and other structural barriers.

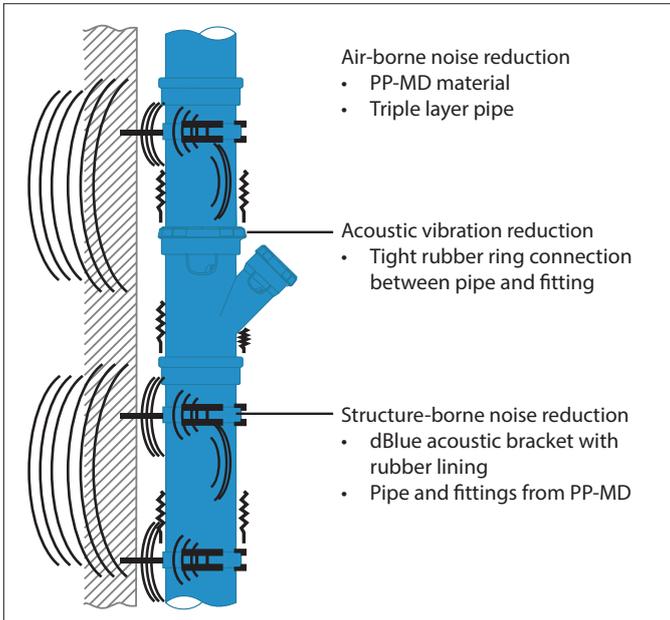


Illustration 3.2

3.4 Acoustic testing

The National Construction Code (NCC) comprises the Building Code of Australia (BCA). BCA Volume One Part F5.6 outlines the requirements for sound insulation.

“If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ not less than:

- I 40 if the adjacent room is a habitable room (other than a kitchen); or
- II 25 if the adjacent room is a kitchen or non-habitable room.”

Akatherm dBlue has been independently tested by the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and meets the required $R_w + C_{tr}$ 25 and 40 benchmarks without the need for lagging.

CSIRO is Australia’s national science agency, and is one of the largest and most diverse scientific institutions in the world with more than 50 sites throughout Australia and overseas.

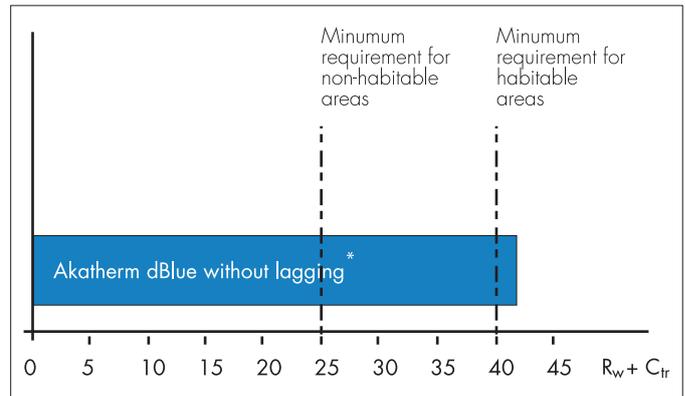


Illustration 3.3

* $R_w + C_{tr}$ 40 results are extrapolated based on the $R_w + C_{tr}$ 25 results.

- +** No acoustic lagging required
- Akatherm dBlue does not require additional acoustic lagging, offering many significant advantages:
 - No lagging material required
 - No lagging installation time
 - Less scheduling of companies
 - Consistent acoustic results during installation lifetime
 - No unverified lagging materials
 - Faster and easier inspection
 - Faster and easier maintenance

4 Planning and design

4.1 Relevant standards

Akatherm dBlue is designed for drainage systems inside the building. The planning and design shall comply to:

- AS/NZS 3500.2 Plumbing and drainage
Sanitary plumbing and drainage
- AS/NZS 7671 Plastics piping systems for soil & waste discharge (low and high temperature) inside buildings.

Additionally planning, design, installation and commissioning shall comply to the guidelines as specified in this manual.

Approvals

Akatherm dBlue is certificated under Watermark:

- AS/NZS 7671 WMK25729

The certifications include all pipe and fittings from size DN40 to DN160.

Acoustic performance

Acoustic performance shall meet the requirements as described in the Australian 'Deemed-to-Satisfy Provisions' for sound insulation rating of services is outlined in NCC/BCA Volume One Part F5 paragraph F5.6:

"F5.6 Sound insulation rating of services

If a duct, soil, waste or water supply pipe, including a duct or pipe that is located in a wall or floor cavity, serves or passes through more than one sole-occupancy unit, the duct or pipe must be separated from the rooms of any sole-occupancy unit by construction with an $R_w + C_{tr}$ not less than:

- I. 40 if the adjacent room is a habitable room (other than a kitchen); or
- II. 25 if the adjacent room is a kitchen or non-habitable room."

$R_w + C_{tr}$ shall have the required value rated in accordance to ISO 717 measured according to ISO 140.

Fire rating

Akatherm dBlue has fire behaviour class B2 (normally inflammable) according to DIN 4102-1 and class E (normally inflammable) according to EN 13501-1. When Akatherm dBlue passes through fire-rated building elements it is mandatory to install fire protection collars that will not reduce the fire-rating of these building elements.

The Akatherm dBlue system dimensions can be installed in combination with a range of fire protection collars. The installed system needs to be in accordance with AS 1530.4. Details available upon request.



Illustration 4.1

4.2 Ceiling penetrations

Each duct in a construction barrier must be constructed with a sleeve made of material that ensures acoustic insulation and prevents against moisture. Proper acoustic insulation will prevent an acoustic bridge through contact noise.

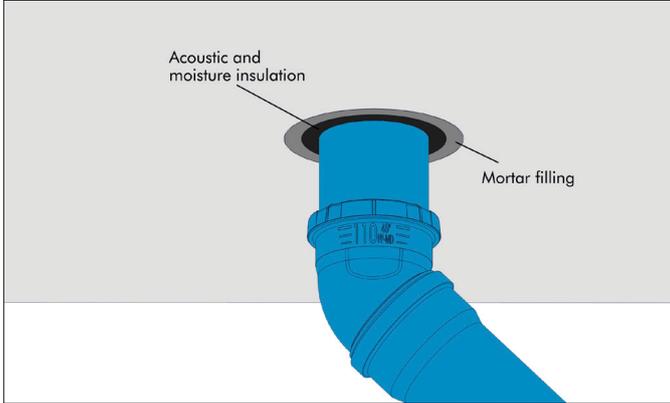


Illustration 4.2

Appropriate protective measures need to be taken when the pipe system can come into contact with hot floor coverings like mastic asphalt.

! Fire-protection may be required when the pipe system passes through fire-rated building elements.

4.3 Transition from downpipe to collector pipe

At the bottom of the vertical stack the waste water will be at its highest volume and speed. At this point the transition to horizontal must be designed using 2 x 45° fittings with a 250 mm dBlue pipe in between. This will prevent unwanted pressure spikes by allowing air to move freely in the pipe system. Furthermore a gradual transition will decrease the noise level.

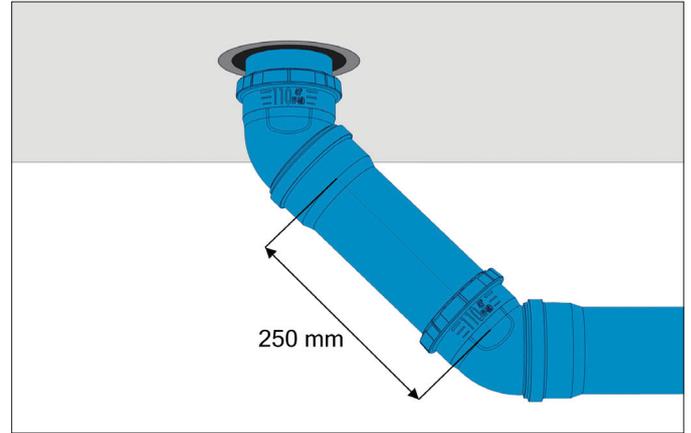


Illustration 4.3

dBlue acoustic brackets should be installed behind each socket to maximise fixation at the bottom of the stack and absorbing vibrational energy (=noise). To minimise the distance from the collector pipe to the ceiling the top elbow can be embedded in the ceiling.

4.4 Horizontal change of direction

Ensure gradual horizontal transitions are made using two 45° elbows (or swept bend) to decrease noise levels compared to the use of a 90° elbow.

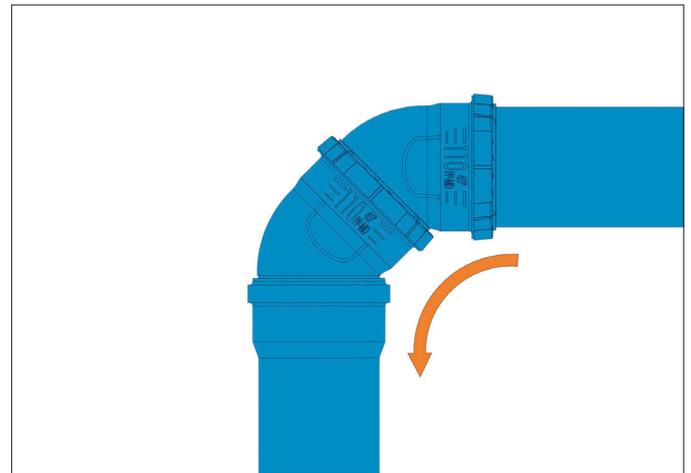


Illustration 4.4

4.5 Transitions to other materials

4.5.1 PVC system

PVC systems are manufactured according to AS/NZS 1260 and have different pipe sizes from Akatherm dBlue below DN110. Refer to the table below for PVC and dBlue pipe sizes.

PVC		Akatherm dBlue	
DN	OD (mm)	DN	OD (mm)
40	43	40	40
50	56	50	50
65	69	75	75
80	82	90	90
100	110	110	110
-	-	125	125
150	160	160	160

Table 4.1

Connections to and from PVC systems with non-compatible diameters are possible using PVC adaptor fittings from the Akatherm dBlue range. The adaptor fitting can be connected to the PVC system using solvent cement and inserted into a dBlue socket using lubricant.

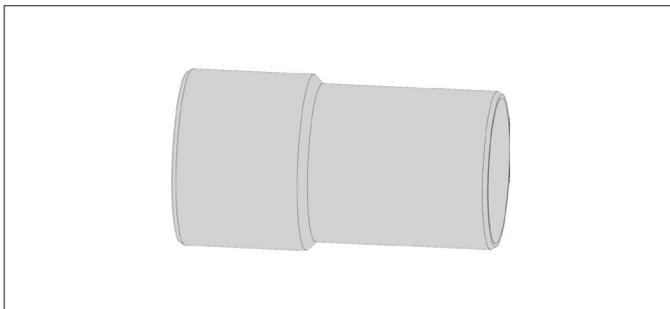


Illustration 4.5

For pipe sizes d110 mm and 160 mm no adaptor fitting is required since both systems have identical outer diameters. The PVC pipe can simply be inserted into the dBlue socket using lubricant.

One transition requires the use of an additional dBlue eccentric reducer.

From PVC DN	To dBlue DN	PVC adaptor OD (mm)	Reducer OD (mm)
40	40	43/40	
40	50	43/40	
50	50	56/50	
65	75	69/75	
65	90	69/75	75/90
65	110	69/110	
80	90	82/90	
80	110	82/110	

Table 4.2

The connection from Akatherm dBlue DN50 to PVC DN50 can be made using the PVC adaptor 56/50 in combination with dBlue double socket 50 mm.

4.5.2 Plumbing fixture drainage fittings

Connections from plumbing fixture drainage fittings are typically installed with copper pipe. Copper is manufactured according to AS 1432 and has different pipe sizes from Akatherm dBlue. Refer to the table below for copper and dBlue pipe sizes.

Copper		Akatherm dBlue	
DN	OD (mm)	DN	OD (mm)
32	31,8	-	-
40	38,1	40	40
50	50,8	50	50

Table 4.3

Connections from copper pipe to Akatherm dBlue are possible using adaptor fittings with rubber nipple from the Akatherm dBlue range. The copper pipe is inserted into the rubber nipple, the fitting can be connected inserted into a dBlue socket using lubricant.

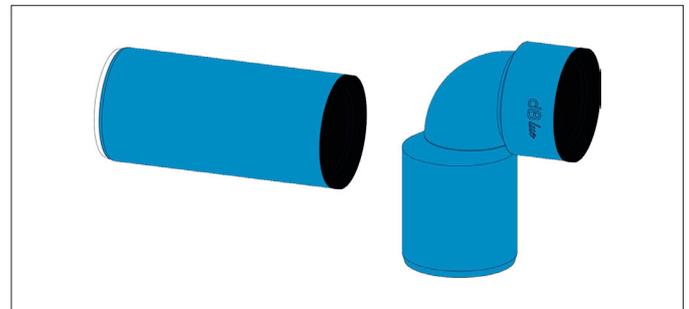


Illustration 4.6

Akatherm dBlue has a straight connection socket and a connection bend. Refer to the table below for the possible transitions available both straight and as a bend.

From copper DN	To dBlue DN	Rubber nipple/spigot OD (mm)
32	40	31,8/40
32	50	31,8/50
40	40	38,1/40
40	50	38,1/50

Table 4.4

4.5.3 Cast iron and other materials

For connections from and to cast iron or other drainage pipe materials it's advised to use flexible rubber sleeve adaptors with stainless steel worm-gear clamps.

The rubber sleeve adaptor should have the same temperature and chemical resistance as the Akatherm dBlue system.

Check the rubber sleeve manufactures guidelines for correct installation and material specifications.

4.6 Akavent high-rise design

4.6.1 Working principle

The Akavent aerator eliminates the requirement of a vent stack by keeping the air pressure in a single stack system within acceptable limits.

+ Eliminating the vent stack creates more usable room in the building and extra space for other installations. Furthermore the Akavent aerator increases the overall flow capacity of the stack, has less installation costs and allows multiple connection per floor.



Illustration 4.7

The air pressure inside a single stack system is kept within acceptable limits by preventing the formation of hydraulic plugs. The fitting prevents hydraulic plugs by breaking the fall on each floor and reducing the speed of the soil & waste flow. Its unique shape smoothly converges the flow of each floor whilst maintaining free movement of air within the downpipe.

The Akavent aerator for Akatherm dBlue is available in diameter 110 mm and 160 mm.

4.6.2 Relevant standard

The Akavent system should be designed according to AS/NZS 3500.2 section 9a: Reduced velocity Aerator stack system.

The Akavent system design information includes (but is not limited to):

- Do not reduce in size
- Maximum 5 x DN100 combined vents
- Use relief lines when offsetting the stack

This manual covers basic design information. Detailed design and calculation information is available in separate documentation.

4.6.3 Akavent system design

System elements

The Akavent system is installed without an additional vent pipe. The system consist of the following elements:

- Akavent aerator on every floor
- Akavent wrapped in sound-insulating material
- Downpipe of dBlue pipe and fittings
- A vent pipe into the atmosphere without reduction in diameter
- A vent pipe at the ground floor transition to the collector pipe

Maximum distance between Akavents

The maximum vertical distance between two Akavents is 5 m. A double offset using 4 x 45° elbows must be used when this distance is exceeded.

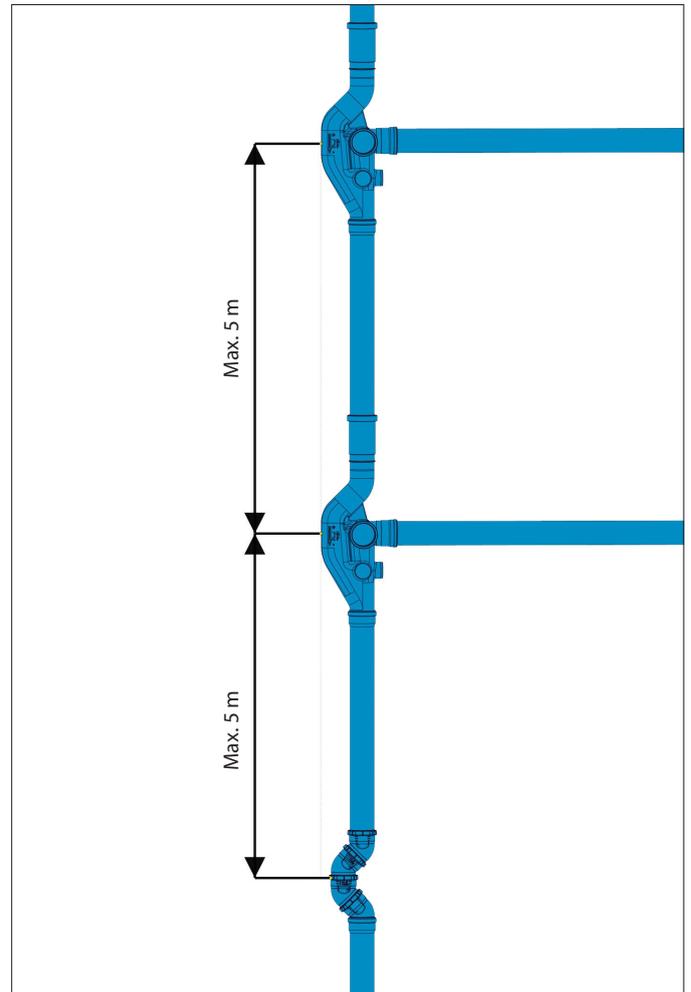


Illustration 4.8

Connecting to the Akavent

The Akavent will be available on site with all project specific connections pre-installed. Specify configuration when ordering.

The expansion socket at the top is used to insert the pipe coming from the higher floor. The bottom of the Akavent will insert into the socket of the dBlue pipe or fitting continuing down.

Floor connections can be installed into laterally placed push-fit sockets DN110 and DN75. The Akavent has three sockets available per diameter.

! Opposite lateral connections of the same diameter are not permitted.

Further important points of attention during installation can be found in the installation chapter of this manual.

Check the relevant standard for maximum length of floor drainage pipe work allowed to connect before an additional vent solution is required.

Further design instructions are available in separate documentation and include:

- Deflection of the downpipe
- First floor vent design
- Venting the Akavent downpipe into atmosphere
- Zone division of multiple downpipes

4.7 Embedding Akatherm dBlue in concrete

The Akatherm dBlue system is suited to be embedded in concrete. Certain precautions need to be taken during design and installation.

Expansion and contraction compensation

Because Akatherm dBlue and hardened concrete do not adhere, the pipe system embedded in concrete can move freely when expanding under influence of temperature changes. All fittings installed in the pipe system act as an anchor point and are subjected to the expansion force. Make sure to allow for enough expansion joints when designing the pipe system.

Pressure and heat during pouring

When the concrete is poured and is still liquid, the outer pressure can exceed the ring stiffness of the system. Furthermore quick drying concrete will undergo an exothermic reaction (a chemical reaction that is accompanied by the release of heat). The temperatures generated by the exothermic reactions can damage the system materials. Adequate protection must be provided to the Akatherm dBlue system.

To compensate for the outer pressure or the heat, the pipe system can be filled with water and closed making it an incompressible closed system.

Acoustic design

Direct contact between the Akatherm dBlue pipe system and the concrete can cause structural-borne noise. We advise to uncouple the pipe system using common sleeves made of material that ensures acoustic insulation and prevent against moisture.

! Precisely follow the installation instructions for embedding Akatherm dBlue in concrete.

4.8 Stormwater drainage and condensation

When using Akatherm dBlue for stormwater drainage the relatively cold rainwater can cause dew condensation on the outside pipe surface within the building.

Condensation occurs when the water vapour carried in the air is deposited on a 'colder' surface. Air at a given temperature can contain only a certain amount of water vapour. If the air temperature drops when in contact with the colder pipe system, the excess amount of water vapour will then condense.

The temperature of the air at which air is saturated with water vapour is called the 'dew point'. Condensation occurs when pipework has a temperature under the dew point of the surrounding air. Condensation depends on a number of factors:

- Room temperature
- Relative humidity of the air
- Temperature of the pipe surface

Akatherm dBlue has a relatively good thermal coefficient and no condensation will occur during short periods of rain. To know exactly when and how to insulate a h-x (Mollier) diagram and a detailed calculation has to be used.

When insulating the pipe system use diffusion-proof closed cell insulation material. Open cell insulation has to have an impermeable outer layer.

The entire pipe network must be insulated and an insulated pipe system must always be a closed circuit. Always ensure to:

- Close all openings, cuts and transitions with sealing material
- Encasing the bracket fully and seal the transition

4.9 Professional kitchens

Animal and vegetable-based oil and grease discharged by commercial kitchens are separated from the waste water by grease separators. Akatherm dBlue is very well suited to connect the discharge fixtures to the grease separator. When the pipe system has enough length, the grease can accumulate and lead to serious blockage of the pipe system.

The use of trace heating and additional insulation may be required to reduce heat loss. The trace heating element should not exceed 45°C.

4.10 Fire protection

Akatherm dBlue has fire behaviour class B2 (normally inflammable) according to DIN 4102-1 and class E (normally inflammable) according to EN 13501-1. When Akatherm dBlue passes through fire-rated building elements it is mandatory to install fire protection collars that will not reduce the fire-rating of these building elements.

The Akatherm dBlue system dimensions can be installed in combination with a range of fire protection collars. The installed system needs to be in accordance with AS 1530.4. Details are available upon request.

We advise to follow the manufacturer's guidelines with respect to design, installation, commissioning and maintenance of the used fire protection collars. Contact the responsible authority for compliance with applicable regulations.

! During design, installation and commissioning of the fire protection collars the applicable on-site, local and national regulations must be observed.

5 Fixing system

Akatherm dBlue is a complete system including dBlue acoustic brackets for optimal sound dampening. The dBlue fixing system includes:

- Bracketing plan in the vertical stack
- Horizontal bracketing plan
- Correct use of guide and anchor point brackets
- Correct tension free installation of each bracket
- Correct installation of each dBlue joint
- Support bracing

Using dBlue acoustic brackets and following the guidelines in this manual will ensure that the Akatherm dBlue soil & waste system will be supported correctly over time and under influence of temperature changes while achieving the desired sound reduction level.

! To achieve the optimal and validated noise reduction levels use only the dBlue acoustic brackets and install them according to this manual.

All dBlue brackets have a M10 nut for connection to the wall and ceiling.

Guide and anchor point bracket

The Akatherm dBlue fixing plan requires the use of guide and anchor point brackets. The dBlue acoustic bracket is designed to function as guide bracket in open position by using two spacers at the bracket closing point. Without the spacers the bracket fully closes and can be used as an anchor point bracket.

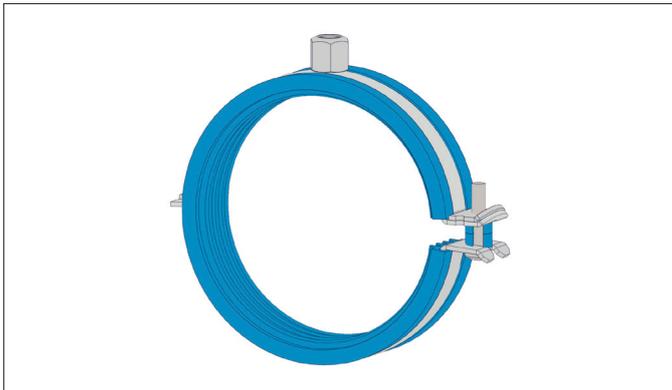


Illustration 5.1

Thermal expansion and contraction

Akatherm dBlue is a rubber ring joint system that takes up thermal expansion and contraction of the pipe system in each joint. This is only possible when following the dBlue joint installation instruction and pulling back the pipe 10 mm after full insertion in the socket. The 10 mm additional room in the joint is sufficient to take up at least 30°C difference between installation and operational temperature.

! Pipes longer than 500 mm have to be pulled back 10 mm after full insertion in the socket to allow thermal expansion of the pipe system.

5.1 Bracketing plan in the vertical stack

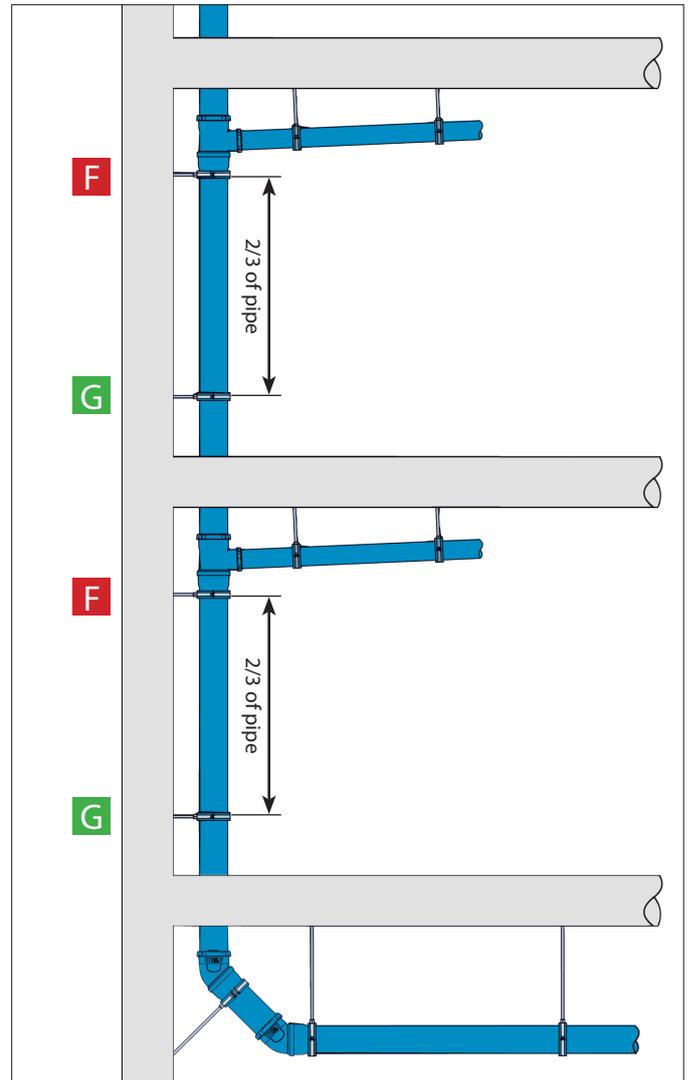


Illustration 5.2

F Anchor point bracket (closed without spacers)

G Guide bracket (open with 2 spacers)

One fitting per floor level

- Fixed point bracket directly below each socket
- Guide bracket at $\frac{2}{3}$ of the pipe length

More than one fitting per floor level

- Secure each socket with an anchor point bracket
- Place a guide bracket when the pipe length between the anchor point brackets is more than 20 x the pipe diameter

Install an anchor point bracket behind each socket at the bottom of the stack where the downpipe transitions to the collector pipe.

The anchor point bracket fixes the socket in which the thermal expansion can be accommodated. The guide bracket keeps the pipe in a straight line to the next socket.

! Expansion forces will be transmitted to the brackets. Make sure to follow instructions in this manual on support bracing in order to keep all brackets in their original place of installation.

5.2 Bracketing plan in horizontal pipes

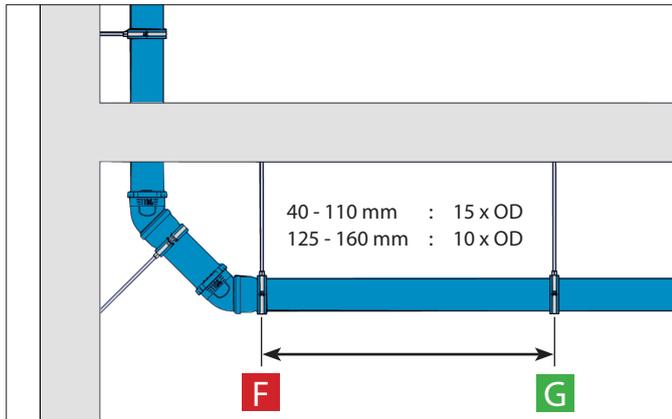


Illustration 5.3

- F** Anchor point bracket (closed without spacers)
- G** Guide bracket (open with 2 spacers)

Anchor point brackets

- Always place an anchor point bracket directly behind each socket.

Guide brackets

Horizontal pipe lengths between the anchor points must be supported by guide brackets at regular intervals:

- 40 - 110 mm : 15 x pipe diameter
- 125 - 160 mm : 10 x pipe diameter

When the pipe system layout does not allow specified guide brackets intervals, decrease interval length until possible.

The anchor point bracket fixes the socket in which the thermal expansion can be accommodated. The guide brackets support the pipe to avoid sagging.

! Expansion forces will be transmitted to the brackets. Make sure to follow instructions on support bracing in order to keep all bracket in their original place of installation.

5.3 Support bracing

The support bracing used for the dBlue fixing system should be designed to withstand:

- The fully filled weight of the pipe system (W)
- The transmitted expansion forces (E) over the full support length (L)

Pipe system weight

The weight of the pipe system (W) is according to the table below.

Pipe diameter DN	Empty weight (kg/m)	100% filled weight W (kg/m)
40	1,0	2,0
50	1,3	3,0
75	1,7	6,0
90	2,0	8,0
110	2,5	11,0
125	3,0	14,0
160	5,0	23,0

Table 5.1

Transmitted expansion forces

Akatherm dBlue takes up thermal expansion and contraction of the pipe system in each joint. The friction between the rubber ring and the pipe is the resistance force (E) that will be fully transmitted to the threaded rod with length L.

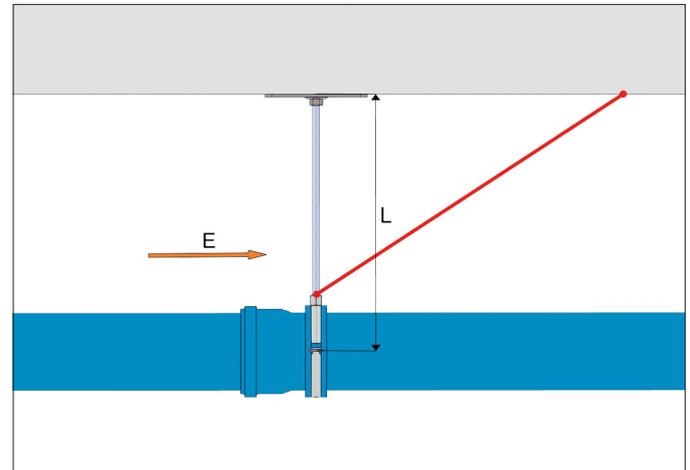


Illustration 5.4

The table below shows the socket resistance force E.

Pipe diameter DN	Force E	
	[N]	[kg]
40	200	20
50	200	20
75	250	25
90	300	30
110	400	40
125	600	60
160	800	80

Table 5.2

Because the thermal expansion is compensated in the sockets it is very important to install the pipes correctly into the sockets.

! Pipes longer than 500 mm have to be pulled back 10 mm after full insertion in the socket to allow thermal expansion of the pipe system.

The 10 mm additional room in the joint is sufficient to take up at least 40°C difference between installation and operational temperature.

Thermal expansion over 40°C will put additional force on the bracing system and will possibly require stronger bracing.

☎ Contact your local dBlue distributor for advice when the difference between installation and continuous operational temperature exceeds 40°C.

6 Installation

6.1 Shortening and chamfering

dBlue pipes and fittings have factory made sockets and chamfered spigot ends. Pipe is available in several standard pipe lengths. Fittings are not designed to be shortened.

Measure pipe length from end of socket

dBlue pipes are made with sockets that are not part of the true pipe length. Ensure measurements are made from the end of the socket, which will prevent pipes becoming too short.

Cut pipe square

Cut the pipe square using pipe cutters or a fine toothed hand saw for the best results. Fix the pipe before cutting. A mitre box can be used to assist in obtaining a square angle.

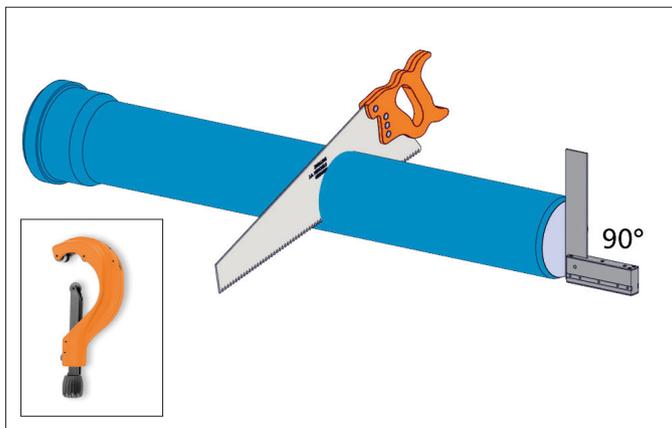


Illustration 6.1

! Do not use high speed electrical cutting tools which will cause heavy burrs and will possibly melt the plastic.

Debur and chamfer pipe

Proper deburring and chamfering of the pipe is required to allow the pipe to be inserted past the rubber ring in the socket.

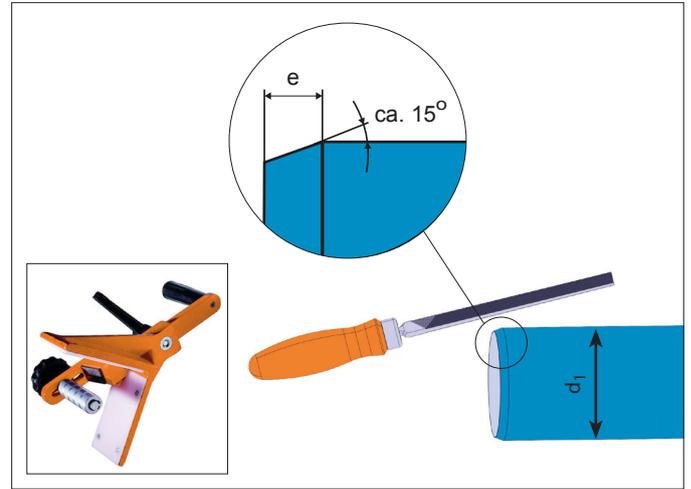


Illustration 6.2

The chamfer angle is always 15°. We recommend the use of a purpose designed chamfering tool for best results. A fine file could also be used but has lesser precision. Remove any leftover burrs using a standard deburring tool.

The chamfer length e differs per diameter according the table below. Uncut pipes have chamfer already.

d_1	Chamfer length e (mm)
40	3,0
50	3,5
75	3,5
90	4,5
110	4,5
125	5,0
160	6,0

Table 6.1

Take care when chamfering at low temperatures. Akatherm dBlue is able to be installed at temperatures as low as -10°C without becoming brittle.

! Without deburring and chamfering, the pipe spigot end can damage the rubber ring or even separate it from the socket, both resulting in leakage. Burrs along the edge will prevent lubrication to be distributed uniformly over the pipe.

6.2 Jointing pipes and fittings

When making joints the socket of the pipe or fitting added should be in downstream direction for best flow results.

Clean

Clear the rubber ring, inside of the socket and the product to be inserted from any dust and dirt.

Lubricate

Always apply plenty of dBlue lubricant at the spigot end and the rubber ring.

Insert fully

Each joint must initially be made by fully inserting the spigot end into the entire depth of the socket until it stops (1).

Mark spigot end

Clearly mark the spigot end at the inserted depth with a permanent pencil or pen. Mark the fitting on a clearly visible side. This will allow visual inspection of each joint after installation (2).

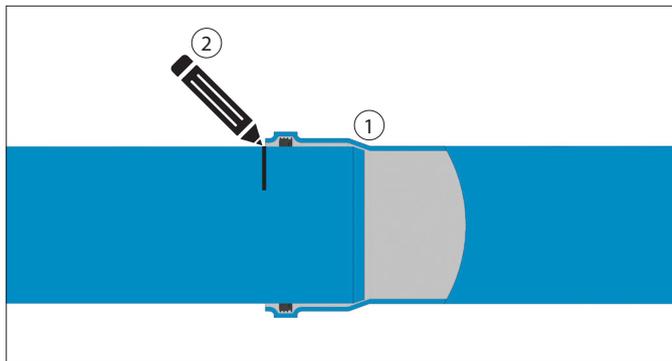


Illustration 6.3

Pull back 10 mm

Pipe that is 500 mm or longer has to be pulled back 10 mm to allow for thermal expansion. Shorter pipes and fittings can remain fully inserted in the socket (3).

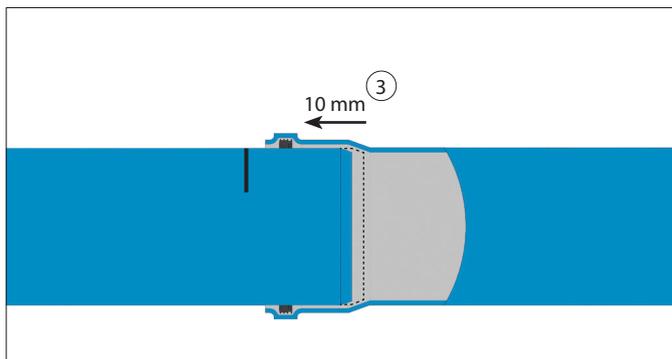


Illustration 6.4

! The dBlue system uses each socket to compensate for thermal expansion of the pipe system under influence of temperature changes.

Pulling back the spigot end 10 mm from the socket creates enough room to allow for 3 m pipe to expand and contract.

6.3 Fixing system

This chapter will describe the correct installation of the dBlue acoustic bracket. The Akatherm dBlue bracketing plan requires the use of guide and anchor point brackets.

+ dBlue uses a single bracket type. The bracket is used as a guide bracket when installed with the supplied spacers and as an anchor point bracket without spacers.

Guide bracket installation

The dBlue acoustic bracket is designed to function as guide bracket in open position by using two spacers at the bracket closing point.

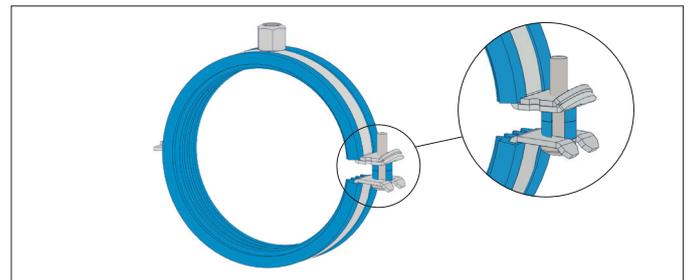


Illustration 6.5

The spacers are not pre-installed and should be placed around the screw between the bracket 'ears'. With the spacers installed the bracket can be closed without creating an anchor point.

Anchor point bracket installation

The dBlue acoustic bracket is designed to function as an anchor point bracket in fully closed position (without spacers).

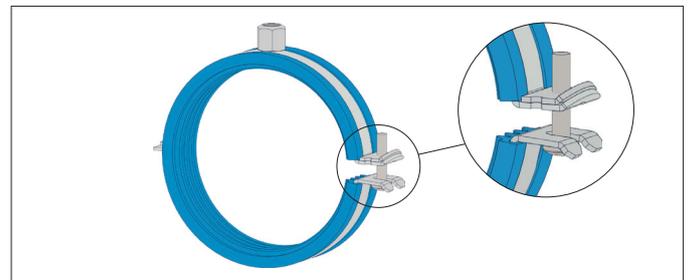


Illustration 6.6

Bracket connection to the wall and ceiling

All dBlue brackets have a M10 nut for further connection to the wall and ceiling. The suspension should be level and tension free.

Akatherm dBlue is a complete system including dBlue acoustic brackets for optimal sound dampening. The Akatherm dBlue fixing system includes:

- Bracketing plan in the vertical stack
- Horizontal bracketing plan
- Correct use of guide and anchor point brackets
- Correct tension free installation of each bracket
- Correct installation of each dBlue joint
- Support bracing

! Follow the design guidelines for the vertical and horizontal bracketing plan, support bracing and correct installation of each dBlue joint as described elsewhere in this manual.

6.4 Transitions to other materials

6.4.1 PVC system

PVC systems are manufactured according to AS/NZS 1260 and have different pipe sizes from Akatherm dBlue below DN110. Connections from PVC systems with non-compatible diameters are possible using PVC adaptor fittings from the Akatherm dBlue range. One transition requires an additional dBlue eccentric reducer.

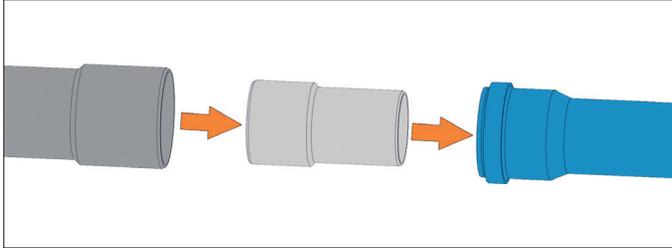


Illustration 6.7

Install the PVC adaptor fittings according to following instructions:

Clean

Clean the PVC adaptor, the PVC socket as well as the rubber ring inside of the dBlue socket from any dust and dirt.

Connect PVC side first

Apply primer and solvent cement on the correct part of the adaptor fitting and insert into the female socket of the PVC system.

Connect dBlue socket next

Apply lubricant to the other side of the PVC adaptor and insert into the dBlue socket. Where required install the additional reducer first.

! The transition adaptor needs to be pushed in firmly all the way to ensure uninterrupted flow.

For pipe sizes DN110 and DN160 no adaptor fitting is required since both systems have identical outer diameters. Refer to the table below for the possible transitions.

From PVC DN	To dBlue DN	PVC adaptor OD (mm)	Additional reducer OD (mm)
40	40	43/40	
40	50	43/40	
50	50	56/50	
65	75	69/75	
65	90	69/75	75/90
65	110	69/110	
80	90	82/90	
80	110	82/110	

Table 6.2

The connection from Akatherm dBlue DN50 to PVC DN50 can be made using the PVC adaptor 56/50 in combination with dBlue double socket 50 mm.

6.4.2 Plumbing fixture drainage fittings

Connections from plumbing fixture drainage fittings are typically installed with copper pipe. Copper is manufactured according to AS 1432 and has different pipe sizes than Akatherm dBlue. Connections from copper pipe to Akatherm dBlue are possible using adaptor fittings with pre-installed rubber nipple.

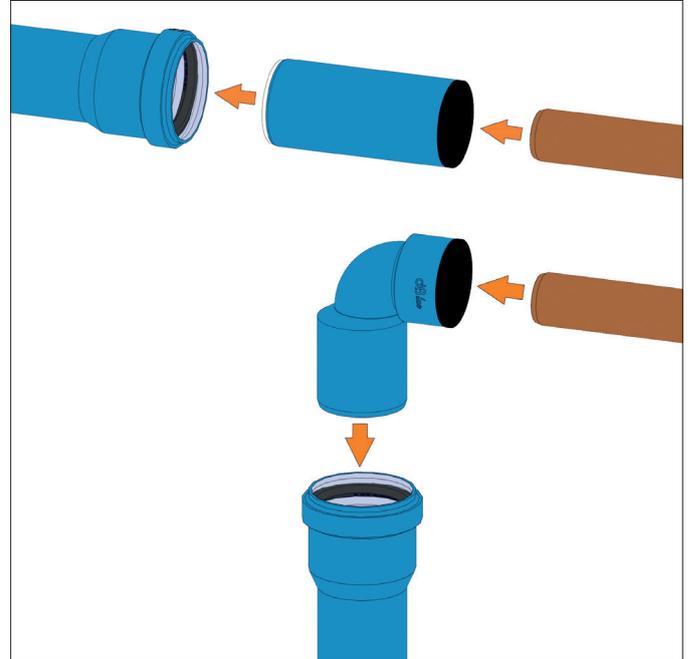


Illustration 6.8

Refer to the table below for the possible transitions available both straight and as a bend.

From copper DN	To dBlue DN	Rubber nipple / spigot OD (mm)
32	40	31,8/40
32	50	31,8/50
40	40	38,1/40
40	50	38,1/50

Table 6.3

Install the adaptor fittings according to following instructions:

Clean and debur

Clean the rubber nipple and ensure the plumbing fixture drainage pipe is free from burrs. Use a file to create a slight chamfer for better insertion.

Insert the plumbing fixture drainage pipe

Apply lubricant to the inside of the rubber nipple and outside of the pipe. Fully insert the drainage pipe until it stops. Connect the dBlue spigot side as a regular dBlue fitting.

! When adjusting the inserted pipe ensure the rubber nipple stays fully inserted into the socket. Use lubricant to allow good pipe movement.

6.4.3 Cast iron and other materials

For connections from and to cast iron or other drainage pipe materials we advise the use of flexible rubber sleeve adaptors with stainless steel worm-gear clamps.



Illustration 6.9

The rubber sleeve adaptor should have the same temperature and chemical resistance as the Akatherm dBlue system. Check the rubber sleeve manufactures guidelines for correct installation and material specifications.

6.5 Akavent

The Akavent aerator will be delivered with an expansion socket welded to the top and the required 110 mm and 75 mm plug-in sockets for lateral floor connections. Install the Akavent according to the following steps:

Clean and chamfer

Clean all rubber ring sockets from dust and dirt. Chamfer and debur the bottom spigot end according to instructions of dBlue pipes.

Install Akavent in the downpipe

The expansion socket at the top of the Akavent has a factory made anchor point construction where a dBlue acoustic anchor point bracket can be placed.

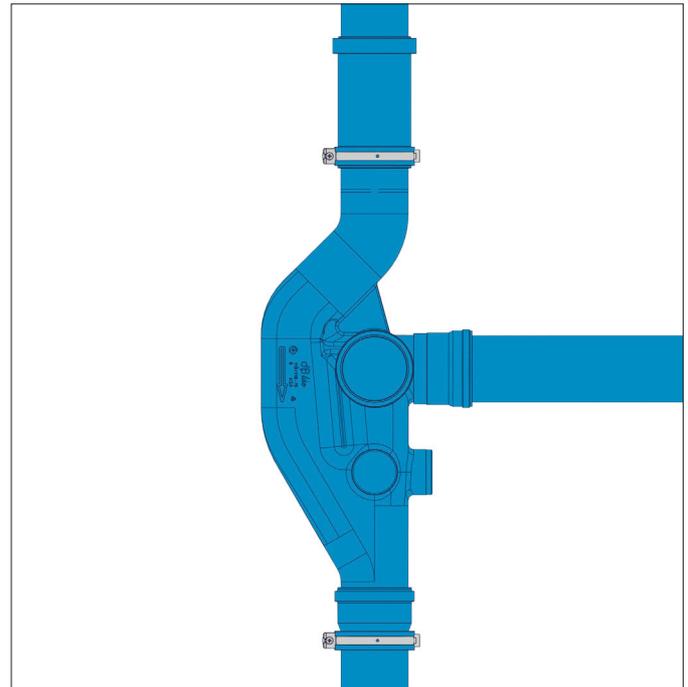


Illustration 6.10

The pipe socket at the bottom of the Akavent must also contain an anchor point bracket as per the vertical bracketing plan.

Install lateral floor connections

Connect the floor connections to the Akavent according to standard instructions. Place anchor point and guide brackets on the horizontal pipe system according to the horizontal bracketing plan.

Optionally insulate Akavent

The Akavent is bracketed with dBlue acoustic brackets which dampen structure-borne noise. When airborne noise is critical at the position of the Akavent, fully wrap the Akavent in sound insulation material.

6.6 Floor waste gully

The dBlue floor waste gully is equipped with:

- 3x closed 50 mm socketed side inlets
- 1x open 110 mm socketed top inlet
- 1x open 75 mm socketed side outlet
- Trap with 75 mm water height

! The snap caps and rubber rings of the 50 mm side inlets must be installed after drilling open the required inlets.

Install the floor gully according to the following steps:

Open the required inlets

Drill a hole through the gully body for the required inlets using a 45 mm hole saw. Temporarily remove the trap from the floor gully preventing unwanted damage.



Illustration 6.11

Insert rubber seals and install snap caps

Insert the rubber seals and install the snap caps to the 50 mm inlets. Any 50mm inlets that have not been utilized can have their seals and caps installed for potential future use. Re-insert trap.



Illustration 6.12

Place floor waste gully beneath slab

Insert the top inlet over the 110 mm pipe coming through the slab penetration.

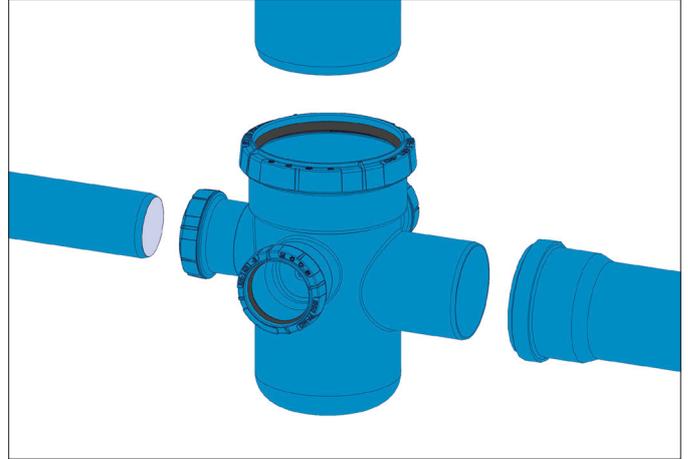


Illustration 6.13

Fixate the floor gully to the slab

Secure the floor gully to the ceiling using anchor point brackets on the 75 mm outlet and opposite 50 mm inlet.

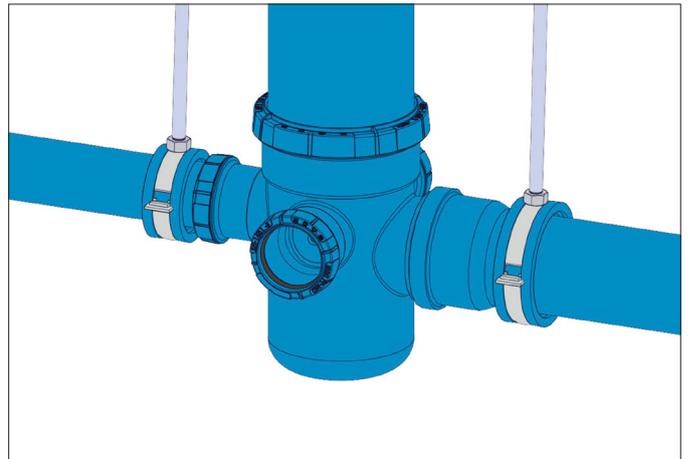


Illustration 6.14

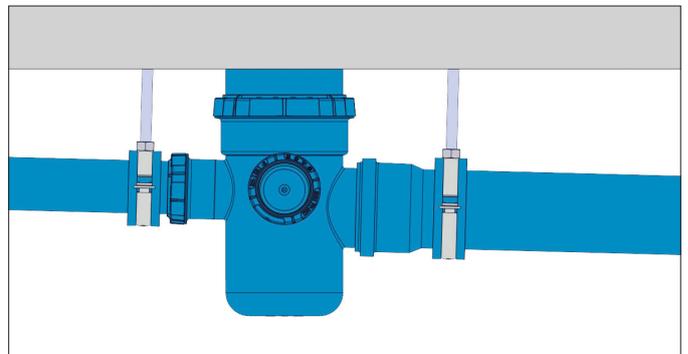


Illustration 6.15

6.7 Disconnecter trap and 4-way riser

The 4-way riser and disconnecter trap combine into a flexible fitting with multiple side connections and a 110 mm connection and trap. The dBlue 4-way riser is equipped with:

- 4x closed 50 mm socket side inlets
- 1x open 110 mm socket top inlet
- 1x open 110 mm spigot bottom end

 The snap caps and rubber rings of the 50 mm side inlets must be installed after drilling open the required inlets.

Install the 4-way riser and disconnecter trap according to the following steps:

Open the required inlets

Drill a hole through the gully body for the required inlets using a 45 mm hole saw.

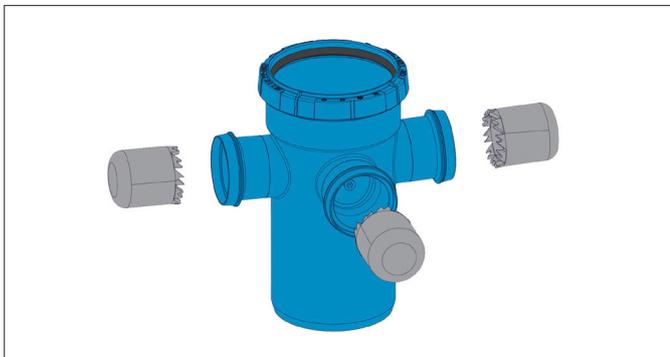


Illustration 6.16

Insert rubber seals and install snap caps

Insert the rubber seals and install the snap caps to the 50 mm inlets. Any 50 mm inlets that have not been utilized can have their seals and caps installed for potential future use.



Illustration 6.17

Place 4-way riser and disconnecter trap beneath slab

Insert the top inlet over the 110 mm pipe coming through the slab penetration.

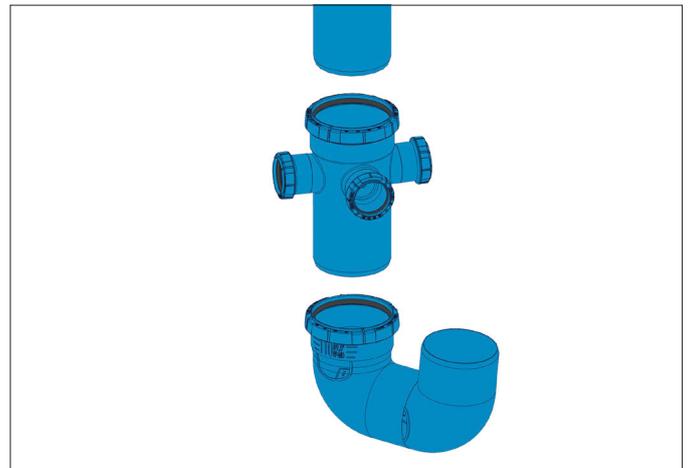


Illustration 6.18

Fixate the disconnecter trap to the slab

Secure the disconnecter trap to the slab using an anchor point brackets.

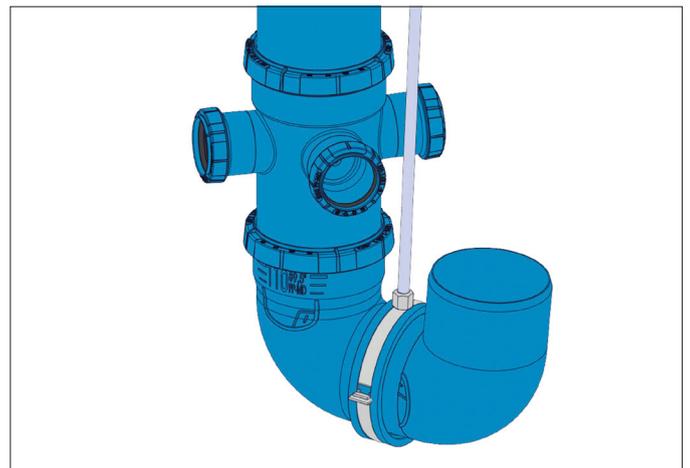


Illustration 6.19

Install side inlets and discharge pipe

Continue installation with the 50 mm side inlets. Place a 87.5° elbow to continue with the discharge pipe system.

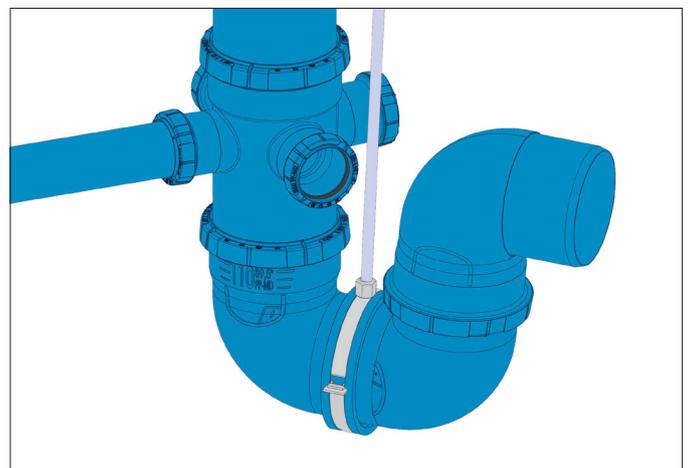


Illustration 6.20

6.8 Shaft inspection

Use the dBlue inspection piece for shaft inspection. Install according to AS/NZS 3500.2 section 4.4 inspection shaft and boundary traps.

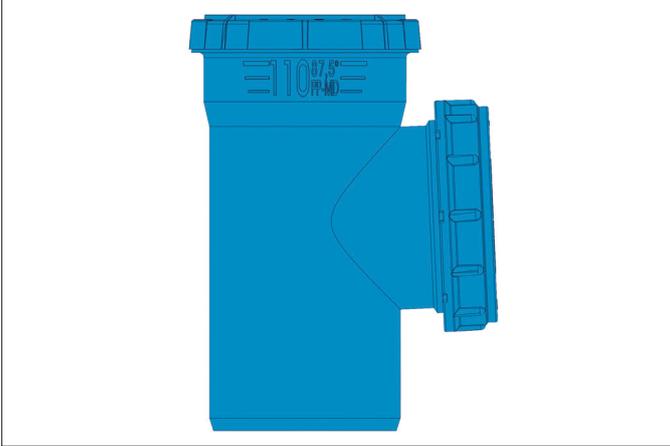


Illustration 6.21

Place the inspection piece according to the standard joint procedure and tighten the screw cap with rubber seal fully after installation.

! Do not use sharp tools for shaft inspection and cleaning.

6.9 Embedding Akatherm dBlue in concrete

The Akatherm dBlue system is suited to be embedded in concrete. However certain precautions need to be taken during design and installation.

Follow the instructions in the planning and design chapter on:

- Expansion and contraction compensation
- Pressure and heat during pouring
- Acoustic design

When installing Akatherm dBlue in concrete always:

- Seal each joint with adhesive strip material before pouring, this will prevent concrete from entering
- Close open pipe sections before pouring
- Secure the pipe system against movement
- Avoid walking on the pipe system
- Avoid placing weight and steel reinforcements directly on pipe system

! Use extra care when installing dBlue in concrete because it's difficult to reach after installation.

6.10 Fire protection

Akatherm dBlue has fire behaviour class B2 (normally inflammable) according to DIN 4102-1 and class E (normally inflammable) according to EN 13501-1. When dBlue passes through fire-rated building elements, it is mandatory to install fire protection collars that will not reduce the fire-rating of these building elements.

! Fire collars can be installed casted within the concrete slab or retro-fitted after slab and pipe are installed.

Fire collars must be installed around the pipe only, not around the socket.

The Akatherm dBlue system dimensions can be installed in combination with a range of fire protection collars. The installed system needs to be in accordance with AS 1530.4. Details are available upon request.

We advise to follow the manufacturer's guidelines with respect to design, installation, commissioning and maintenance of the used fire protection collars. Contact the responsible authority for compliance with applicable regulations.

! During design, installation and commissioning of the fire protection collars the applicable on-site, local and national regulations must be observed.

6.11 Using pipe remainders without a socket

Cut remainder pipe without socket can be used in combination with a double socket. Make sure to follow the debur, chamfer and joint procedure.

Install an anchor point bracket in the middle of each double socket, which will ensure no movement of the fitting.

Allow for sufficient expansion room.

6.12 Additions to existing system

Modification and additions to existing systems is possible using a sleeve coupler. The sleeve coupler slides over a pipe completely because it has no centre stop.

7 Product range

7.1 Dimensions

The dimensions of the pipe and fittings in the product tables are all in mm unless stated differently. The standard wall thickness of the fittings is not included in the tables but can be found in the table below

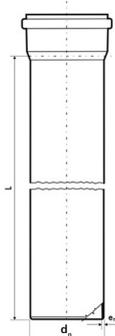
Diameter d_1	Wall thickness e
40	1,8
50	1,8
75	2,3
90	2,8
110	3,4
125	3,9
160	4,9

Table 7.1

7.2 Abbreviations

Abbreviation	
DN_1	Nominal dimension
d_n / d_1	External dimension fitting/pipe
Z_1	Length until insertion point
α°	Angle of fitting
L	Total length fitting
l_1	Partial length of fitting

Table 7.2



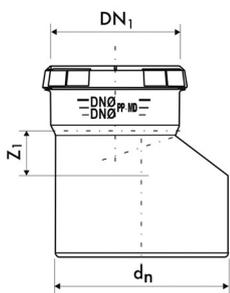
d_n	L	dBlue code	Tradelink code	e
40	150	dB-PEU015H	128504	1,8
40	250	dB-PEU025H	128505	1,8
40	500	dB-PEU050H	128506	1,8
40	1000	dB-PEU100H	128507	1,8
40	1500	dB-PEU150H	-	1,8
40	2000	dB-PEU200H	128508	1,8
40	3000	dB-PEU300H	128509	1,8
50	150	dB-PEU015J	128510	1,8
50	250	dB-PEU025J	128511	1,8
50	500	dB-PEU050J	128512	1,8
50	1000	dB-PEU100J	128513	1,8
50	1500	dB-PEU150J	128514	1,8
50	2000	dB-PEU200J	128515	1,8
50	3000	dB-PEU300J	128516	1,8
75	150	dB-PEU015P	128517	2,3
75	250	dB-PEU025P	128518	2,3
75	500	dB-PEU050P	128519	2,3
75	1000	dB-PEU100P	128520	2,3
75	1500	dB-PEU150P	128521	2,3
75	2000	dB-PEU200P	128522	2,3
75	3000	dB-PEU300P	128523	2,3
90	150	dB-PEU015S	128524	2,8
90	250	dB-PEU025S	128525	2,8
90	500	dB-PEU050S	128526	2,8
90	1000	dB-PEU100S	128527	2,8
90	1000	dB-PEU150S	128528	2,8
90	1500	dB-PEU200S	128529	2,8
90	3000	dB-PEU300S	128530	2,8
110	150	dB-PEU015V	128531	3,4
110	250	dB-PEU025V	128532	3,4
110	500	dB-PEU050V	128533	3,4
110	1000	dB-PEU100V	128534	3,4
110	1500	dB-PEU150V	128535	3,4
110	2000	dB-PEU200V	128536	3,4
110	3000	dB-PEU300V	128537	3,4
125	150	dB-PEU015X	128538	3,9
125	250	dB-PEU025X	128539	3,9
125	500	dB-PEU050X	128540	3,9
125	1000	dB-PEU100X	128541	3,9
125	1500	dB-PEU150X	128542	3,9
125	2000	dB-PEU200X	128543	3,9
125	3000	dB-PEU300X	128544	3,9
160	150	dB-PEU015Z	-	4,9
160	250	dB-PEU025Z	-	4,9
160	500	dB-PEU050Z	128545	4,9
160	1000	dB-PEU100Z	128546	4,9
160	1500	dB-PEU150Z	-	4,9
160	2000	dB-PEU200Z	128547	4,9
160	3000	dB-PEU300Z	128548	4,9

dBlue Acoustic Soil & Waste System

Product range

Reducer eccentric

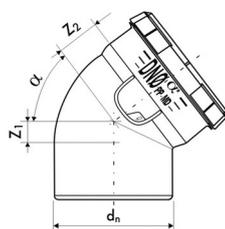
PP-MD



d_n/DN_1	dBlue code	Tradelink code	Z_1
50/40	VRD-050-040-OOD	128639	25
75/40	VRD-075-040-OOD	128640	25
75/50	VRD-075-050-OOD	128641	25
90/40	VRD-090-040-OOD	128642	40
90/50	VRD-090-050-OOD	128643	35
90/75	VRD-090-075-OOD	128644	24
110/50	VRD-110-050-OOD	128645	25
110/75	VRD-110-075-OOD	128646	25
110/90	VRD-110-090-OOD	128647	30
125/110	VRD-125-110-OOD	128648	30
160/110	VRD-160-110-OOD	128649	35
160/125	VRD-160-125-OOD	128650	35

Elbow
 15°, 30°, 45°, 67,5°, 87,5°

PP-MD



α°	d_n	dBlue code	Tradelink code	Z_1	Z_2
15	40	VKL-040-000-15D	128549	4	12
15	50	VKL-050-000-15D	128550	4	13
15	75	VKL-075-000-15D	128551	12	16
15	90	VKL-090-000-15D	128552	15	15
15	110	VKL-110-000-15D	128553	14	18
30	40	VKL-040-000-30D	128554	7	10
30	50	VKL-050-000-30D	128555	8	12
30	75	VKL-075-000-30D	128556	14	15
30	90	VKL-090-000-30D	128557	20	19
30	110	VKL-110-000-30D	128558	20	22
45	40	VKL-040-000-45D	128559	12	18
45	50	VKL-050-000-45D	128560	12	20
45	75	VKL-075-000-45D	128561	20	28
45	90	VKL-090-000-45D	128562	26	32
45	110	VKL-110-000-45D	128563	25	35
45	125	VKL-125-000-45D	128564	35	45
45	160	VKL-160-000-45D	128565	38	60
67,5	40	VKL-040-000-67D	128566	16	20
67,5	50	VKL-050-000-67D	128567	26	23
67,5	75	VKL-075-000-67D	128568	30	31
67,5	90	VKL-090-000-67D	128569	39	40
67,5	110	VKL-110-000-67D	128570	45	44
87,5	40	VKL-040-000-90D	128571	29	30
87,5	50	VKL-050-000-90D	128572	33	35
87,5	75	VKL-075-000-90D	128573	41	49
87,5	90	VKL-090-000-90D	128574	54	59
87,5	110	VKL-110-000-90D	128575	61	75
87,5	110	VKL-110-LRB-90D*	128578	25	35
87,5	125	VKL-125-000-90D	128576	75	78
87,5	160	VKL-160-000-90D	128577	99	98

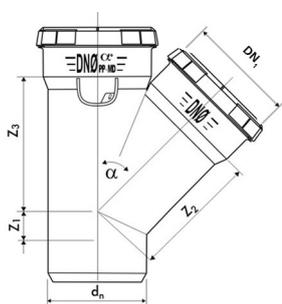
* swept bend

dBlue Acoustic Soil & Waste System

Product range

Branch
45°, 67°, 87,5°

PP-MD



α°	d_n/DN_1	dBlue code	Tradelink code	Z_1	Z_2	Z_3
45	40/40	VTR-040-040-45D	128579	15	54	54
45	50/40	VTR-050-040-45D	128580	13	61	58
45	50/50	VTR-050-050-45D	128581	17	67	67
45	75/40	VTR-075-040-45D	128582	3	78	71
45	75/50	VTR-075-050-45D	128583	1	83	81
45	75/75	VTR-075-075-45D	128584	23	96	97
45	90/40	VTR-090-040-45D	128585	12	88	83
45	90/50	VTR-090-050-45D	128586	2	94	89
45	90/75	VTR-090-075-45D	128587	16	106	106
45	90/90	VTR-090-090-45D	128588	24	116	116
45	110/40	VTR-110-040-45D	128589	19	100	90
45	110/50	VTR-110-050-45D	128590	13	108	100
45	110/75	VTR-110-075-45D	128591	4	120	118
45	110/90	VTR-110-090-45D	128592	12	129	128
45	110/110	VTR-110-110-45D	128593	29	140	140
45	125/110	PTR-125-110-045	128594	23	162	162
45	125/125	VTR-125-125-45D	128595	30	162	162
45	160/110	VTR-160-110-45D	128596	5	184	190
45	160/160	VTR-160-160-45D	128597	45	208	208
67	40/40	VTR-040-040-67D	128598	15	36	36
67	50/40	VTR-050-040-67D	128599	13	44	41
67	50/50	VTR-050-050-67D	128600	17	45	45
67	75/40	VTR-075-040-67D	128601	8	58	48
67	75/50	VTR-075-050-67D	128602	38	60	53
67	75/75	VTR-075-075-67D	128603	38	65	65
67	90/40	VTR-090-040-67D	128604	7	65	53
67	90/50	VTR-090-050-67D	128605	10	68	59
67	90/90	VTR-090-090-67D	128606	37	78	78
67	110/50	VTR-110-050-67D	128607	12	77	63
67	110/75	PTR-110-075-067	128608	20	87	80
67	110/110	VTR-110-110-67D	128609	45	94	94
87,5	40/40	VTR-040-040-90D	128610	30	29	29
87,5	50/40	VTR-050-040-90D	128611	29	34	29
87,5	50/50	VTR-050-050-90D	128612	33	34	35
87,5	75/40	VTR-075-040-90D	128613	26	47	32
87,5	75/50	VTR-075-050-90D	128614	32	47	36
87,5	75/75	VTR-075-075-90D	128615	47	50	50
87,5	90/50	VTR-090-050-90D	128616	40	58	53
87,5	90/75	PTR-090-075-090	128617	27	55	40
87,5	90/90	VTR-090-090-90D	128618	53	58	58
87,5	110/40	VTR-110-040-90D	128619	27	63	36
87,5	110/50	VTR-110-050-90D	128620	31	65	42
87,5	110/75	VTR-110-075-90D	128621	44	66	55
87,5	110/90	VTR-110-090-90D	128622	50	69	63
87,5	110/110	VTR-110-110-90D	128623	62	70	70
87,5	125/110	PTR-125-110-090	128624	60	80	75
87,5	125/125	VTR-125-125-90D	128625	74	80	80
87,5	160/110	PTR-160-110-090	128626	55	100	85
87,5	160/160	VTR-160-160-90D	128627	108	101	101

Product range

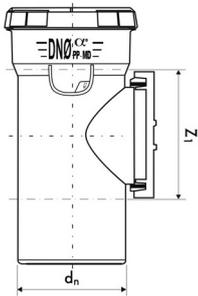
dBlue Acoustic Soil & Waste System

Clean out branch
90°

PP-MD



d_n	dBlue code	Tradelink code	Z_1
50	VCZ-050-000-OOD	128633	69
75	VCZ-075-000-OOD	128634	90
90	VCZ-090-000-OOD	128635	109
110	VCZ-110-000-OOD	128636	131
125	VCZ-125-000-OOD	128637	154
160	VCZ-160-000-OOD	128638	209

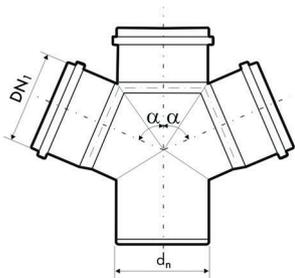


Double branch
67,5°

PP-MD



α°	d_n/DN_1	dBlue code	Tradelink code
67,5	90/90	PCR-090-090-067	128628
67,5	110/50	PCR-110-050-067	128629
67,5	110/110	PCR-110-110-067	128630
87,5	110/110	PCR-110-110-090	128631



dBlue Acoustic Soil & Waste System

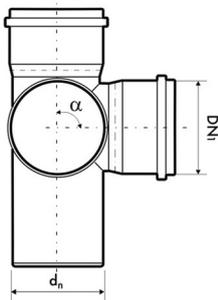
Product range

Double corner branch
67,5°

PP-MD



α°	d_n/DN_1	dBlue code	Tradelink code
67,5	110/110	PCN-110-110-067	-



Akavent aerator

PE

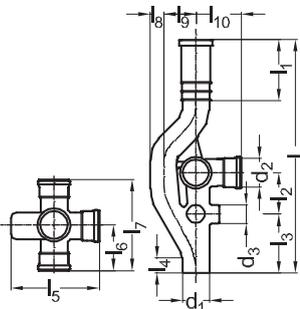


d_1	dBlue code	Tradelink code	L	l_1	l_2	l_3	l_4	l_5	l_6	l_7	l_8	l_9	l_{10}
110	VVEN-110-110-75D	-	956	256	170	240	60	344	159	318	55	130	159
160	VVEN-160-110-75D	-	1010	265	170	250	60	404	179	358	80	140	184

The Akavent is available with 6 horizontal inlets:

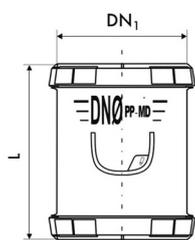
3 x d_2 : 110 mm
3 x d_3 : 75 mm

Opposite connections are not permitted.

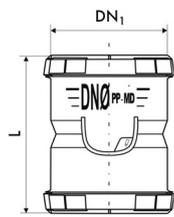




DN ₁	dBlue code	Tradelink code	L
40	VMD-040-000-00D	128658	95
50	VMD-050-000-00D	128659	97
75	VMD-075-000-00D	128660	104
90	VMD-090-000-00D	128661	111
110	VMD-110-000-00D	128662	116
125	VMD-125-000-00D	128663	120
160	VMD-160-000-00D	128664	140



DN ₁	dBlue code	Tradelink code	L
40	VMP-040-000-00D	128651	95
50	VMP-050-000-00D	128652	100
75	VMP-075-000-00D	128653	104
90	VMP-090-000-00D	128654	111
110	VMP-110-000-00D	128655	116
125	VMP-125-000-00D	128656	120
160	VMP-160-000-00D	128657	140



dBlue Acoustic Soil & Waste System

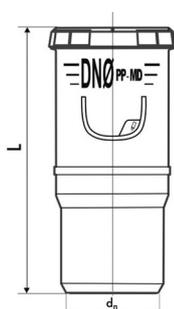
Product range

Expansion socket

PP-MD



d_n	dBlue code	Tradelink code	L
110	VDK-075-000-00D	128665	179
125	VDK-125-000-00D	128666	193
160	VDK-160-000-00D	128667	201

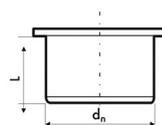


Socket plug

PP-MD



d_n	dBlue code	Tradelink code	L
40	VKK-040-000-00D	128668	32
50	VKK-050-000-00D	128669	32
75	VKK-075-000-00D	128670	33
90	VKK-090-000-00D	128671	36
110	VKK-110-000-00D	128672	37
125	VKK-125-000-00D	128673	38
160	VKK-160-000-00D	128674	40





d ₁ /d ₂	dBlue code	Tradelink code	L
43/40	TRA-PVC-043-040	-	400
43/50	TRA-PVC-043-050	-	400
56/50	TRA-PVC-056-050	-	200
69/75	TRA-PVC-069-075	-	200
69/110	TRA-PVC-069-110	-	-
82/90	TRA-PVC-082-090	-	400
82/110	TRA-PVC-082-110	-	-

d₁ PVC outside diameter
d₂ dBlue outside diameter

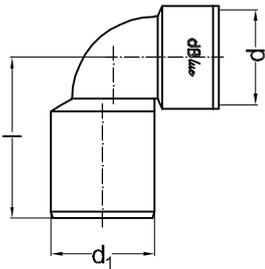
The following transitions can be combined from available products:

From PVC	to	dBlue	PVC adaptor	Eccentric reducer
69		90	TRA-PVC-069-075	VRD-090-075-00D
From dBlue	to	PVC	PVC adaptor	Double socket
50		56	TRA-PVC-056-050	VMP-050-000-00D

Trap connection bend



d ₁ /d	dBlue code	Tradelink code	l
40 x 32	VKL-SYF-040-32D	128689	80
40 x 40	VKL-SYF-040-40D	128690	80
50 x 32	VKL-SYF-050-32D	128691	80
50 x 40	VKL-SYF-050-40D	128692	80



dBlue Acoustic Soil & Waste System

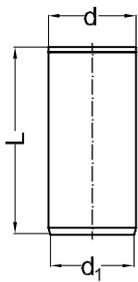
Product range

Trap connection socket

PP-MD



d_1/d	dBlue code	Tradelink code	L
40/32	VRD-SYF-040-32D	128693	100
40/40	VRD-SYF-040-40D	128694	100
50/32	VRD-SYF-050-32D	128695	100
50/40	VRD-SYF-050-40D	128696	100

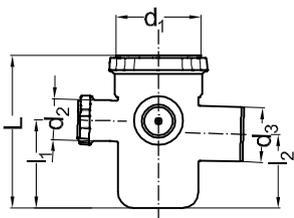


Floor waste gully

PP-MD

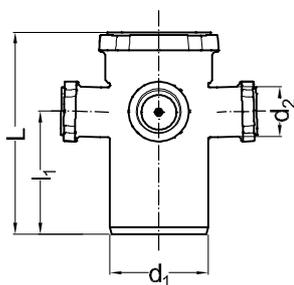


$d_1/d_2/d_3$	dBlue code	Tradelink code	L	l_1	l_2
110/50/75	VWP-110-050-75D	128699	210	121	101

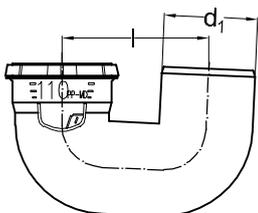




d_1/d_2	dBlue code	Tradelink code	L	L_1
110/50	VKO-110-050-00D	128700	237	149



d_1	dBlue code	Tradelink code	l
90	VSF-090-000-00D	128697	160
110	VSF-110-000-00D	128698	180

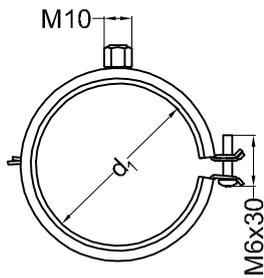


dBlue Acoustic Soil & Waste System

Product range

Acoustic bracket

Metal with rubber inlay



DN ₁	dBlue code	Tradelink code
40	POB-STL-040-000	128682
50	POB-STL-050-000	128683
75	POB-STL-075-000	128684
90	POB-STL-090-000	128685
110	POB-STL-110-000	128686
125	POB-STL-125-000	128687
160	POB-STL-160-000	128688

dBlue uses a single bracket type. The bracket is used as a guide bracket when installed with the 2 supplied spacers and as an anchor point bracket without spacers.

dBlue lubrication

	dBlue code	Tradelink code
250 ml	PAS-250-000-000	-

Rubber ring

SBR



d	dBlue code	Tradeline code
40	USZ-KAN-040-BL	128701
50	USZ-KAN-050-BL	128702
75	USZ-KAN-075-BL	128703
90	USZ-KAN-090-BL	128704
110	USZ-KAN-110-BL	128705
125	USZ-KAN-125-BL	128706
160	USZ-KAN-160-BL	128707

Snap cap



d	dBlue code	Tradeline code
40	VPZ-040-DBL-000	128675
50	VPZ-050-DBL-000	128676
75	VPZ-075-DBL-000	128677
90	VPZ-090-DBL-000	128678
110	VPZ-110-DBL-000	128679
125	VPZ-125-DBL-000	128680
160	VPZ-160-DBL-000	128681

Intended use for four way riser and floor waste gully.

8 Approvals, standards and quality

8.1 Approvals

Akatherm dBlue has been approved by the following certification agencies:

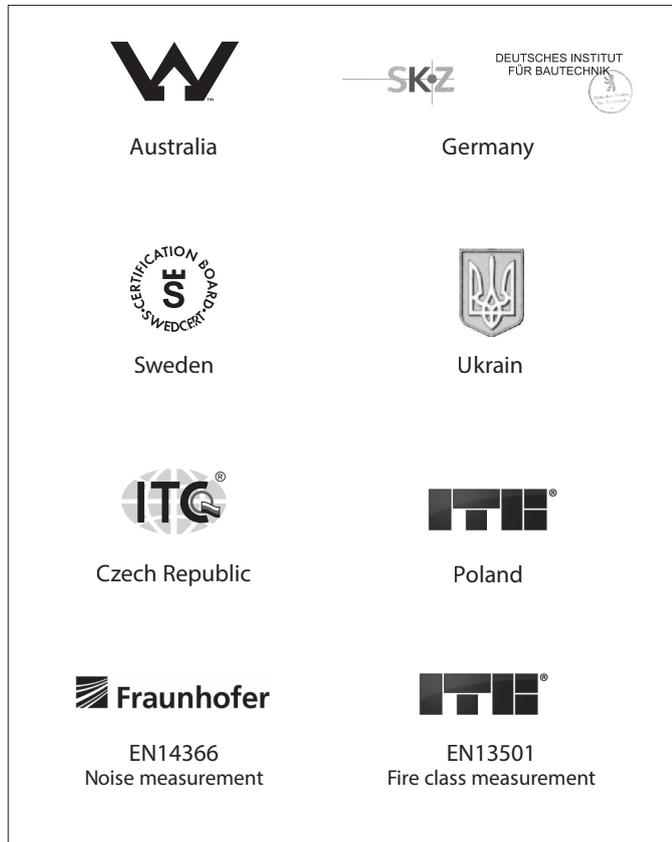


Illustration 8.1

8.2 Standards

Akatherm dBlue is a professional acoustic soil & waste drainage system and meets a number of quality and safety standards.

AS/NZS 7671

Plastic piping systems for soil and waste drainage (low and high temperature) inside buildings - Polypropylene (PP).

AS 2887

Plastic waste fittings.

AS/NZS 3500.2

Sanitary plumbing and drainage.

AS 1530.4

Method for fire tests on building materials, components and structures.

EN 1451

Plastic piping systems for soil and waste discharge (low and high temperature) within the building structure. Polypropylene (PP). Specifications for pipes, fittings and the system.

EN 1411

Plastic piping and ducting systems. Thermoplastic pipes. Determination of resistance to external blows by the staircase method.

EN 14366

Laboratory measurement of noise from waste water installations.

EN 13501

Fire classification of construction products and building elements.

DIN 4102

Fire behaviour of building materials and building components.

EN 1055

Plastic piping systems. Thermoplastic piping systems for soil and waste discharge inside buildings. Test method for resistance to elevated temperature cycling.

EN 1054

Plastic piping systems. Thermoplastic piping systems for soil and waste discharge. Test method for airtightness of joints.

EN 681

Elastomeric seals. Material requirements for pipe joint seals used in water and drainage applications.

8.3 Quality management

Akatherm dBlue is developed and manufactured within an ISO 9001 Quality Assurance system. It emphasises on quality care and continuous improvements in customer satisfaction.

Furthermore Akatherm has integrated the ISO 14001 environmental management system to control and improve our overall environmental performance.

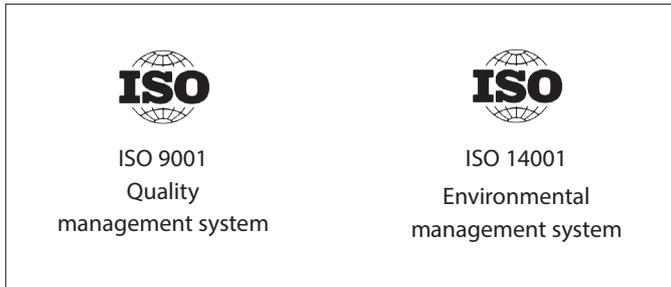


Illustration 8.2

8.4 Warranty

Akatherm guarantees the proper functioning of your drainage system by combining training upfront, technical support during construction and (if required) inspection afterwards.

All the Akatherm products have a warranty of 15 years, details are available on request.

8.5 Aliaxis

Akatherm is a part of Aliaxis which is the largest producer of plastic pipe systems in the world. The Aliaxis group has 14.000 employees and comprises of more than 100 companies with subsidiaries in 40 countries. All companies operate under their own brand and are specialized in specific solutions for building, industrial and utility applications. Akatherm is the brand within Aliaxis focusing on specialist drainage systems in the commercial and industrial building sector.

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