6 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.

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 a guide bracket 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.

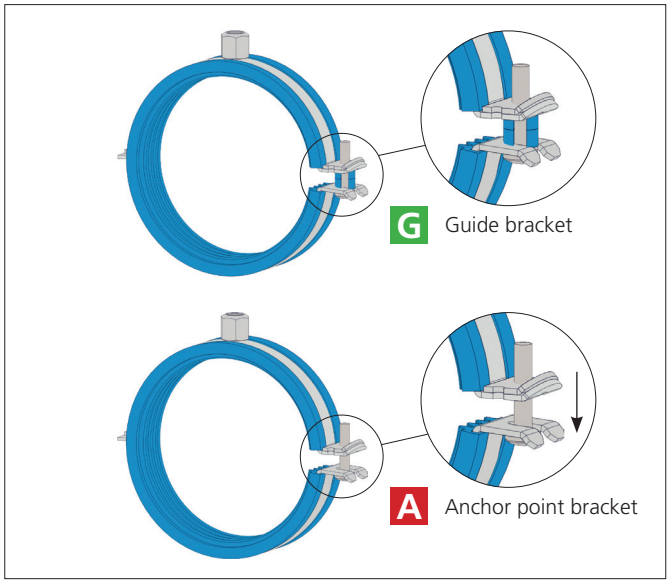

Illustration 6.1

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.

6.1 Bracketing plan in the vertical stack

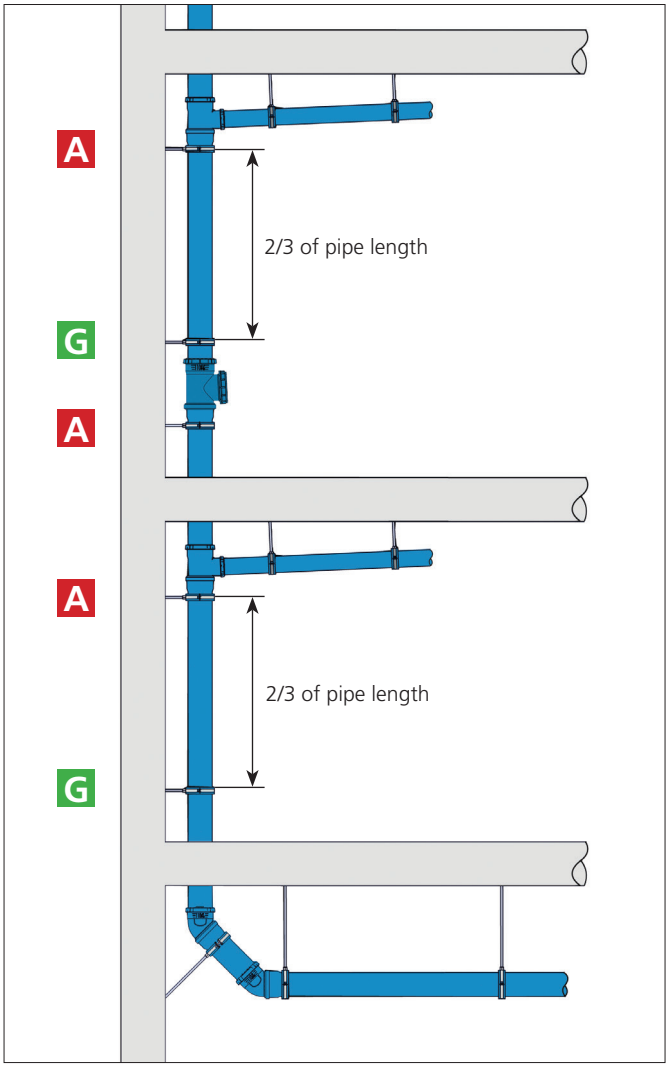

Illustration 6.2

A Anchor point bracket (closed without spacers)

G Guide bracket closed with 2 spacers

Installation of one fitting per floor level
- Anchor point bracket directly below each socket
- Guide bracket at $^{2}/_{3}$ of the pipe length

Installation of 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 20x 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.

Fixing system

6.2 Bracketing plan in horizontal pipes

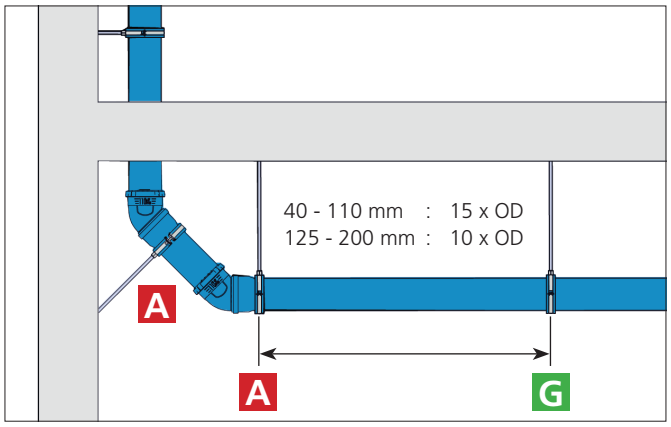

Illustration 6.3

A Anchor point bracket (closed without spacers)

G Guide bracket closed 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 - 200 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. Consult the specifications of the pipe rods to determine the maximum allowed length.

6.3 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)
- The possible forces due to pressure in testing or blockage situations

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	0,26	1,30
50	0,34	2,03
75	0,65	4,54
90	0,94	6,53
110	1,41	9,94
125	1,82	12,61
160	2,94	20,66
200	4,63	32,27

Table 6.1

Transmitted forces to the bracketing
Several forces will be transmitted to the brackets during testing and use of the system. These can mainly be divided by forces transmitted due to expansion and contraction of the system and foces transmitted to the brackets due to pressures within the system. Whilst Akatherm dBlue is a gravity drainage system in some specific cases (such as testing the system) some pressure may be applied to the system. Proper bracketing will ensure leak free usage of the system.

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). Only this internal resistance is transferred to the pipe when considering expansion forces.

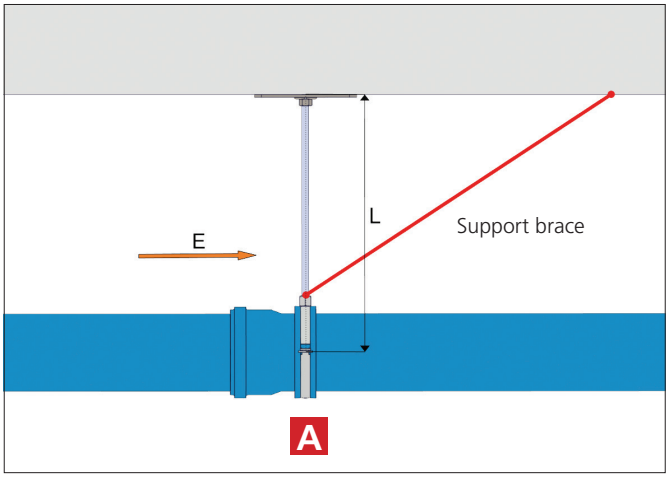

Illustration 6.4

The table below shows the socket resistance force E.

Pipe diameter	Force E	
DN	(N)	(kg)
40	200	20
50	200	20
75	250	25
90	300	30
110	400	40
125	600	60
160	800	80
200	1000	100

Table 6.2

Transmitted forces due to pressure
Additional forces may be transmitted to the bracketing system when the system is put under pressure. This can happen in situations where a blockage occurs and in testing situations. Several different scenarios and maximum pressures are described in chapter 7.12 Testing.

The maximum force on the support bracing depends on the maximum pressure within the system and the diameter of the pipe. This can be calculated using the below formula

$$F = (P \cdot \pi \cdot (Ø/2)^2)/10$$

Formula 6.1

F = Force (N)
P = Pressure (Bar)
Ø = Diameter (mm)

For example, by using the above formula a maximum Force (N) at a pressure of 1 bar with a diameter of 40 can be calculated as 125,7 Newtons.

Calculation of the pressures liable to act on the system during testing and during use and comparing this with the actual force that will be transmitted from pipe to bracing will ensure that the correct rod length is selected.

Consult the pipe rod manufacturers specifications to determine the maximum allowed length. In situations where the actual force exceeds the maximum force allowed bracing may be necessary.

Akatherm dBlue is designed in accordance with EN1451 in which a maximum testing pressure of 0,5 bar is defined. Pressurisation of the system is not premissible.