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Application Procedure Specification Dhatec Pipe Stop

Dhatec Document No.: DHA415-APS-PS

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Change Record

Rev.	Description of Revision
00	First Issue
01	Fixation Pipe Stop Rails added, and support points pipe added
02	Included Appendix B indicating Fixation of Pipe Stop Rails to Timber beam supports
03	Line-up Pipe Stop added
04	Correction of range Block A (page 5)
05	Font style

General Information

Equipment	Pipe Stop
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Disclaimer of liability: Every effort has been made to ensure that the information in this document is accurate and correct to the best of our knowledge, correct at the date of publication. However, Dhatec B.V. cannot be held responsible for consequences that follow from the claims that were made in this document.

Do not carry out any repairs or modifications on the equipment without consulting Dhatec B.V., doing so will invalidate the guarantee. The guarantee is also invalidated if accidents and damage of any form are caused as a result of improper use and/or not obeying the warnings in general as explained in this user guide. Dhatec B.V. accepts no responsibility for any personal accidents as a consequence of not following the safety instructions and warnings. This is also the case for consequential loss in any form.

Safety Requirements

These are general guidelines, all personnel involved should adhere to the safety requirements of the particular location at which they are performing their operations.

Dhatec recommends wearing of suitable PPE while handling their products. This includes gloves, safety shoes, safety glasses, safety helmet, hearing protection and suitable work clothing.

The working areas should be kept tidy at all times in order to minimize the risk of trips and slips.

All personnel involved should use suitable manual handling techniques and follow industry recommended guidelines for lifting and moving, such as those described in “Ergonomic Guidelines for Manual Material Handling” published by the National Institute for Occupational Safety and Health (Publication 2007-131), or those otherwise prescribed by the client.

Introduction

The Pipe Stop system is a storage system designed to secure line pipes during storage. Storing these pipes is not without risks. If the pipes are not handled and stored carefully, serious damages or injuries can occur.

The purpose of this installation manual is to make the users of the Pipe Stop aware of the risks and dangers resulting from the installation, use and maintenance of the Pipe Stop system. This manual provides basic safety guidelines to cope with the risks and hazards and to guarantee a safe way of stacking pipes. In spite of these basis guidelines, one should always respect the local safety regulations.

Everybody who will use the Pipe Stop system should be familiar with the essence of this manual. Therefore it is obligatory to carefully read this manual thoroughly, before installing and using the Pipe Stop system.

The installation of the Pipe Stop system may only be realized by trained employees, who are completely known with the guidelines and procedures specified in this manual.

Always contact Dhatec in case of doubts or uncertainties during installation, operation and maintenance of the Pipe Stop system.

Equipment

The Pipe Stop system is a storage system for stacking pipes in a safe way. It consists out of rail segments with a length of 4 meters that are steel reinforced. These rails can be endlessly connected, to form rail of any desired length. The connection will be realized with connectors that are specially designed. For supporting a complete pipe stack, at least 2 parallel rails are needed.

On top of the rails LDPE (Low Density Polyethylene) blocks will be placed. Per rail two blocks are needed for the correct support of one pipe. The pipes will only be supported by the blocks and will not contact the rail. To realize this way of support, it is of great importance that the blocks are positioned correctly. For every pipe diameter, there is a proper block configuration, given in this instruction manual. Therefore the position of the blocks on the rails should always be regarded with great care. In case the prescribed exact position of the blocks is unclear, one should always contact Dhatec for assistance.

The Pipe Stop system is capable of supporting pipes from Ø200 mm to Ø2.575 mm. To cover this complete range of pipe diameters, there are four different types of blocks available; Block Type A, Type B, Type C and Type D. Block Type A is designed to support pipes from Ø200 mm up to Ø406 mm, Block Type B is designed to support pipes from Ø380 mm up to Ø670 mm, Block Type C for pipes from Ø660 mm up to Ø1.590 mm and Block Type D for pipes from Ø1.030 mm up to Ø2.575 mm. Block Type C and Type D have one sided supporting areas whereas Block Type A and Type B are designed to support pipes on both sides of the block.

Pipe Stop Rail (Figure 1)

The length of the Rail: 4.013mm
Weight of the Rail: approx. 46,5kg

Figure 1. Pipe Stop Rail

Pipe Stop Connector (Figure 2)

Weight of the Connector: approx. 0,6kg

Figure 2. Pipe Stop Connector

Pipe Stop Block A (Figure 3)

Diameter range: ø 200 – 406 mm
Weight of the Block: approx. 5,5 kg

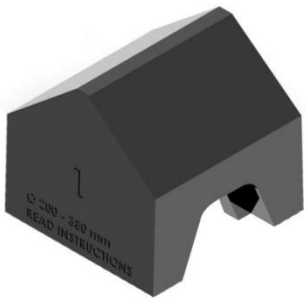


Figure 3. Pipe Stop Block A

Pipe Stop Block B (Figure 4)

Diameter range: ø 380 – 670 mm
Weight of the Block: approx. 12,5 kg

Figure 4. Pipe Stop Block B

Pipe Stop Block C (Figure 5)

Diameter range: ø 660 – 1.590 mm
Weight of the Block: ± 8,2 kg

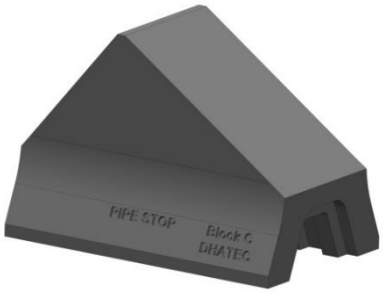


Figure 5. Pipe Stop Block C

Pipe Stop Block D (Figure 6)

Diameter range: ø 1.030 – 2.575 mm
Weight of the Block: ± 16,2 kg

Figure 6. Pipe Stop Block D

Pipe Stop End Cap (Figure 7)

Weight of the End Cap: approx. 1,1kg

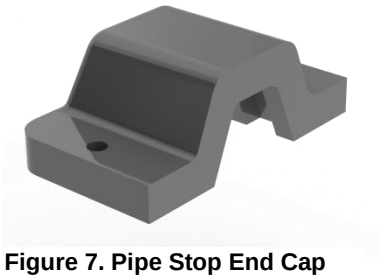


Figure 7. Pipe Stop End Cap

Pipe Stop Installation Tool (Figure 8)

Weight of the Installation Tool: approx. 0,4kg

Figure 8. Pipe Installation Tool

Pipe Stop Fixation Plate (Figure 9)

Weight of the Fixation Plate: approx. 1,3kg

Figure 9. Pipe Stop Fixation Plate

Pipe Stop Anti-Skid (Figure 10)

Weight of the Anti-Skid: approx. 1,4 kg/meter

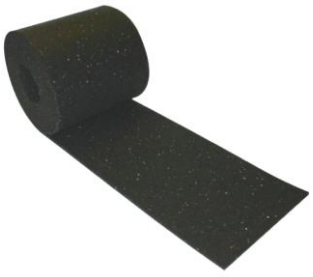


Figure 10. Anti-Skid

General instructions for Pipe Stop

Before using the Pipe Stop PS50 system, all parts should be subjected to an extensive visual inspection. If any below listed defect is observed, discard the relevant part.

Product failures:

- The Pipe Stop PS50 blocks (as shown in Fig. 3, Fig. 4, Fig. 5 and Fig. 6) may not show permanent imprints of pipes on the supporting faces.
- The edges of the Pipe Stop PS50 blocks may not be worn off more than 10 mm.
- The Pipe Stop PS50 blocks should always fit over the Pipe Stop PS50 rails without any problems.
- The ribs underneath the Pipe Stop PS50 blocks may not show signs of permanent deformation or fractures.
- The logos on the sides of the Pipe Stop PS50 blocks may not be illegible.
- The ribs on top of the Pipe Stop PS50 rails (as shown in Fig 1) may not show signs of permanent deformation or fractures.
- The Pipe Stop PS50 rails should not show signs of bending or deflection after installation.
- The steel connector parts at both ends of each Pipe Stop PS50 rail may not show signs of corrosion or permanent deformation.
- The steel reinforcement inside the Pipe Stop PS50 rails may not be visible.
- The steel Pipe Stop PS50 connector (as shown in Fig. 2) may not show signs of corrosion or permanent deformation.
- The thread of the Pipe Stop PS50 connector may not have any defects.
- The Pipe Stop PS50 connector may not show any fractures.
- The Pipe Stop PS50 connector should always fit on both ends of the Pipe Stop PS50 rail without any problems.
- The hole in the steel Pipe Stop PS50 connector may not be oval.
- The Pipe Stop PS50 end cap (as shown in Fig. 7) may not show signs of permanent deformation or fractures.
- The Pipe Stop PS50 installation tool (as shown in Fig. 8) should not be bent or deformed after installation.
- The Pipe Stop PS50 fixation plate (as shown in Fig. 9) may not show any fractures or deformation.
- The Pipe Stop PS50 fixation plate should always fit over the Pipe Stop PS50 rails without any problems.
- The antiskid rubber mats (as shown in Fig. 10) may not be torn or crushed, during or after installation.

When using the Pipe Stop system, the procedures listed below should always be regarded. The following list is only a brief overview of the procedures that should be respected, a complete elaboration can be found in the following paragraphs of this chapter.

A. Installation of the Pipe Stop system
   A.1. Preparation of storage facility
   A.2. Installation of Rails
   A.3. Installation of Block A
   A.4. Installation of Blocks B, C and D
   A.5. Installation of Fixation Plate

B. Loading of pipes
   B.1. Verification of block settings
   B.2. Placement of bottom pipes of stack
   B.3. Verification of support of bottom pipes
   B.4. Placement of remaining pipes

C. Storage of pipes
   C.1. Inspection of pipe stack on regular base

D. Unloading of pipes
   D.1. Check stability of pipe stack
   D.2. Unloading pipes from stack

E. Disassembly of Pipe Stop System
   E.1. Removal of Pipe Stop parts

A. Installation of Pipe Stop System

Step A.1. Preparation of storage facility:

- Make sure the surface on which the Pipe Stop System will be installed is *levelled*, a slope of maximum 2° (= 3,5 %) is acceptable.
- Make sure the surface on which the Pipe Stop System will be installed is *flat*, unevenness in the terrain of maximum 10 mm are acceptable. Unevenness larger than 10 mm should be levelled out properly.
- Make sure the surface on which the Pipe Stop System will be installed is *free of ice, snow, oil, mud, algae*, or any other substances that have a negative influence on the friction.
- Make sure the surface on which the Pipe Stop System will be installed is free of obstacles (such as wood, stones, gravel or any other obstacles).
- When installing the Pipe Stop System on asphalt, concrete or pavement, the Pipe Stop System can be placed directly onto the ground. The surface needs to be reinforced in order to carry the pipe stack. Suggested is to use concrete mats, as specified in Appendix A, underneath the Pipe Stop rail.
- When installing the Pipe Stop System on timber beams, the surface needs to be level before placing the timber beams. The Pipe Stop System can be fixated to the timber, as specified in Appendix B.
- Make sure the load bearing capacity of the surface on which the Pipe Stop PS50 System will be installed is at least:
    - 2,75 MN/m^2 when installing the Pipe Stop PS50 rail *directly onto the ground*.
    - 1,35 MN/m^2 when installing the Pipe Stop PS50 rail *onto concrete mats*.
    - Contact Dhatec for this advice when installing the Pipe Stop PS50 rail *onto timber beams*.
- Make sure the storage area is visibly marked and that the transport and emergency routes are clearly indicated.
- Make sure the maximum operating temperature of 40°C is respected, when using the configuration tables as presented in Appendix C. Contact Dhatec for configuration tables for higher temperatures. On short term, a maximum object temperature of 65°C is acceptable.
- Contact Dhatec for long term storage on high temperature for special high temperature configuration tables.

Step A.2. Installation of rails

- Each Pipe Stop PS50 rail will be assembled from Pipe Stop PS50 rail segments of 4,0 meter long. For every pipe stack, at least two parallel Pipe Stop rails are necessary for securely stacking pipes. The needed amount of rails can be determined by means of the configuration tables as presented in Appendix C. In case it is unclear how many parallel Pipe Stop rails are needed for a correct support of the pipe stack, always contact Dhatec.
- When necessary, the Pipe Stop PS50 rail segments can be cut to the desired length. However, always consider *a minimum length of 1,0 meter*.
- Make sure the Pipe Stop PS50 rail segments are not damaged, deformed or worn down more than 10 mm.
- The Pipe Stop PS50 rail segments may only be connected by means of the specially designed connectors, which will only be supplied by Dhatec. For a smooth connection, the connectors need to be greased. In case connectors, other than supplied by Dhatec, are used, the safety of the Pipe Stop PS50 system cannot be guaranteed.
- Make sure that the connectors are not damaged and do not show signs of corrosion. In case of damages or corrosion, reject the connector!

- When connecting the Pipe Stop PS50 rail segments to each other, always use the Installation tool (as shown in Fig. 8) as supplied by Dhatec. Doing so will result in a gap between the Pipe Stop PS50 rail segments of 24,8 mm.
- A correct connection is absolutely vital for the safe functioning of the Pipe Stop PS50 system. See Fig. 11, Fig. 12 and Fig. 13 how the Pipe Stop rail segments should be connected to form a complete Pipe Stop rail. After connecting the Pipe Stop PS50 rail segments, place a Pipe Stop PS50 block over the newly made connection. The block should fit over the gap comfortably. If additional force is needed to place the block on the rail, the connection is incorrect and the connection needs to be made again.
- Make sure the Pipe Stop PS50 rail segments are not damaged, deformed or worn down more than 10 mm.
- The Pipe Stop PS50 rail segments may only be connected by means of the specially designed connectors, which will only be supplied by Dhatec. For a smooth connection, the connectors need to be greased. In case connectors, other than supplied by Dhatec, are used, the safety of the Pipe Stop PS50 system cannot be guaranteed.
- Make sure that the connectors are not damaged and do not show signs of corrosion. In case of damages or corrosion, reject the connector!
- When connecting the Pipe Stop PS50 rail segments to each other, always use the Installation tool (as shown in Fig. 8) as supplied by Dhatec. Doing so will result in a gap between the Pipe Stop PS50 rail segments of 24,8 mm.
- A correct connection is absolutely vital for the safe functioning of the Pipe Stop PS50 system. See Fig. 11, Fig. 12 and Fig. 13 how the Pipe Stop rail segments should be connected to form a complete Pipe Stop rail. After connecting the Pipe Stop PS50 rail segments, place a Pipe Stop PS50 block over the newly made connection. The block should fit over the gap comfortably. If additional force is needed to place the block on the rail, the connection is incorrect and the connection needs to be made again.

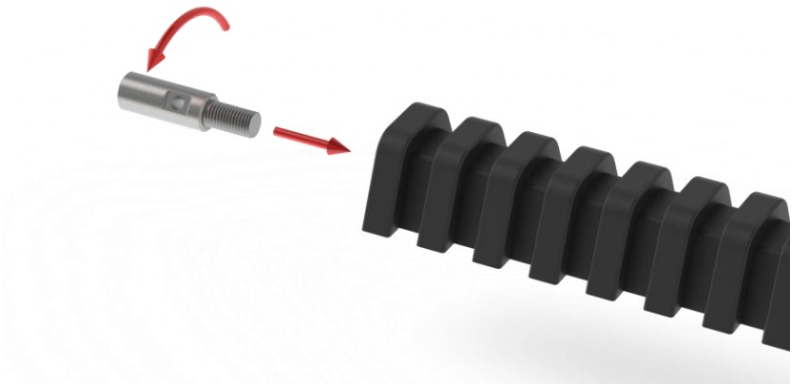


Figure 11. Step 1 of Pipe Stop rail assembly; fix the Pipe Stop connector with the male side only one thread into the end of a Pipe Stop rail segment

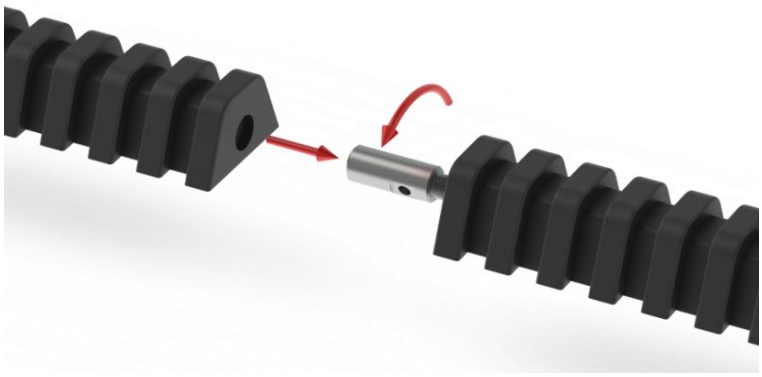


Figure 12. Step 2 of Pipe Stop rail assembly; slide the Pipe Stop rail segments together and turn the connector into the other Pipe Stop rail segment. Respect the above indicated sense of direction!

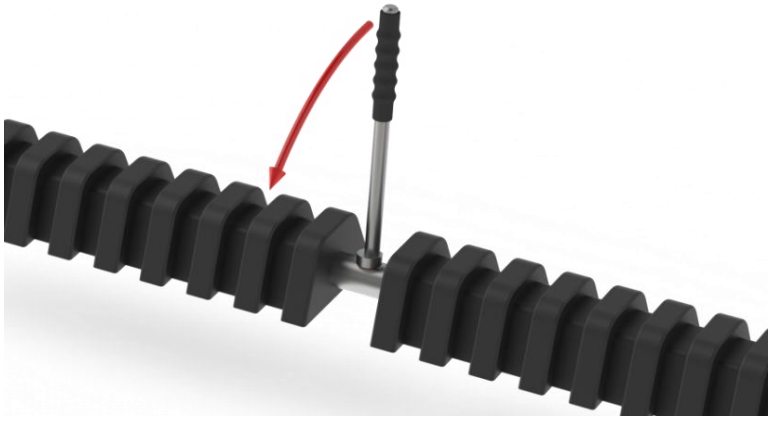
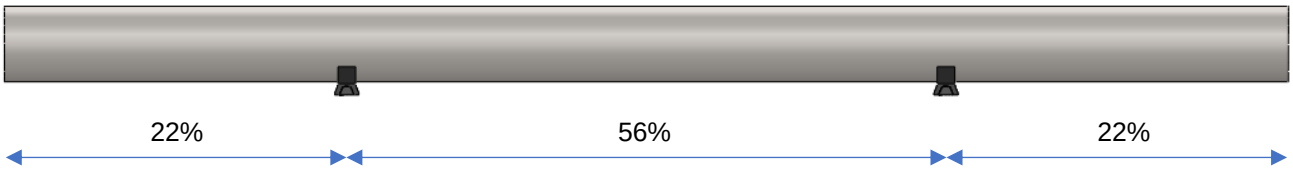


Figure 13. Step 3 of Pipe Stop rail assembly; use the Pipe Stop PS50 installation tool to rotate the connector in the indicated direction, until the gap between the rail segments is 24,8mm.

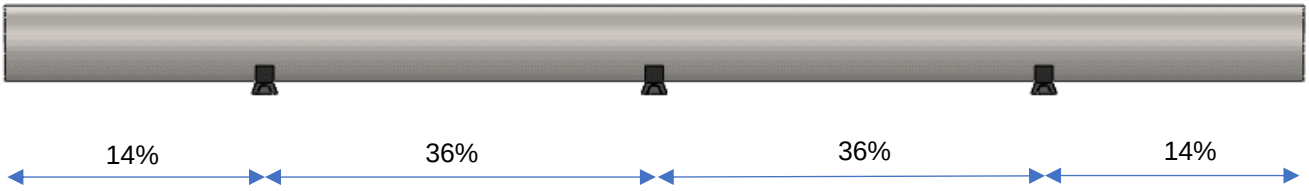
- It is *strongly* recommended to apply anti-skid rubber mats underneath the Pipe Stop PS50 rails, to prevent the rails from sliding away during loading. These anti-skid rubber mats should have a width of at least 250 mm and a thickness of at least 6 mm. By applying anti-skid rubber mats underneath the Pipe Stop PS50 rail, additional safety is added to the Pipe Stop PS50 system. Using anti-skid rubber mats will result in lower tensile stresses in the Pipe Stop PS50 rails.

- It is obligated to fix the Pipe Stop PS50 rails to the ground in case no anti-skid rubber mats are applied underneath the rails. Use the holes in the Pipe Stop PS50 rail segments for applying the fixings. For a proper fixation of the rails, it is important to use the right fixings;
    - For concrete area's use heavy duty anchors (type TA M from Fischer or comparable products from other suppliers)
    - For asphalt area's use asphalt anchors (type FAR from Fischer or comparable products from other suppliers)
    - For timber supports use a Galvanized Hexagon head wood screw DIN571 10x140MM and DIN7349 M10 Zinc-plated Steel Washer to fixate the rails on the timber. After positioning the PS50 rails on top of the anti-skid rubber mats, stabilization plate (if present) and timber beams, fixate the rails on to the timber underneath making use of the hole provisions on the PS50 rails. Each PS50 rail comes with 6 hole positions which can be used to fixate the rails on to the timber. After placing the PS50 rails on to the timber, pre-drill a hole of Ø5 mm at each of these hole locations through the anti-skid rubber mats, stabilization plate (if present) and timber support before going forward with drilling of the screws in to the timber. Once the hole is pre-drilled, bore the hole to Ø11 mm ***only in the anti-skid rubber mats and stabilization plate*** and ***not in the timber supports.*** This is important to ensure that the wood screws can be properly screwed in to the timber supports underneath and there is a sufficiently strong connection. Before screwing the wood screws in to the timber, place the M10 Zinc-plated Steel Washer on top of the PS50 rails where provisions have already been supplied. The M10 Hexagon head wood screw DIN 570 10x140MM can now be used to fixate the PS50 rails on to the timber supports underneath as shown in Appendix B.
- Make sure the anchors / fixings do not stick out from the top of the Pipe Stop PS50 rail. Otherwise the Pipe Stop blocks will not fit completely over the Pipe Stop rail.
- The alignment of the Pipe Stop PS50 rails is of vital importance for the safe functioning of the system. The rails needed for one pipe stack should be aligned parallel. An error of parallelism of 0,1 meter over a length of 25 meters is acceptable, with a maximum of 0,5 meter in total. When using anti-skid rubber mats underneath the Pipe Stop PS50 rails, the alignment of these rubber mats is of great importance too.
- To give the best support for the pipes, the Pipe Stop Rails must be placed at a set distance according to the pipe length and the amount of Pipe Stop Rails needed. The distance is prescribed as a percentage of the pipe length. The next figure will show the prescribed distances with 2, 3 and 4 supports.

2 Supports



3 Supports



4 Supports

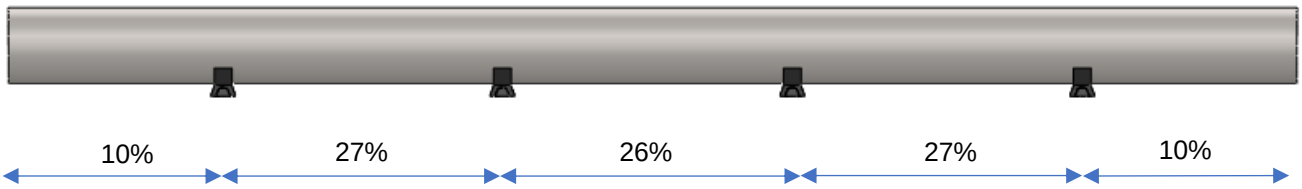


Figure 14. Ideal placement of supports

In case there are more than 4 parallel rails needed for stacking the pipes, always contact Dhatec for the correct position of the Pipe Stop rails.

- When the distances between the rails is decided, the first two rails can be connected to each other. The first support can be placed in position and fixed to the surface. Connect two other rails for support 2. To line-up support 1 and support 2, the rails must be placed parallel, this can be done by measuring “Distance A” (figure 15). To check if the starting point of support 1 is the same as support 2, distance “A-1” and “A-2” can be measured. Distance “A-1” should be the same as “A-2”. If the support is in position, it can be fixed to the surface. To line-up support 3 and 4 the same principal can be used, to minimize tolerances always measure from support 1. When the first two rails of each support are lined-up and fixed to the surface, the supports can be endless extend with other Pipe Stop Rails. Please contact Dhatec for all questions about lining-up the rails.

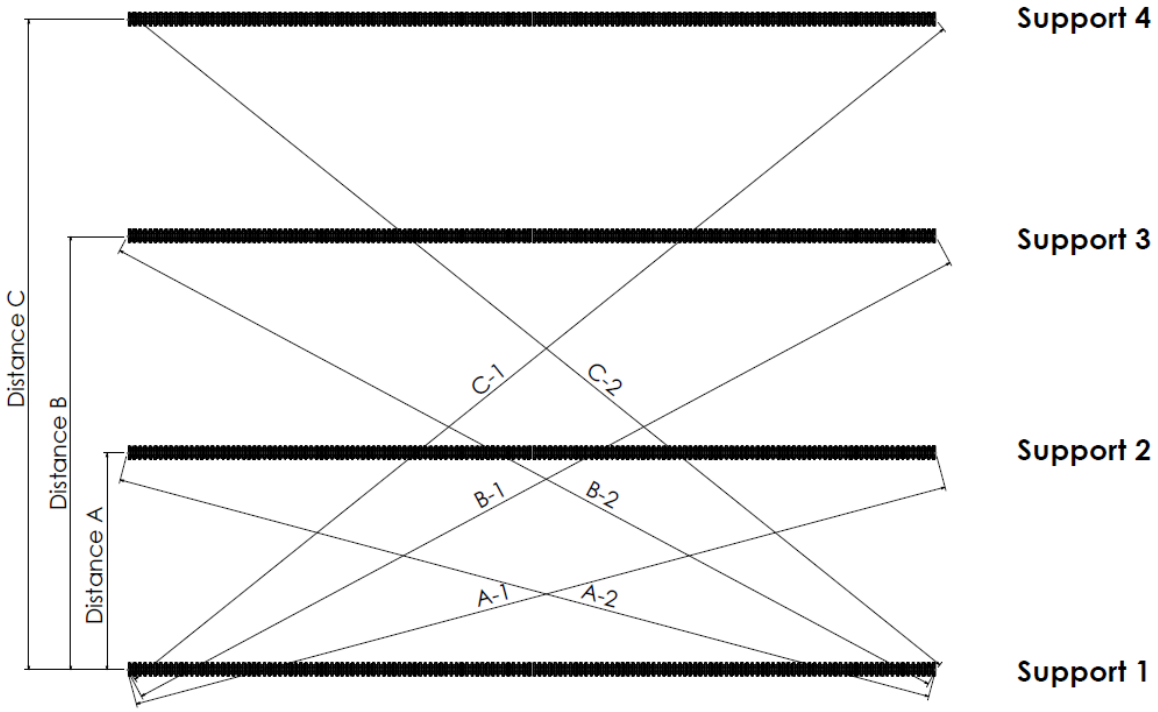


Figure 15. Line-up Pipe Stop

- To prevent Pipe Stop PS50 blocks being installed at the outer ends of the assembled Pipe Stop PS50 rails, always use Pipe Stop PS50 End Caps (see Fig. 7). These End Caps should be placed at each outer end of every assembled Pipe Stop PS50 rail. Use at least 2 tapping screws (4,0 x 45 mm) for fixating the End Cap onto the Pipe Stop PS50 rail.

Step A.3. Installation of block A

- Make sure the Pipe Stop PS50 rail and the surface on which the Pipe Stop PS50 blocks will be installed is *free of ice, snow, oil, mud, algae*, or any other substances that have a negative influence on the friction.
- In case anti-skid rubber mats are applied underneath the Pipe Stop PS50 rail, check the rubber mats for damages. In case the rubber mats are seriously damaged, replace them for new mats.
- Make sure that neither the Pipe Stop PS50 blocks are damaged, nor the edges of the Pipe Stop blocks are worn down more than 10 mm.
- In order to position the Pipe Stop PS50 blocks at the correct distance from each other, use the tables as presented in Appendix C. In case the settings that should be used are not completely clear, please get into contact with Dhatec for more information. Please be aware that Pipe Stop Block A has two different sides due to the asymmetric form. This asymmetric form enables the stacking of small diameter pipes (ø 200 - 406 mm).
  *Example of stacking pipes with an **outside** diameter of 219 mm and a weight of 770 kg per pipe using Block A:*
  Depending on the pipe diameter, pipe weight and number of rails on the bottom, you can see how many layers of pipes you can stack. According to the Pipe Stop PS50 configuration for Block A, you can stack up a maximum of 20 layers.
  When applying the blocks for 219 mm pipes, the gap between the blocks should be 11 mm according to configuration type 1-2-1.
- *Since the asymmetric form of Block A enables the stacking of small diameter pipes, it allows as well the possibility to have two different kinds of configurations (Type 1-2-1 and Type 1-1-1).*
  1) Same side in front (1-1-1 or 2-2-2) used for 9, 11, 13 and 16 inch pipes (see table on page 25).
  2) Alternately sides in front (1-2-1) used for 8, 10, 12 and 14 inch pipes (see table on page 25).
  Make sure you use the same configuration for every rail that is used in the same stack.

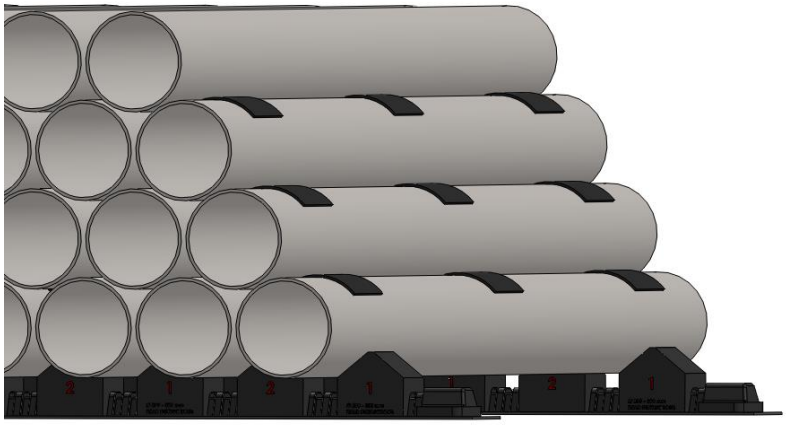


Figure 16. Pipe Stop configuration Type 1-2-1

Step A.4. Installation of blocks B, C and D

- Make sure the Pipe Stop PS50 rail and the surface on which the Pipe Stop PS50 blocks will be installed is *free of ice, snow, oil, mud, algae*, or any other substances that have a negative influence on the friction.
- In case anti-skid rubber mats are applied underneath the Pipe Stop PS50 rail, check the rubber mats for damages. In case the rubber mats are seriously damaged, replace them for new mats.
- Make sure that neither the Pipe Stop PS50 blocks are damaged, nor the edges of the Pipe Stop blocks are worn down more than 10 mm.
- In order to position the Pipe Stop PS50 blocks at the correct distance from each other, use the tables as presented in Appendix C. In case the settings that should be used are not completely clear, please get into contact with Dhatec for more information.
  *Example of the Pipe Stop Configurations to store pipes with an **outside** diameter of 36" and a weight of 4.000 kg per pipe:*
  Depending on the pipe diameter, pipe weight and number of rails on the bottom you can see how many layers of pipes you can stack.
  According to the Pipe Stop PS50 Configuration you can use Pipe Stop Block C.
  This means when you use 2 bottom rails, you can stack up a maximum of 12 layers pipes. When using 3 bottom rails, you can stack up a maximum of 15 layers pipes.
- Make sure there is full contact between the Pipe Stop rail and the Pipe Stop blocks over the whole length of the block. Gaps between the blocks and the rails should always be avoided in order to prevent an incorrect transfer of the horizontal forces from the blocks to the rails.
- Make sure there is full contact between the Pipe Stop blocks and the ground, over the whole length of the block. Gaps between the blocks and the ground should always be avoided in order to prevent an incorrect transfer of the vertical forces from the blocks to the ground.

Step A.5. Installation of fixation plate

- To fix the rail on to the surface, the holes in the rails can be used as mentioned in Step A.2. Another option to fix the rails is to use the fixation plate. The fixation plate is usually used to prevent the rails from shifting position during the loading of the pipes in the initial set-up process.
- After placing the blocks on the rails, the fixation plates are placed over the rails. At least two fixation plates per rail segments are required.
- Screws or welds can be used to fix the rails on the surface, using fixation plates; depending of the nature of the surface.
- Fixation Plates are available in Steel and Stainless Steel. Stainless Steel plates are suitable for marine conditions where there can be salinity in the atmosphere and corrosion can occur.

B. Loading of pipes

Step B.1. Verification of block settings

- Make sure the Pipe Stop PS50 blocks are *free of ice, snow, oil, mud, algae*, or any other substances that have a negative influence on the friction.
- Make sure the contact surface of the Pipe Stop PS50 blocks and the top side of the Pipe Stop PS50 rail are free of substances that can cause damages to pipe coatings.
- Check if the gaps between the block are set according to the configuration.
- Check if the Pipe Stop PS50 blocks make full contact with the Pipe Stop PS50 rail over the whole length of the blocks. In case there is a gap between the Pipe Stop block and the Pipe Stop rail, take away the block and make the Pipe Stop rail underneath the block free from obstacles.
- Check if the Pipe Stop PS50 blocks make full contact with the ground, over the whole length of the blocks. In case there is a gap between the Pipe Stop block and ground, take away the block and make the surface underneath the block free from obstacles.

Step B.2. Placement of bottom pipes of stack

- Before stacking the pipes, follow step B.2. and step B.3. of this manual completely. First position the pipes on the bottom layer of the pipe stack.
- Make sure that the pipes, that will be part of one pipe stack, all have the same outer diameter. A tolerance in the outer diameters of the pipes of 0,5 % is acceptable.
- Make sure that during the lifting and loading procedures of the pipes, nobody is standing underneath the lifted pipes.
- The dynamic loads/forces to the Pipe Stop system should be kept to a minimum. The vertical crane speed for loading and unloading the pipes should be limited to max 0,1 m/s. Pipe need to be positioned with minimum impact.
- Make sure that the distance from the end of the pipe to the Pipe Stop rail is equal for both sides of the pipe, otherwise reposition the pipe to realize the same overhang on both sides of the pipe.

Step B.3. Verification of support of bottom pipes

- Before stacking the pipes, follow step B.2. and step B.3. of this manual completely. First position the pipes on the bottom layer of the pipe stack.
- Make sure that the pipes, that will be part of one pipe stack, all have the same outer diameter. A tolerance in the outer diameters of the pipes of 0,5 % is acceptable.
- Make sure that during the lifting and loading procedures of the pipes, nobody is standing underneath the lifted pipes.
- The dynamic loads/forces to the Pipe Stop system should be kept to a minimum. The vertical crane speed for loading and unloading the pipes should be limited to max 0,1 m/s. Pipe need to be positioned with minimum impact.
- Make sure that the distance from the end of the pipe to the Pipe Stop rail is equal for both sides of the pipe, otherwise reposition the pipe to realize the same overhang on both sides of the pipe.

Step B.4. Placement of remaining pipes

- After building and checking the bottom layer of the pipe stack, continue by positioning the remaining pipes. See Fig. 17 how to arrange the pipe stack. Make sure the vacant pipe positions on the outside of the pipe stack are respected!

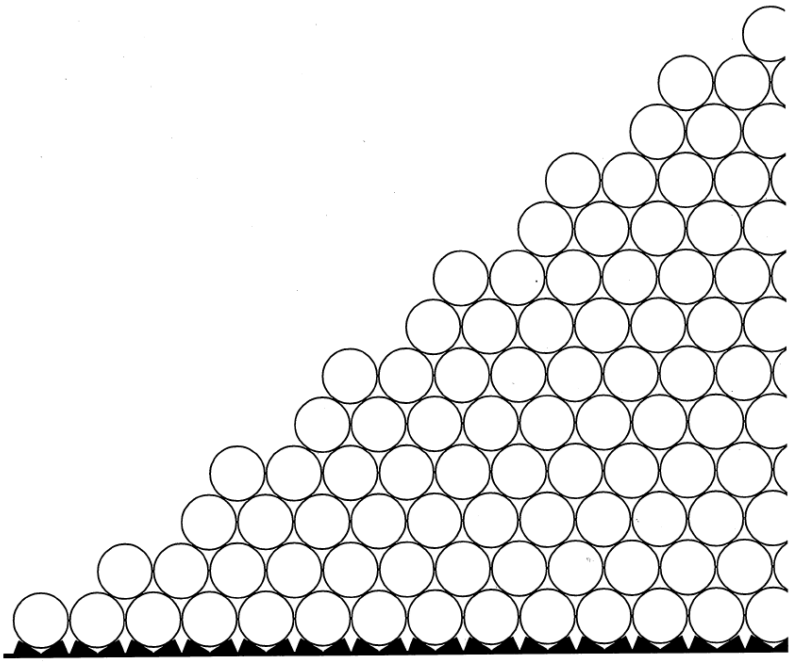


Figure 17. Arrangement of pipes, stacked on Pipe Stop PS50 system

- Make sure that the pipes, that will be part of one pipe stack, all have the same outer diameter. A tolerance in the outer diameters of the pipes of 0,5 % is acceptable.
- Make sure that during the lifting and loading procedures of the pipes, nobody is standing underneath the lifted pipes.
- The dynamic loads / forces to the Pipe Stop PS50 system should be kept to a minimum. The vertical crane speed for loading and unloading the pipes should be limited to max 0,1 m/s. Pipes need to be positioned with minimum impact.
- Make sure the distance from the end of the pipe to the end of the pipe below is equal for both sides of the pipe. Otherwise reposition the pipe to realize the same distance on both sides of the pipe.
- Make sure the maximum number of pipe layers, according to the configuration tables as presented in Appendix C, are respected. Never stack more pipe layers on the Pipe Stop PS50 system than indicated in the configuration table!
- The configuration tables as presented in Appendix C, shows the maximum number of pipes layers that can be supported by the Pipe Stop PS50 system. The pipes themselves have a stacking limitation as well. Always take this limitation into account when building a pipe stack!

Note:

When building the next pyramid stack of pipes on the same PS50 rails, please follow step B.1 to B.4 again. Due to the weights of the pipes, the PS50 rails can be stretched. When start stacking from both sides of the PS50 rails it is possible that this stretching may result in deformation of the PS50 rails in the middle. For this reason, it is advised to start stacking at one side and continue to the other side. Please see Fig. 18 and Fig. 19 for more understanding.

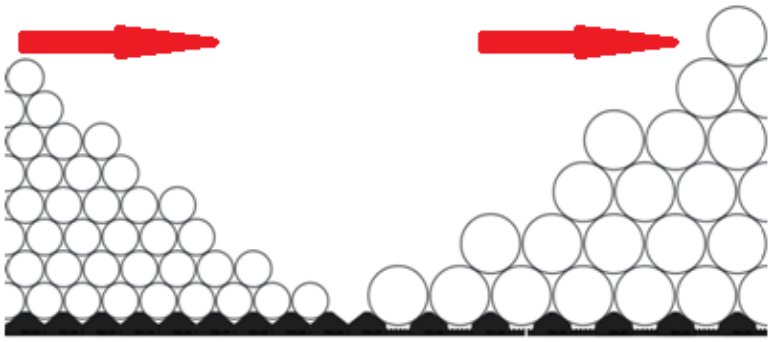


Fig. 18: Advised way of stacking, two pyramid stacks started against each other.

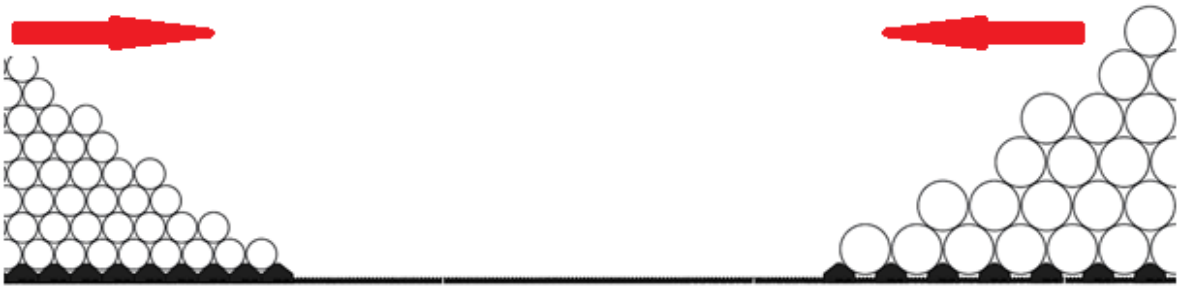


Fig. 19: Not advised way of stacking, two pyramid stacks each started from another side.

If there is an important reason for stacking from both sides, it is highly advised not to connect the PS50 rails in middle.

C. Storage of pipes

Step C.1. Inspection of pipe stack on regular base

- During the storage of the pipes, at least once a month the pipe stack and the Pipe Stop PS50 parts should be inspected visually.
- Make sure the pipe stack is according to the configuration tables as presented in Appendix C. The maximum number of pipe layers and the maximum pipe weight should always be respected.
- Check the Pipe Stop PS50 parts for deformation conform the critical product specifications. In case of irregularities, the relevant Pipe Stop PS50 part should be discarded and replaced by an intact and approved part.
- Check if all spaces between the pipes are the same across the bottom layer of the pipe stack. In case of irregularities, even though the Pipe Stop blocks are set at the correct position according to the configuration tables as presented in Appendix C, always contact Dhatec.
- Check if there is no contact between the pipes and the Pipe Stop PS50 rail. In case there is contact, make sure that the Pipe Stop blocks are set at the correct position. Supposing that all Pipe Stop blocks are positioned correctly, always contact Dhatec.
- Check if there is full contact between all Pipe Stop PS50 blocks and the pipe. If not, make sure the Pipe Stop blocks are set at the correct position and reposition the pipe so that there is full contact between the pipe and all Pipe Stop blocks.
- Check if the Pipe Stop PS50 blocks are not tilted and they make full contact with the Pipe Stop PS50 rail over the whole length of the blocks. In case a block is tilted or there is no full contact, remove the overlying pipe and reposition the Pipe Stop block on the Pipe Stop rail to restore full contact between the rail and the block.
- Check if the Pipe Stop PS50 blocks make full contact with the ground. In case there is no full contact between the ground and the Pipe Stop block, make the surface underneath the block free from obstacles to restore full contact between the block and the ground.

D. Unloading of pipes

Step D.1. Check stability of pipe stack

- Before unloading the pipe stack, the stack should be inspected conform the procedures as prescribed in paragraph *"C Storage of pipes"* to ensure the stability of the pipe stack. In case the stability of the pipe stack is uncertain, always contact Dhatec.

Step D.2. Unloading pipes from stack

- Once the stability of the pipe stack is confirmed, the unloading of the pipes can start. Therefore proper handling and lifting equipment should be used.
- Make sure the stability of the pipe stack is controlled during unloading of the stack. The vacant pipe positions on the outside of the pipe stack, as presented in the arrangement of Fig. 16 should be respected as much as possible during unloading of the pipe stack!
- Make sure that during lifting of the pipes, nobody is standing underneath the lifted pipes.
- The dynamic loads / forces to the Pipe Stop PS50 system should be kept to a minimum. The vertical crane speed for loading and unloading the pipes should be limited to max 0,1 m/s. Pipes need to be removed with minimum impact.

E. Disassembly of Pipe Stop System

Step E.1. removal of Pipe Stop parts

- Once all pipes are removed from the pipe stack the Pipe Stop PS50 system can be disassembled.
- All disassembled Pipe Stop PS50 parts should be subjected to an extensive visual inspection. The critical product specifications, should always be respected. In case a part does not meet these specifications, that relevant part should be discarded and replaced by an intact and approved part.
- After the disassembling and inspection of the Pipe Stop parts, these parts should be stored properly. Further, the Pipe Stop PS50 rail segments and the Pipe Stop PS50 connectors should be greased, in order to prevent corrosion during storage of the Pipe Stop parts.

Warnings and recommendations

- Never use the Pipe Stop PS50 system on slopes of more than 2° (= 3,5 %).
- Unevenness in the terrain of more than 10 mm are not acceptable.
- Make sure the maximum operating temperature of 40°C is respected, when using the configuration tables as presented in Appendix C. Contact Dhatec for configuration tables for higher temperatures.
- Never use the Pipe Stop PS50 system for objects with a temperature of more than 65°C.
- Never use Pipe Stop PS50 parts that should have been discarded according to the critical product specifications.
- The Pipe Stop PS50 blocks must be free from substances that have a negative influence on the friction.
- Never use Pipe Stop PS50 rail segments that are shorter than 1,0 meters.
- The alignment of the Pipe Stop PS50 rails is vital importance for the safe functioning of the system. The rails needed for one pipe stack should be aligned parallel. In case of two parallel rails, the distance between the rails should be 56% of the pipe length.
- Never use connectors other than supplied by Dhatec.
- Always prevent the Pipe Stop PS50 rails form sliding away during loading, by applying antiskid rubber mats underneath the rails or by fixating the rails to the ground.
- Always position the Pipe Stop PS50 blocks according to the configuration tables as presented in Appendix C.
- Always use Pipe Stop PS50 end caps at the end of each Pipe Stop rail.
- Never store pipes with different outer diameters in the one pipe stack.
- Never exceed the vertical crane speed of max 0,1 m/s during loading and unloading of the pipes.
- Never allow anybody underneath the lifted pipes during loading and unloading of the pipes.
- Always respect the vacant pipe positions as indicated in Fig. 16.
- Always respect the maximum number of pipe layers according to the configuration tables as presented in Appendix C.
- During the storage of the pipes, at least once a month the pipe stack and the Pipe Stop PS50 parts should be inspected visually.
- Before unloading the pipe stack, ensure the stability of the pipe stack.
- After dismantling the Pipe Stop PS50 system, subject the parts to an extensive visual inspection and discard the parts that do not meet the critical product specifications.

This instruction manual is put together with great care. When safety risks and issues are noticed which are not covered by this instruction, please contact Dhatec to share this remark.

Guidelines to check if Pipe Stop is applied properly

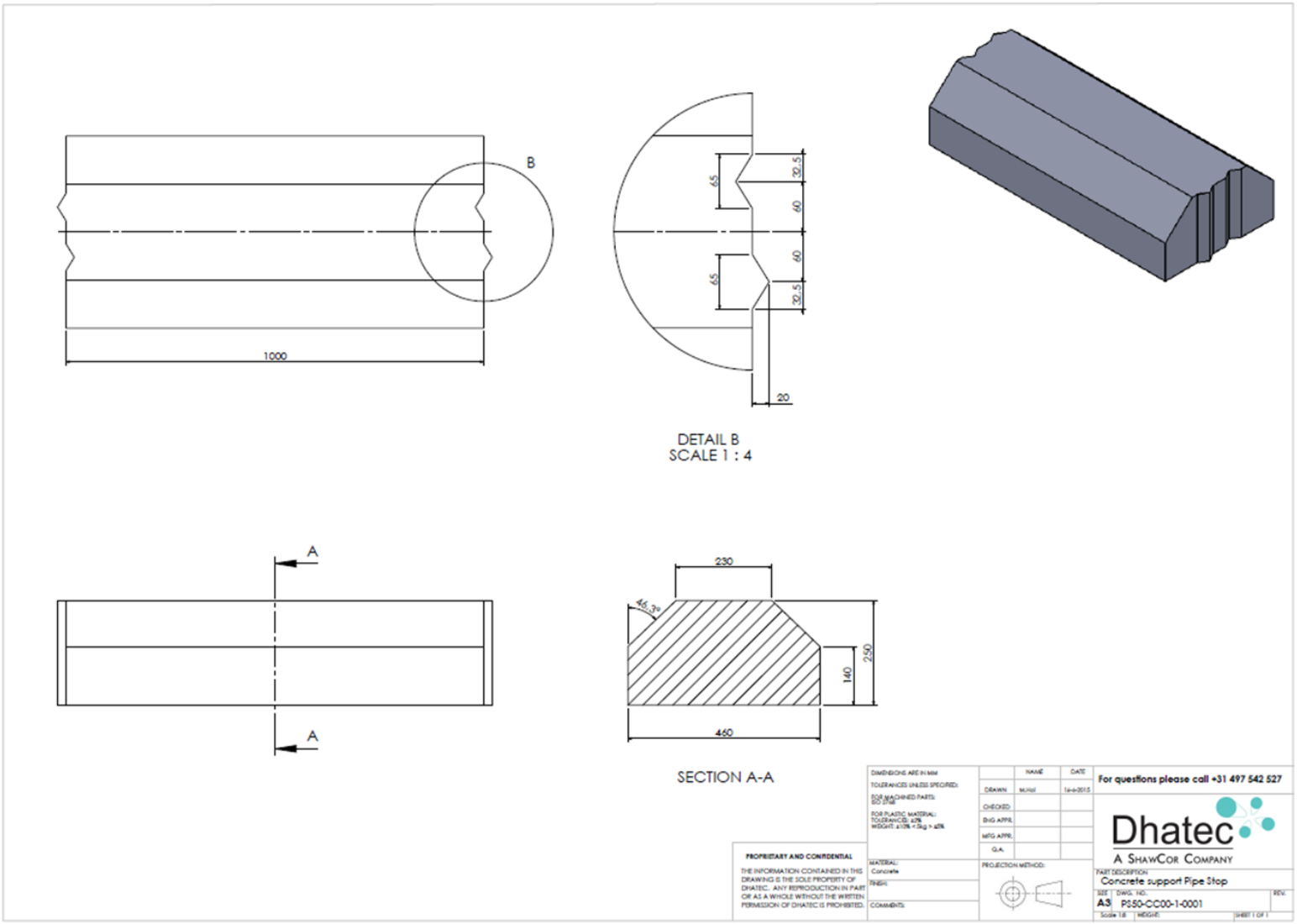
Make sure there is full contact between the Pipe Stop rail and blocks over the whole length of the block. Always use end Caps onto the end of the rail:

- **There is no full contact over the whole length of the block and the rail**
- **End Cap is not used on the end of the rail**
- **Antiskid layer is not placed underneath the Pipe Stop system**

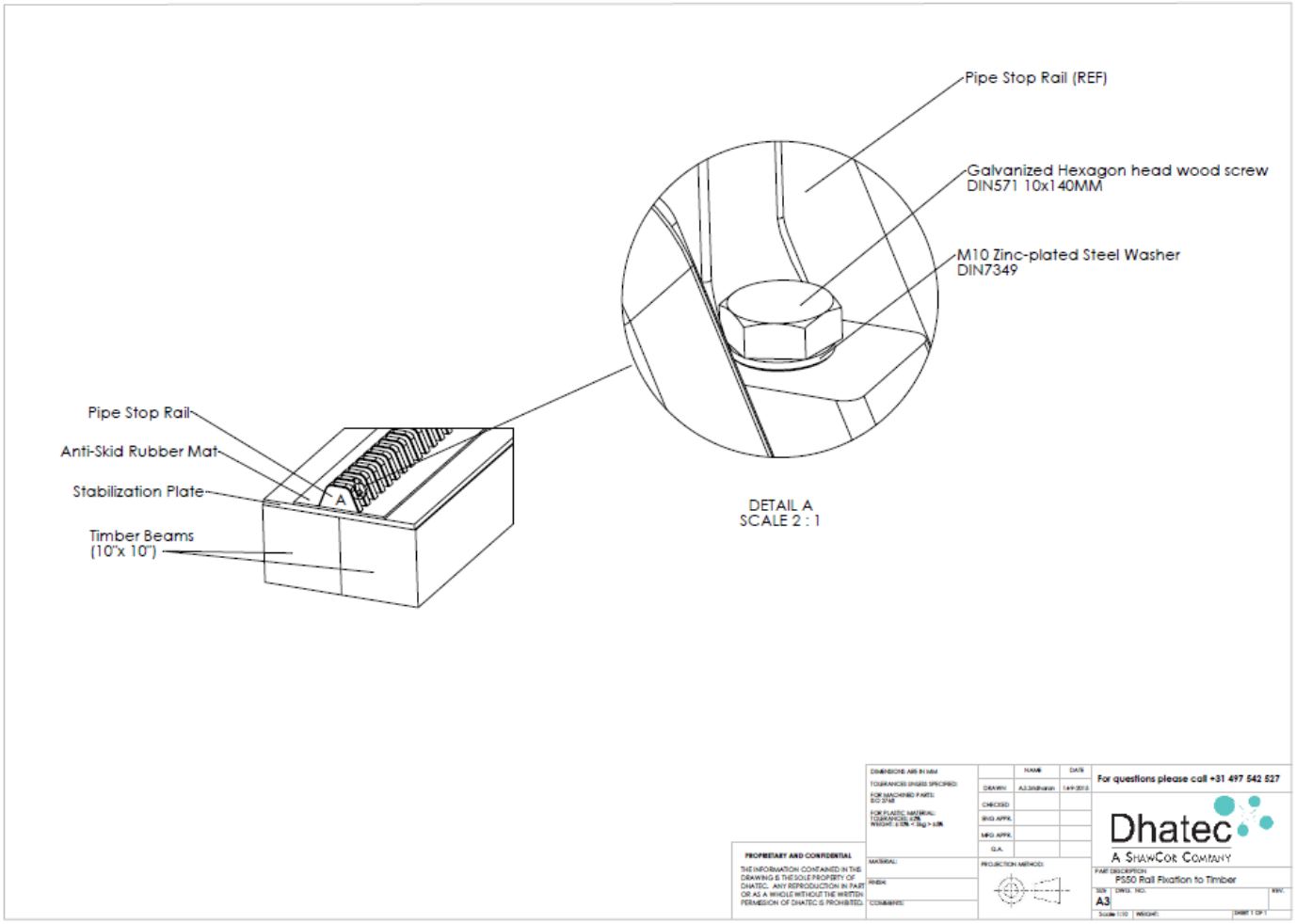
All pipes in one stack must have the same outside diameter:

- **Different pipe (outside) diameter in the same**

Appendix A: Drawing of concrete strip



Appendix B: Drawing of PS50 Rail Fixation to Timber



Appendix C: Configuration tables for Pipe Stop PS50 system

Pipe Stop PS50 Configurations - For Block type A (Ø 8 - Ø 16 inch) (Ø 200 - Ø 406 mm)

DHATEC A SHAWCOR COMPANY

Pipe Stop PS50 Values determind for max. 40°C (Contact Dhatec for configurations for higher temperatures)						Pipe diameter		Block A as in Type 1-2-1				Block A as in Type 1-1-1			
2 rails		3 rails		4 rails		from	(mm)	200	250	302	354	224	276	328	380
pipe weight		pipe weight		pipe weight		to	(mm)	224	276	328	380	250	302	354	406
from (kg)	to (kg)	from (kg)	to (kg)	from (kg)	to (kg)	inch		8 5/8	10 3/4	12 3/4	14	9 5/8	11 3/4	13 5/8	16
						Gap (mm)		11	63	115	167	37	89	141	193
0	1210	0	1815	0	2420	Maximum number of pipe layers →		20	20	20	20	20	20	20	20
1210	1274	1815	1911	2420	2548			19	19	19	19	19	19	19	19
1274	1345	1911	2018	2548	2690			18	18	18	18	18	18	18	18
1345	1424	2018	2136	2690	2848			17	17	17	17	17	17	17	17
1424	1513	2136	2270	2848	3026			16	16	16	16	16	16	16	16
1513	1614	2270	2421	3026	3228			15	15	15	15	15	15	15	15
1614	1729	2421	2594	3228	3458			14	14	14	14	14	14	14	14
1729	1862	2594	2793	3458	3724			13	13	13	13	13	13	13	13
1862	2018	2793	3027	3724	4036			12	12	12	12	12	12	12	12
2018	2201	3027	3302	4036	4402			11	11	11	11	11	11	11	11
2201	2421	3302	3632	4402	4842			10	10	10	10	10	10	10	10
2421	2690	3632	4035	4842	5380			9	9	9	9	9	9	9	9
2690	3027	4035	4541	5380	6054			8	8	8	8	8	8	8	8
3027	3459	4541	5189	6054	6918			7	7	7	7	7	7	7	7
3459	4036	5189	6054	6918	8072			6	6	6	6	6	6	6	6
4036	4843	6054	7265	8072	9686			5	5	5	5	5	5	5	5
4843	6054	7265	9081	9686	12108			4	4	4	4	4	4	4	4
6054	8072	9081	12108	12108	16144			3	3	3	3	3	3	3	3
8072	12109	12108	18164	16144	24218			2	2	2	2	2	2	2	2
12109	24218	18164	36327	24218	48436			1	1	1	1	1	1	1	1
						center to center distance (mm)		234	286	338	390	260	312	364	416

Warning:
This table shows the maximum number of pipe layers that can be supported by the Pipe Stop PS50 system. The pipes themselves have a stacking limitation as well, take this limitation into account when building the stack!

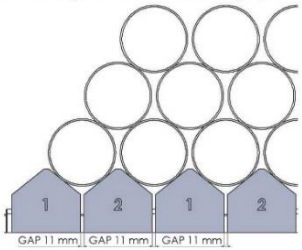
Please read page 16 of the installation manual for the detailed explanation about installing Pipe Stop Block A

limitation is total weight on each position (24,2 tons)

Date: 4-12-2013

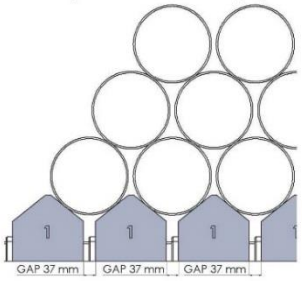
Authors: Ing. Tom van der Weerden

Example 8 5/8 inch pipe



Configuration Type 1-2-1

Example 9 5/8 inch pipe



Configuration Type 1-1-1

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DHATEC
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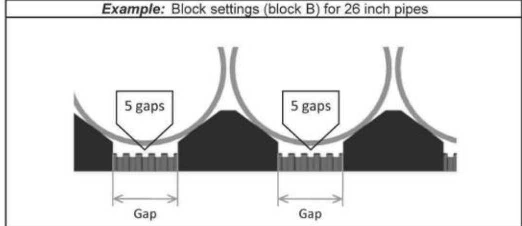
Pipe Stop PS50 Configurations - For Block type B & C (Ø 380 - Ø 1590 mm)

Pipe Stop PS50
Values determined for max. 40°C (Contact Dhatec for configurations for higher temperatures)

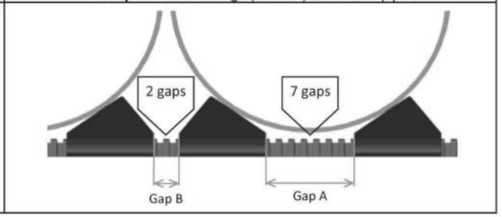
2 rails pipe weight from (kg)	2 rails pipe weight to (kg)	3 rails pipe weight from (kg)	3 rails pipe weight to (kg)	4 rails pipe weight from (kg)	4 rails pipe weight to (kg)	pipe diameter	block B						block C																	
						from (mm)	380	412	463	515	566	618	660	715	772	824	875	927	978	1030	1081	1133	1184	1236	1287	1338	1390	1441	1493	1530
						to (mm)	412	463	515	566	618	670	715	772	824	875	927	978	1030	1081	1133	1184	1236	1287	1338	1390	1441	1493	1530	1590
						Inch	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62
						Gap: / Gap A:	0	1	2	3	4	5	0	1	2	3	4	5	6	6	7	7	7	8	8	8	9	9	9	10
						Gap B:							0	0	0	0	0	0	0	1	1	2	3	3	4	5	5	6	7	7
0	1300	0	2000	0	2650	↓ Maximum number of pipe layers ↓	20	20	20	20	20	20	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
1300	1450	2000	2200	2650	2950		19	19	19	19	19	19	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
1450	1600	2200	2450	2950	3250		18	18	18	18	18	18	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
1600	1800	2450	2700	3250	3650		17	17	17	17	17	17	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
1800	2050	2700	3050	3650	4100		16	16	16	16	16	16	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
2050	2300	3050	3500	4100	4650		15	15	15	15	15	15	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
2300	2650	3500	4000	4650	5300		14	14	14	14	14	14	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
2650	2900	4000	4350	5300	5800		13	13	13	13	13	13	15	15	15	15	15	14	14	13	12	12	11	11	10	10	9	9	9	9
2900	3050	4350	4600	5800	6150		13	13	13	13	13	13	14	14	14	14	14	14	14	13	12	12	11	11	10	10	9	9	9	9
3050	3300	4600	4950	6150	6650		12	12	12	12	12	12	14	14	14	14	14	14	14	13	12	12	11	11	10	10	9	9	9	9
3300	3550	4950	5350	6650	7150		12	12	12	12	12	12	13	13	13	13	13	13	13	13	12	12	11	11	10	10	9	9	9	9
3550	3800	5350	5750	7150	7650		11	11	11	11	11	11	13	13	13	13	13	13	13	13	12	12	11	11	10	10	9	9	9	9
3800	4150	5750	6250	7650	8300		11	11	11	11	11	11	12	12	12	12	12	12	12	12	12	12	11	11	10	10	9	9	9	9
4150	4200	6250	6300	8300	8450		11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	10	10	9	9	9	9
4200	4500	6300	6800	8450	9050		10	10	10	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	10	10	9	9	9	9
4500	5000	6800	7500	9050	10000		10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	9	9	9	9
5000	5550	7500	8300	10000	11100		9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
5550	6250	8300	9350	11100	12500		8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
6250	7100	9350	10700	12500	14250		7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7
7100	8300	10700	12500	14250	16650		6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
8300	10000	12500	15000	16650	20000		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
10000	12500	15000	18750	20000	25000		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
12500	16650	18750	25000	25000	33300		3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
16650	25000	25000	37500	33300	50000		2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
25000	50000	37500	75000	50000	100000		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
						center to center distance (mm)	416	468	520	572	624	676	728	780	832	884	936	988	1040	1092	1144	1196	1248	1300	1352	1404	1456	1508	1560	1612
						min. distance pipe to floor (mm)	134	126	116	105	94	83	155	144	132	121	110	98	86	93	81	87	93	81	88	94	82	88	94	81

Warning:
This table shows the maximum number of pipe layers that can be supported by the Pipe Stop PS50 system. The pipes themselves have a stacking limitation as well, take this limitation into account when building the stack!

Example: Block settings (block B) for 26 inch pipes



Example: Block settings (block C) for 46 inch pipes



- limitation is maximum amount of layers (15 resp. 20)
- limitation is stackingheight (12 meter)
- limitation is total weight on each position (50 tons)
- limitation is strength of rail/connector

Date: 05-01-2012
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DHATEC
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Pipe Stop PS50 Configurations - For Block type D (Ø 1030 - Ø 2575 mm)

| Pipe Stop PS50 | | | | | | pipe diameter | | block D | | | | | |