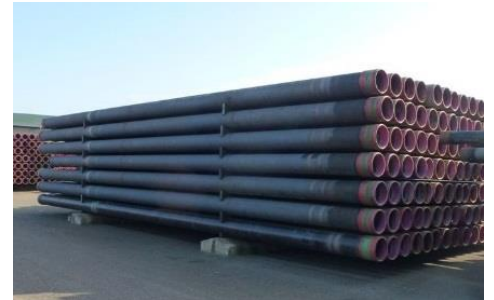




Application Procedure Specification Dhatec Carrier Premium

Dhatec Document No.: DHA415-APS-PCP

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Change Record

Rev.	Description of Revision
00	First Issue
01	Details of the Anti-Skid added (p.6)
02	General update + layout
03	Font style

General Information

Equipment	Pipe Carrier Premium
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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 Carrier Premium is a suitable solution for storage or transport of small diameter pipes with a range from Ø114,3 up to Ø508 mm (4,5" – 20"). It allows efficient and safe pipe handling and transport.

The Pipe Carrier Premium improves pipe storage and pipe transport operations. The logistic processes of tubes and pipes are simplified with 5 carrier types that cover the above-mentioned diameter range. The system provides possibilities for bundling tubes, allowing efficient handling and transport of many tubes simultaneously. Each carrier has a length of 1,225 m. Two carriers beside each other use the full truck width (2,45 m) resulting in an optimal truck load configuration. Also, maximum safety during transport is ensured since the Carriers are designed to be tilting proof. With the Pipe Carrier Premium, pipes are supported sideways. This results in less stress for pipe and coating due to a better distribution of forces. An added advantage is that each model of the Pipe Carrier Premium is suitable for a certain diameter range. Less carriers are needed to cover different sizes.

Pipe Carrier Premium is made from UV-stabilized recycled LDPE with a high load bearing capacity. The LDPE surface respects any coating layer and no parts are sticking out, making them safe for coated pipes. The system is weather proof, reusable and highly durable for short and long-term storage.

Always contact Dhatec in case of doubts or uncertainties during installation, operation and maintenance of the Pipe Carrier Premium parts.

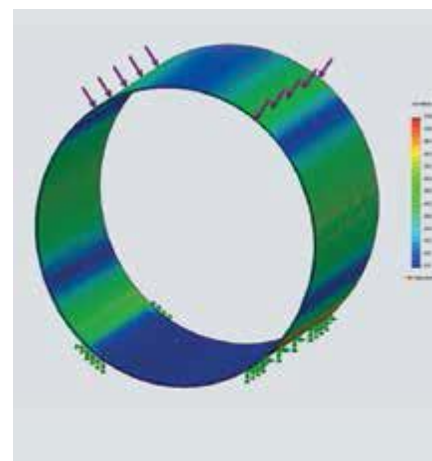


Figure 1. less stress due to sideways support

Equipment

Pipe Carrier Premium consists of a range of Base-Carriers and a range of Mid-Carriers (Types 2-5).

The Base-Carrier is placed at the bottom. After placing the first layer of pipes on the Base-Carrier, the Mid-Carrier is positioned on top of the first layer of pipes. After that another layer of pipes can be placed on the Mid Carrier and another Mid-Carrier can be placed on top of pipes to continue with the pipe loading process. The number of Carriers depends on the total weight of the pipes. If the Pipe Carrier Premium is used for transport, Anti-Skid mats have to be placed underneath the Base-Carrier and in the pipe spaces as shown in Figure 2. Always use pipe spaces to stack pipes. It is not allowed for sides of the Pipe Carrier Premium to make contact with the pipe.

Types of Pipe Carrier Premium:

Type	Pipe Diameter Range [mm]	Pipe Diameter Range [inch]	Max. Load per Recess [kg]	Max. Load Base Carrier [kg]	Max. Load Mid Carrier [kg]
Pipe Carrier 6	Ø 114,3 – 204,2	Ø 4,500 – 8,000	1.436,0	8.616	8.616
Pipe Carrier 5	Ø 177,8 – 245,0	Ø 7,000 – 9,625	2.233,7	11.169	11.169
Pipe Carrier 4	Ø 219,1 – 306,3	Ø 8,625 – 12,000	2.750,0	11.000	11.000
Pipe Carrier 3	Ø 273,1 – 408,3	Ø 10,750 – 16,000	3.429,7	10.289	10.289
Pipe Carrier 2	Ø 355,6 – 508,0	Ø 14,000 – 20,000	5.050,1	10.100	10.100

Table 1. Types of Pipe Carrier Premium

Base and Mid Carrier

The Base-Carrier is recognizable by the flat surface at the bottom as shown in Figure 2.

Type	Weight (kg)
Pipe Carrier Premium 6 Base	11,2
Pipe Carrier Premium 6 Mid	12
Pipe Carrier Premium 5 Base	11,8
Pipe Carrier Premium 5 Mid	11,5
Pipe Carrier Premium 4 Base	11,2
Pipe Carrier Premium 4 Mid	12
Pipe Carrier Premium 3 Base	12,3
Pipe Carrier Premium 3 Mid	13,9
Pipe Carrier Premium 2 Base	15,6
Pipe Carrier Premium 2 Mid	18

Table 2. Weight of the Base and Mid-Carriers

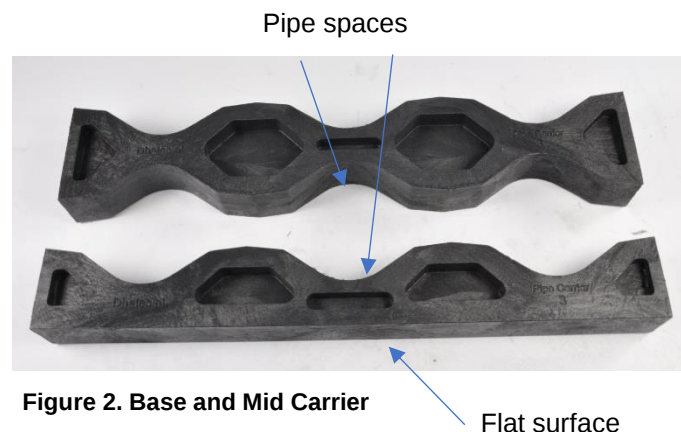


Figure 2. Base and Mid Carrier

Anti-Skid

Weight of the Anti-Skid (200mm x 8mm) is approximately 1,4 kg/meter.

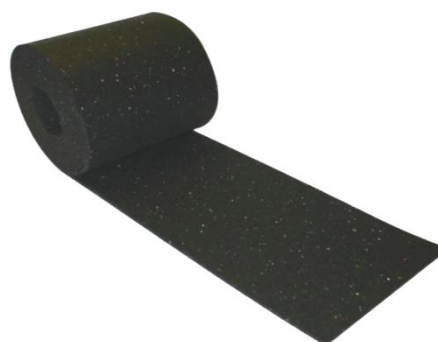


Figure 3. Anti-Skid

Installation of Pipe Carrier Premium for Storage

Step 1. Preparation of storage facility:

- Make sure the surface on which the Pipe Carrier Premium will be installed is *levelled*, a slope of maximum 2° (= 3,5 %) is acceptable.
- Make sure the surface on which the Pipe Carrier Premium 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 Carrier Premium 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 Carrier Premium will be installed is free of obstacles (such as wood, stones, gravel or any other obstacles).
- When installing the Pipe Carrier premium on asphalt, concrete or pavement, the Pipe Carrier Premium can be placed directly on these surfaces. Otherwise the ground needs to be reinforced in order to carry the pipe stack. Suggested is to use concrete slabs, as specified in Appendix A, underneath the Pipe Carrier Premium.
- 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 60°C is respected, otherwise contact Dhatec for maximum load specifications at higher temperatures.

Step 2. Preparation of placing pipes

- Before using the Pipe Carrier Premium, the Base-Carrier and Mid-Carrier should be subjected to an extensive visual inspection. If any below listed defect is observed, discard the relevant parts.
 - o The Base-Carrier and Mid-Carrier may not show permanent imprints of pipes on the supporting faces.
 - o The logos on the sides of the Base-Carrier and Mid-Carrier may not be illegible.
 - o The antiskid rubber mats (as shown in Figure 3) may not be torn or crushed, during or after installation. If they happen to be torn or crushed, please purchase a replacement at Dhatec.
 - o The edges of the Base-Carrier and Mid-Carrier may not be worn off more than 10 mm. If it is worn out, please purchase a replacement at Dhatec
- Make sure you are in a controlled environment where handling of the pipes can be done in a safe way.
- Determine the weight of the pipes in the stack.
- Determine the desired number of pipe layers of the stack.
- Refer to table 1 and the formula below to determine how many carriers you should use to support the pipes.

$$\frac{\text{Total pipe load}}{\text{Number of supporting Base Carriers}} < \text{Maximum load on Base Carrier}$$

- Take the corresponding Base-Carriers for the pipe diameter and place them parallel to each other on even ground, when using two supporting Base-Carriers place them on both ends at 22% of the whole pipe length as shown in Figure 4.

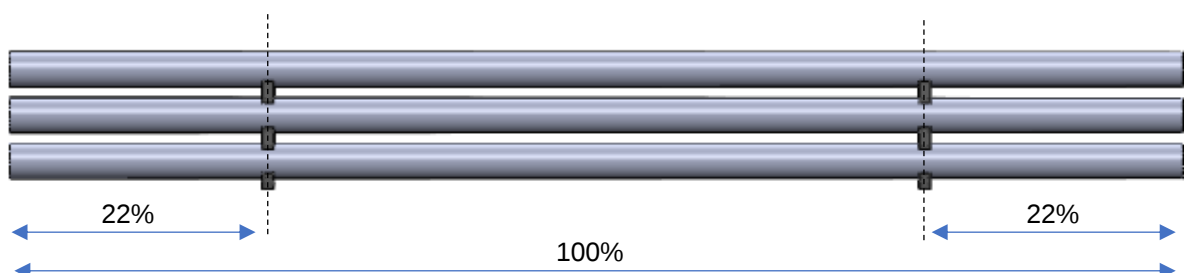


Figure 4. Spacing the Pipe Carrier Premium parts

Step 3. Placement of pipes

- Make sure that the Pipes that will be placed on one layer have the same diameter and are compatible with the Base-Carriers and Mid-Carriers.
- 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 Carrier Premium should be kept to a minimum. The vertical crane or forklift speed for loading and unloading the pipes should be limited to max 0,1 m/s. Pipe needs to be positioned with minimum impact.
- When bottom layer of pipes is placed check if there is full contact between all pipes and Base-Carriers. If not, make sure the Base Carriers are set at the correct position and reposition the pipe so that there is full contact between the pipe and Base-Carrier.
- After the bottom layer of pipes are placed two Mid-Carriers can be placed on top, align the Mid-Carriers with the Base-Carrier.
- Place another layer of pipes on the Mid-Carriers.
- Repeat the previous two steps till the recommended height is reached.
- The Pipe Carrier Premium is not meant for pyramid stacking but for square stacking. For pyramid stacking advise, contact Dhatec.

Step 4. Inspection

- During the storage of the pipes, at least once a month the pipe stack and Pipe Carrier Premium parts should be inspected visually.
- Check Pipe Carrier Premium parts for deformation. The parts must conform to the critical product specifications. In case of irregularities, the relevant Pipe Carrier Premium part should be discarded and replaced by an intact and approved part.

Step 5. Unloading pipes from stack

- Before unloading the pipe stack, the stack should be inspected for conformity to procedures as prescribed in paragraph “*Step 4*” to ensure the stability of the pipe stack. In case the user is uncertain about the stability of the pipe stack, always contact Dhatec for advice
- 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 the unloading of the stack. Make sure that during the lifting of the pipes, nobody is standing underneath the lifted pipes.
- The dynamic loads / forces to the Pipe Carrier Premium 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.
- Carefully unload the top layer of pipes
- Remove Mid-Carriers.
- Repeat the previous two steps when more layers of pipes are stacked.
- Carefully unload the Base-Carriers.

Installation of Pipe Carrier Premium for Transportation

Step 1. Preparation of pipes for transportation

- Make sure the surface on which the Pipe Carrier Premium 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 Carrier Premium 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 Pipe Carrier Premium has enough support.
- Make sure the area where the pipes and Pipe Carrier Premium are being loaded and unloaded, is levelled.
- Make sure the maximum operating temperature of 60°C is respected, otherwise contact Dhatec for maximum load specifications at higher temperatures.

Step 2. Preparation of placing pipes

- Before using the Pipe Carrier Premium, the Base-Carrier and Mid-Carrier should be subjected to an extensive visual inspection. If any below listed defect is observed, discard the relevant parts.
 - o The Base-Carrier and Mid-Carrier may not show permanent imprints of pipes on the supporting faces.
 - o The logos on the sides of the Base-Carrier and Mid-Carrier may not be illegible.
 - o The anti-skid rubber mats (as shown in Figure 3) may not be torn or crushed, during or after installation. If they happen to be torn or crushed, please purchase a replacement at Dhatec.
 - o The edges of the Base-Carrier and Mid-Carrier may not be worn off more than 10 mm. If it is worn out, please purchase a replacement at Dhatec.
- Make sure you are in a controlled environment where handling of the pipes can be done in a safe way.
- Determine the weight of the pipes in the stack.
- Determine the desired number of pipe layers of the stack.
- Refer to table 1 and formula below to determine how many carriers you should use to support the pipes.

$$\frac{\text{Total pipe load}}{\text{Number of supporting Base Carriers}} < \text{Maximum load on Base Carrier}$$

- Place a layer of Anti-skid rubber above the prescribed¹ chassis beams and place the corresponding Base-Carriers for the pipe diameter parallel to each other on the Anti-skid.
- Place Anti-skid on the Base-Carriers.

Step 3. Placement of pipes

- Make sure that the Pipes that will be placed on one layer have the same diameter and are compatible with the Base-Carrier and Mid-Carrier.
- 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 Carrier Premium should be kept to a minimum. The vertical crane or forklift speed for loading and unloading the pipes should be limited to max 0,1 m/s. Pipe need to be positioned with minimum impact.
- When bottom layer of pipes are placed check if there is full contact between all pipes and Base- Carriers. If not, make sure the Base-Carriers are set at the correct position and reposition the pipe so that there is full contact between the pipe and Base-Carrier.
- After the bottom layer of pipes are placed apply Anti-skid on the pipes and two Mid-Carriers can be placed on top, align the Mid-Carriers with the Base-Carrier.
- Place another layer of pipes on the Mid-Carriers and place Anti-skid on the pipes for the next Mid-Carrier.
- Repeat the previous two steps till the required height is reached.

¹ drivers should have been educated to load their vehicles properly and therefore are assumed to be familiar with loading prescriptions

- Secure the pipe stack with tie downs (see Table 3 for number of Tie-downs that is needed for securing the total load), make sure all the pipes are secured. Use Dhatec's Slide Stop (Figure 5) or see Figure 6 for an example of securing all pipes. If in doubt about securing the load, contact Dhatec.

Load (kg)	Number of tie-downs (S_{TF} 750 daN, LC 2500)
10000	3
15000	5
20000	6
25000	8
30000	9

Figure 1. Tie-downs



Figure 5. Slide Stop

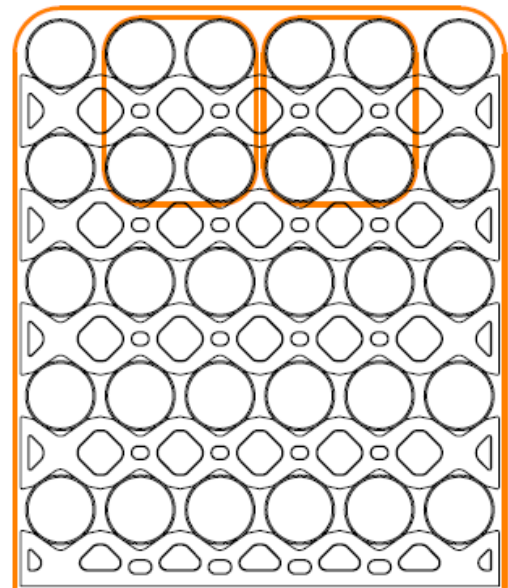


Figure 6. Securing all pipes with tie-downs

Step 4. Unloading pipes from stack

- Before unloading the pipe stack, the stack must be inspected on stability first with the tie-downs still in place and second with the tie-downs released. In case the stability of the pipe stack is uncertain stop with unloading and always contact Dhatec.
- 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. Make sure that during lifting of the pipes, nobody is standing underneath the lifted pipes.
- The dynamic loads / forces to the Pipe Carrier Premium 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.
- Be careful when removing tie-downs because of high tension.
- Carefully unload the top layer of pipes.
- Remove Mid-Carriers and Anti-skid mats.
- Repeat the previous two steps when more layers of pipes are transported.
- Carefully unload the Base-Carriers.

Warnings and recommendations

- Before using the Pipe Carrier Premium, the Base-Carrier and Mid-Carrier should be subjected to an extensive visual inspection. If any below listed defect is observed, discard the relevant parts.
 - o The Base-Carrier and Mid-Carrier may not show permanent imprints of pipes on the supporting faces.
 - o The logos on the sides of the Base-Carrier and Mid-Carrier may not be illegible.
 - o The anti-skid rubber mats (as shown in Figure 3) may not be torn or crushed, during or after installation. If they happen to be torn or crushed, please purchase a replacement at Dhatec.
 - o The edges of the Base-Carrier and Mid-Carrier may not be worn off more than 10 mm. If it is worn out, please purchase a replacement at Dhatec.
- Never use the Pipe Carrier Premium 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 60°C is respected. Otherwise contact Dhatec for maximum load specifications at higher temperatures.
- Never use Pipe Carrier Premium for objects with a temperature of more than 60°C.
- Never use Pipe Carrier Premium parts that should have been discarded according to the critical product specifications.
- The Pipe Carrier Premium must be free from substances that have a negative influence on the friction.
- The alignment of the Pipe Carrier Premium is vital importance for the safe functioning of the Pipe Carrier Premium. Base-Carriers needed for one pipe stack should be aligned parallel. In case of two parallel Carriers, the distance between the Carriers should be 56% of the pipe length.
- Never store pipes with different outer diameters on one layer.
- 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 maximum number of pipe layers which are capable for the Pipe Carrier Premium
- During the storage of the pipes, at least once a month the pipe stack and the Pipe Carrier Premium parts should be inspected visually.
- Before unloading the pipe stack, ensure the stability of the pipe stack.
- After dismantling the Pipe Carrier Premium, 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.

Appendix A: Concrete beam

