

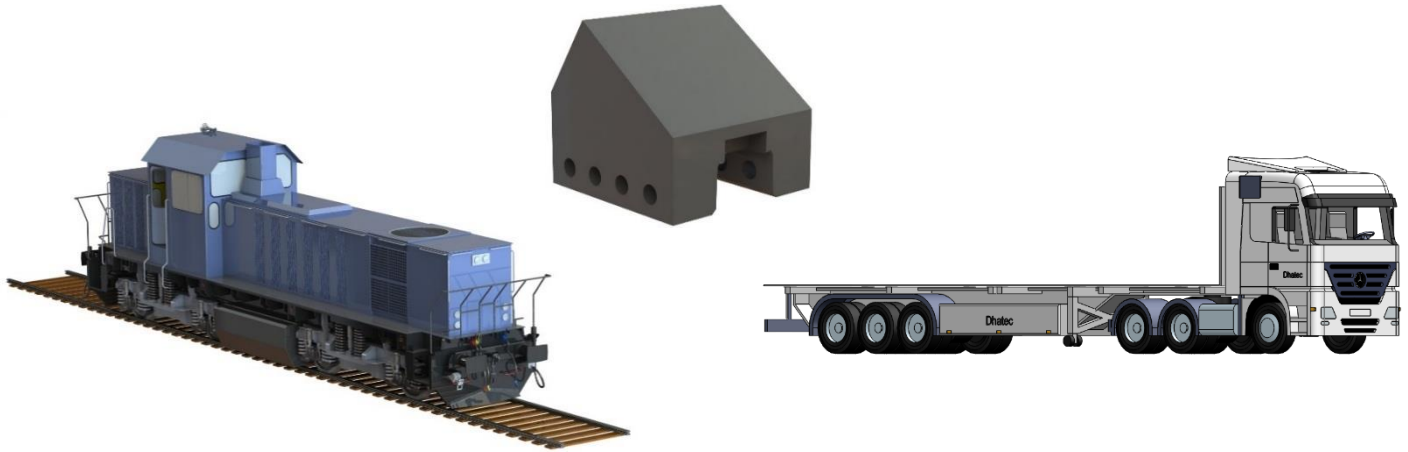


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Assets In Transit Deserve Optimal Care

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Application Procedure Specification Dhatec System88: Block B

Dhatec Document No.: DHA415-APS-S88B

Rev.	Date	Status	Prepared by	Reviewed by	Approved by
00	12.04.2017	For Construction	D. Eens	I. van Assema	I. van Assema
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Change Record

Rev.	Description of Revision
00	First Issue
01	Font style

General Information

Equipment	System88
Supplier Name	Dhatec B.V.
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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

System88 is a safe and flexible system to efficiently transport pipes by train or truck. It is a system that can easily be adjusted for different pipe diameters. The blocks are made out of a PE-compound and are safe for coated pipes.

System88 is an engineered system based on extensive research and designed following EN1025 and VDI 2700 regulations. All static and dynamic calculations for pipe transport on truck and train are evaluated and approved by TÜV Germany. As developer and manufacturer of the System88 program, Dhatec gives full technical support and advice.

Equipment

A minimum of 2 profiles per vehicle are required to support the pipes. Blocks will be secured on the profiles. Each bottom pipe is supported by a minimum of 4 blocks. The blocks are secured to the profile by Locking pins with Securing clips.

System88 steel profile (Figure 1)

The square profile is available in the standard width of a truck's trailer:

2.450mm or a train's trailer: 2.700mm

The weight of the profile is approx. 20 kg (truck) / 22kg (train)



Figure 1. System88 steel profile

System88 Block B (Figure 2)

This block will be placed on the bottom-profile.

Diameter range: \varnothing 406,4 – 965,2 mm.

Weight of the Block: approx. 3,7 kg.

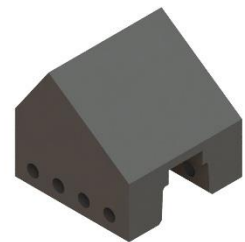


Figure 2. System88 block B

System88 block K (Figure 3)

This block will be placed on a mid-profile.

Diameter range: \varnothing 219,1 – 558,8 mm.

Weight of the Block: approx. 2,8 kg.

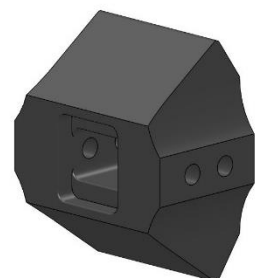


Figure 3. System88 block K

System88 block L (Figure 4)

This block will be placed on a mid-profile.

Diameter range: \varnothing 406,4 – 1.219,2 mm

Weight of the Block: approx. 7,4 kg.

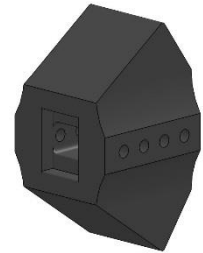


Figure 4. System88 block L

Locking pin for blocks (Figure 5)

This pin is used to secure the block on the rail. When the block and the rail align, a pin is placed through the aligned holes.

Weight of the Locking pin: approx. 0,6 kg



Figure 5. Locking pin

Securing clip for Locking pin (Figure 6)

This is a safety attribute which will decrease the chances of the pin failing to secure the block on the rail.

Weight of the clip: approx. 0,1 kg.



Figure 6. Securing clip for Locking pin

Anti-skid (NOT used when working on trains)

Anti-skid increases the friction between System88 and the load (0.3 → 0.6). Although it is not mandatory, Dhatec strongly recommends using it.

Weight of the anti-skid: approx. 1,4 kg/m.



Figure 7. Anti-skid

Tie down

Loads need to be secured to prevent movement of goods and to be allowed to travel on public roads. Each country has its own laws regarding the amount of securing needed. Dhatec bases their calculations on the norm VDI2700. Customer specific calculations can be done on request.

Using Anti-skid (truck) can greatly reduce the number of tie downs necessary. A calculation example can be found in Appendix B.

Tie downs are available in lengths of 9m or 12m.

Lashing capacity: 2500 daN (single)
5000 daN (looped)

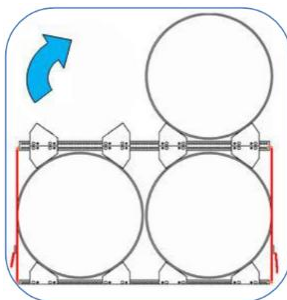
$S_{hf} = 50\text{daN}$, $S_{tf} = 750\text{ daN}$

Norm: EN 12195-2



Connector belt

When a layer consists of 2 pipes, there is a chance the system will tilt when placing a pipe on a mid-section. To prevent this, the rail of that layer is connected to the rail of the section below.



Lashing capacity: 1000 daN (single)

2000 daN (looped)

$S_{hf} = 50\text{daN}$, $S_{tf} = 100\text{ daN}$

Norm: EN 12195-2

Connector belts are 1,75m long and sold as a pair, since the rail has to be connected on both sides.



Figure 9. Connector belt

Profile-to-trailer connector

Similar to the connector belt, the Profile-to-trailer connector connects the profile to the trailer. This will prevent tilting and displacement of the bottom layer.

Lashing capacity: 1000 daN (single)
2000 daN (looped)

Norm: EN 1492-1

Profile-to-trailer connectors are 0,7m long and sold as a pair.



Figure 30. Profile-to-trailer connector

Hoisting belt

When the blocks are assembled on the rail, the total weight can be high. That's why lifting is best performed by a crane or forklift using Hoisting belts.

Lashing capacity: 1000daN (single)
2000daN (looped)

Dhatec's hoisting belts are 2m long.



General instructions for System88

Before using System88, all parts should be subjected to a visual inspection. If any below listed defect is observed, discard the relevant part.

Product failures:

- The System88 blocks (as shown in Fig. 2-4) may not show permanent imprints of pipes on the supporting faces.
- The edges of the System88 blocks may not be worn off more than 10 mm.
- The System88 blocks should always fit over the System88 profile without any problems.
- The holes in the System88 blocks may not show signs of permanent deformation or fractures. They should not be oval or have a diameter larger than Ø 23 mm.
- The holes of the System88 profile may not show signs of permanent deformation or fractures. They should not be oval or have a diameter larger than Ø 23 mm.
- The System88 profile should not show signs of bending or deflection after installation.
- The System88 steel profile (as shown in Fig. 1) may not show signs of corrosion, permanent deformation or cracks.
- The anti-skid rubber mats (figure 7) may not be torn or crushed, during or after installation.
- The Locking pin (figure 5) may not show signs of permanent deformation, fractures or corrosion.
- The Securing clip (figure 6) must have its original shape. The ring must lock under spring tension.

When using System88, 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 System88

- A.1. Preparation
- A.2. Installation of profile
- A.3. Installation of block B

B. Loading of pipes

- B.1. Verification of block settings
- B.2. Placement of bottom pipes
- B.3. Verification of support of bottom pipes
- B.4. Installation of blocks K or L
- B.5. Placement of remaining layers

C. Securing of pipes

- C.1. Applying safety features

D. Unloading of pipes

- D.1. Checking stability of pipe stack
- D.2. Unloading pipes

E. Disassembly of System88

- E.1. Removal of S88 parts

A. Installation of System88 on truck

A.1. Preparation of truck

- Make sure the trailer is free of ice, snow, oil or anything else that could influence the friction.
- Make sure the trailer is solid. There should be no weak or rotten spots where the system will be placed.
- Make sure the trailer fits the bill. This means checking if it can handle the weight, is wide and long enough and all safety features are present.
- Place Anti-skid on places where the bottom profiles will come (Truck only).



Figure 11. Start set-up with Anti-skid in place (trucks only)

A.2. Installation of the profiles

Place the base profiles on the trailer. When the base profiles are in place, fasten (screw 10x) it to the trailer or use profile-to-trailer connectors.



Figure 12. Fasten profile to trailer

A.3. Installation of Block B

If the base profiles are attached to the trailer, block B can be placed. Check the configuration supplied by Dhatec for their exact placement.



Figure 13. Place block on profile

- When the blocks are placed on the base profile, secure them with the Locking pins and Securing clips.

Optional, but strongly recommended when driving without load on the system:
Make sure the rail is connected to the trailer with a Profile-to-trailer connector. Unconnected rails can cause tilting and are extremely dangerous.



Figure 14. Lock the blocks with a pin and place profile-to-trailer connectors

Fasten the Profile-to-trailer connector with a pin to the profile, secure the pin with a clip. Hook the other end to the trailer. Only fasten the Profile-to-Trailer Connector and do not tension it. Place the Profile-to-Trailer Connector on the other side in a similar way, when both sides are fastened, they can be tensioned.

Place Anti-skid on top of the blocks (Truck only). This will increase the friction between pipe and block and reduce the number of tie downs required to secure the pipe.



Figure 15. Place Anti-Skid on top of the blocks (truck only)

B. Loading of pipes

B.1. Verification of block settings

When everything is in place, re-check the distances between the blocks. When the measurements don't comply, start over.

B.2. Placement of bottom pipes of stack

If everything is checked and approved, it's time to place the first layer of pipes onto the system.

- Make sure that the pipe surface is free from snow, ice, oil or anything that could influence friction between pipe and block.
- **For trucks only:** Although not mandatory, we strongly recommend placing an Anti-skid layer on the PE-blocks.

There should be Anti-skid:

- o Between the rail and the trailer
- o Between the base blocks and the pipes
- o Between the pipes and the mid blocks (both sides)

Place the first pipe. Check the gap between the rail and the pipe and see if it matches the dimensions on the configurations.



Figure 16. Place pipes on the bottom blocks

B.3. Verification of support of bottom pipes



Figure 17. Place Anti-skid on the bottom layer

When the first layer is in place, make sure every pipe is stable. Check the distance between the pipes and between the pipes and rail and compare with the configuration.

B.4. Installation of Blocks K or L

When the first layer of pipes is in place, another rail needs to be placed. The easiest way to prepare this rail is to place blocks K or L when the rail is not yet in place. Check the positioning of the blocks in the configuration and secure them the same way as the blocks on the base profile (Locking pins with Securing clips).

After everything is secured, place the rail on top of the pipes as shown in figure 18. Due to the weight, we advise to use a hoisting belt to place the mid-section on the pipes.

Make sure both the blocks and the rails align. Connect the rail to the bottom rail using a Connector belt. This will prevent tilting of the load while loading pipes.



Figure 18. Place the mid-section with blocks on top of the bottom layer



Figure 19. Place the Connector belts



Figure 20. Place Anti-skid on the mid-section (Truck only)

B.5. Placement of remaining layers

If the first layer is stable and approved, the next layers can be placed likewise.
(Remember to use Anti-skid (truck only) and connector belts where choosing to)



Figure 21. Place remaining layers

C. Securing of pipes

C.1. Applying safety features

Before securing the pipes, check if the measurements of the load match the measurements on the configuration. Using anti-skid is not mandatory, neither is using a profile-to-trailer connector when driving with a load and connector belts when transporting layers that consists of 3 or more pipes.



Figure 22. Place other safety attributes

A couple of safety features could already be in place: Profile-to-trailer connector, connector belts, anti-skid (truck). The last step is placing tie downs (and optional Slide Stops) along the length of the trailer.

The number of tie downs depends on the weight of the load.

Total weight of the pipes	Number of tie-downs ($S_{TF}750$ daN, LC 2500)	
	With Anti-skid layers	Without Anti-skid layers
30.000 kg	9	45
25.000 kg	8	38
20.000 kg	6	30
15.000 kg	5	23
10.000 kg	3	15
5.000 kg	2	8

A calculation example of the required number of tie downs for a 20t load is provided in Appendix C.
Anti-skid may only be used on trucks, NOT on trains!

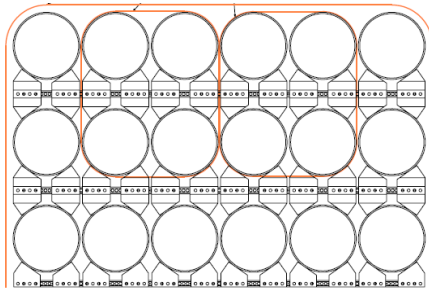


Figure 43. Example Strapping scheme

As seen in the table above, using anti-skid significantly lowers the number of tie downs needed to secure the load. Always use enough tie downs. Divide the tie downs evenly along the length of the load. Make sure they are not twisted.

If the top layers contain more than 2 pipes, the middle pipes on top are not secured with tie downs. This can be rectified by using Slide Stop. Because Slide Stop is an engineered pre-shaped beam, when tensioned it will secure the middle pipes. This can also be done by placing tie downs around smaller sections of pipes. When necessary, ask Dhatec for a strapping scheme.



Figure 54. Working principle of Slide stop



Figure 25. Truck ready to go



Figure 26. Flatcar ready to go

When finished, re-check every tie down, connector belt, Profile-to-trailer connector and Slide Stop.
Every driver is responsible for his or her own load. Adapt driving style to weather conditions.

D. Unloading of pipes**D.1. Check stability of pipe stack**

Before unloading the pipes, be sure the stack is stable. This means no pipe will shift or start to roll when unloading another pipe.

Be careful when removing tie-downs because of the high tension.

D.2. Unloading pipes

Start unloading with the outer pipes. Make sure the connector belts and profile-to-trailer connectors stay in place until the entire parent layer is unloaded.

When unloading the outer pipes, unload the corresponding pipe on the other side next to minimize the risk of tipping.

If an entire layer is unloaded, the connector belt from that layer can be removed. With a hoisting belt, the rail and blocks can be lifted off as 1 piece.

E. Disassembly of System88**E.1. Removal of S88 parts**

When the pipes are unloaded, the System88 parts can be disassembled. Follow steps A3-A2-A1.

Collect every pin with Securing clip used to hold the blocks in place. Make sure the Securing clips don't show deformations. If any show deformations, discard them.

Check the blocks for pipe imprints. If any deformation is permanent, the block needs to be replaced. The wear on the edge shouldn't exceed 10mm.

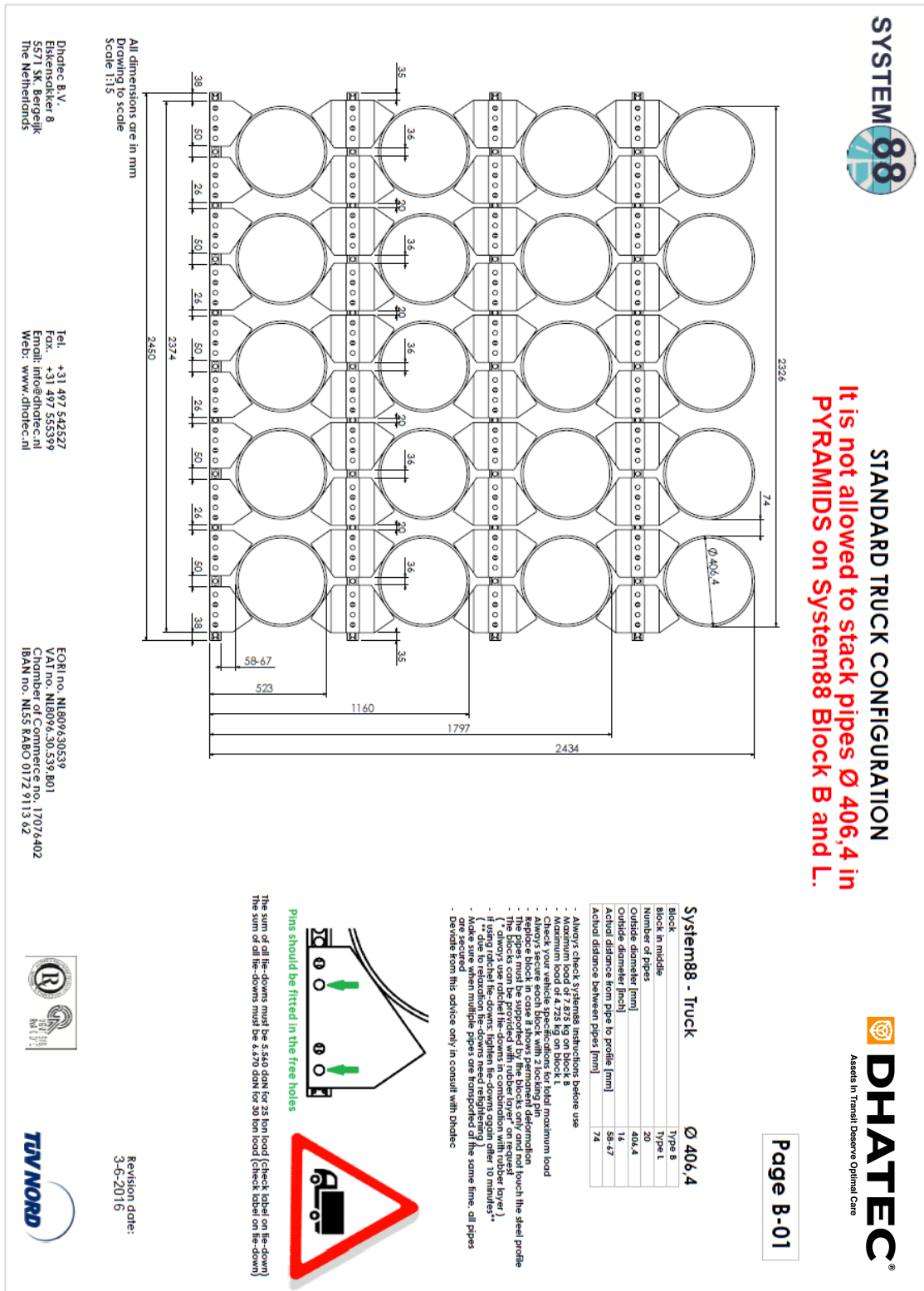
End note

This recommended practice is put together with great care. When safety risks are noticed which are not covered by this instruction please contact Dhatec to share this finding.

[1] Pipe Configurations are supplied with the first delivery, contact our office for copies and updates.

[2] Truck drivers should have been educated to load their vehicles properly and therefore are assumed to be familiar with loading prescriptions.

Appendix A Standard Configurations Truck block B

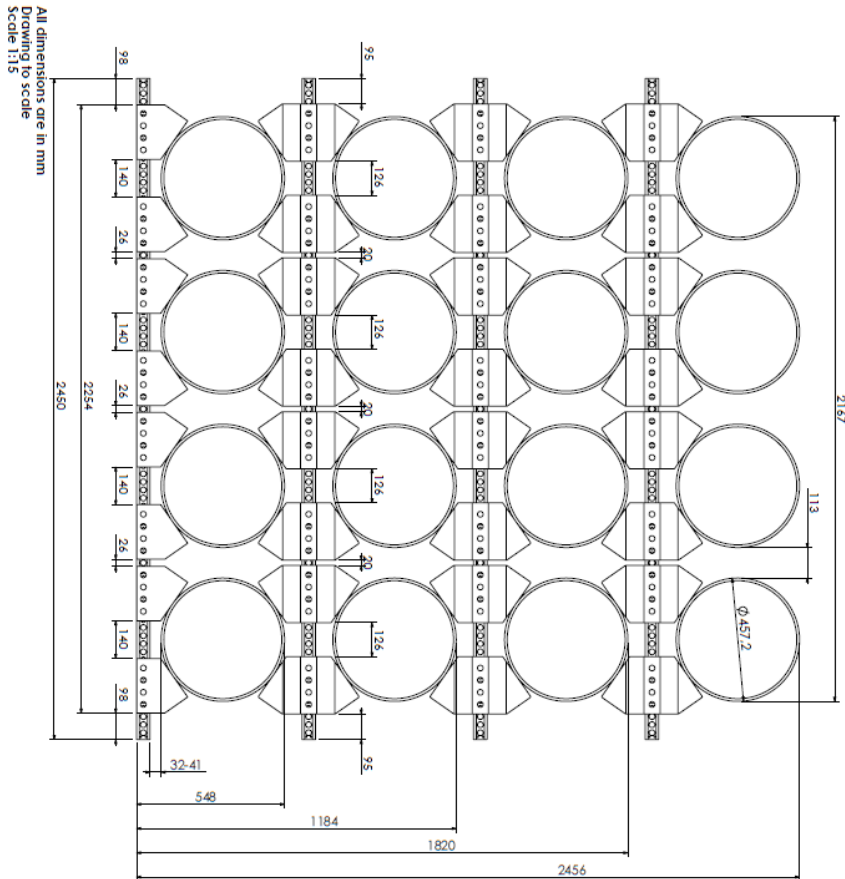




STANDARD TRUCK CONFIGURATION
It is not allowed to stack pipes Ø 457,2 in PYRAMIDS on System88 Block B and L.



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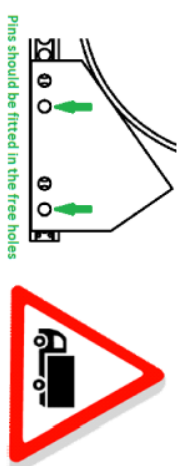
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System88 - Truck

Block	Type 8
Block in middle	Type 1
Number of pipes	16
Outside diameter [mm]	457,2
Outside diameter [inch]	18
Actual distance from pipe to profile [mm]	32-41
Actual distance between pipes [mm]	113

- Always check System88 instructions before use
- Maximum load of 7.975 kg on block 8
- Maximum load of 7.975 kg on block 1
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pin
- Replace block in case a shows permanent deformation
- The blocks can be provided with rubber layer" on request
- (Always use rubber he-downs in combination with rubber layer)
- Using rubber he-downs, lighter he-downs (after 10 minutes)
- Make sure when multiple pipes are transported at the same time, all pipes are secured
- Deviate from this advice only in consult with dhatec



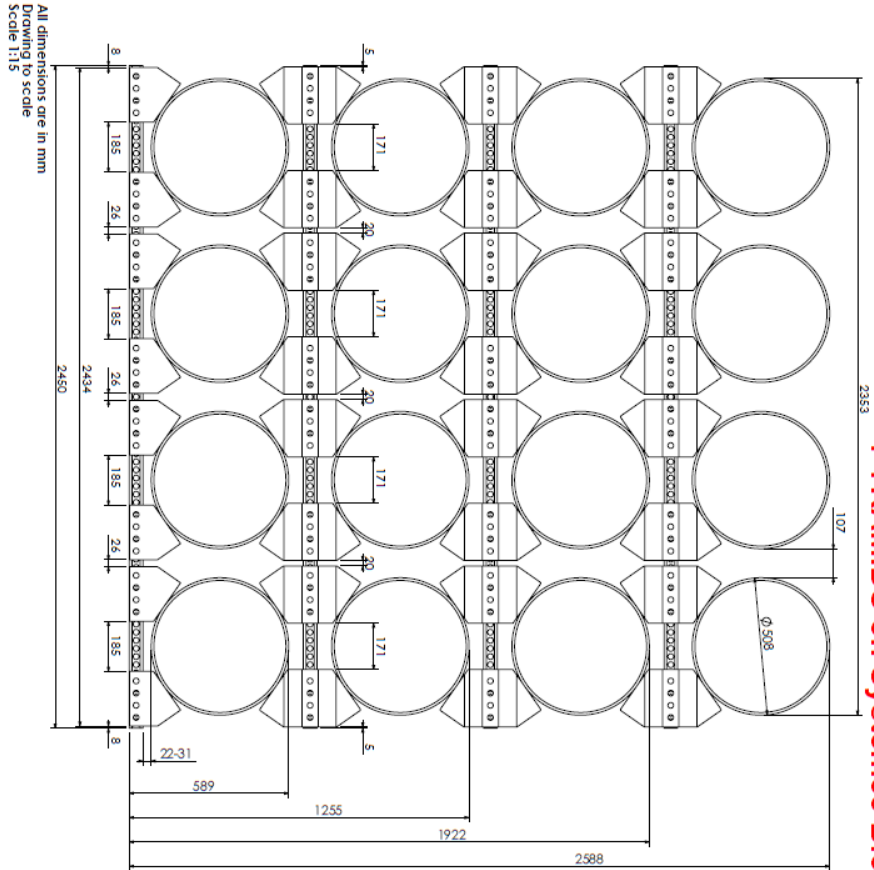
Pins should be fitted in the free holes
The sum of all he-downs must be 6540 dcm for 25 ton load (check label on he-down)
The sum of all he-downs must be 6470 dcm for 30 ton load (check label on he-down)

Revision date:
3-6-2016





STANDARD TRUCK CONFIGURATION
It is not allowed to stack pipes Ø 508,0 in PYRAMIDS on System88 Block B and L.



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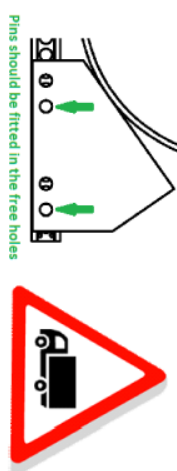
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System88 - Truck

Block	Type B	Ø 508,0
Block in middle	Type L	
Number of pipes	14	
Outside diameter [mm]	508,0	
Outside diameter [inch]	20	
Actual distance from pipe to profile [mm]	22-31	
Actual distance between pipes [mm]	107	

- Always check system88 instructions before use
- Always use correct pin and rubber layer
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pin
- The blocks must be provided with rubber layer on request (layer)
- The pipes must be supported by the blocks only and not touch the steel profile
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes**
- ** due to relaxation tie-downs need retightening
- Make sure when multiple pipes are transported at the same time, all pipes
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

The sum of all tie-downs must be 5.510 dcn for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 4.270 dcn for 30 ton load (check label on tie-down)

Revision date:
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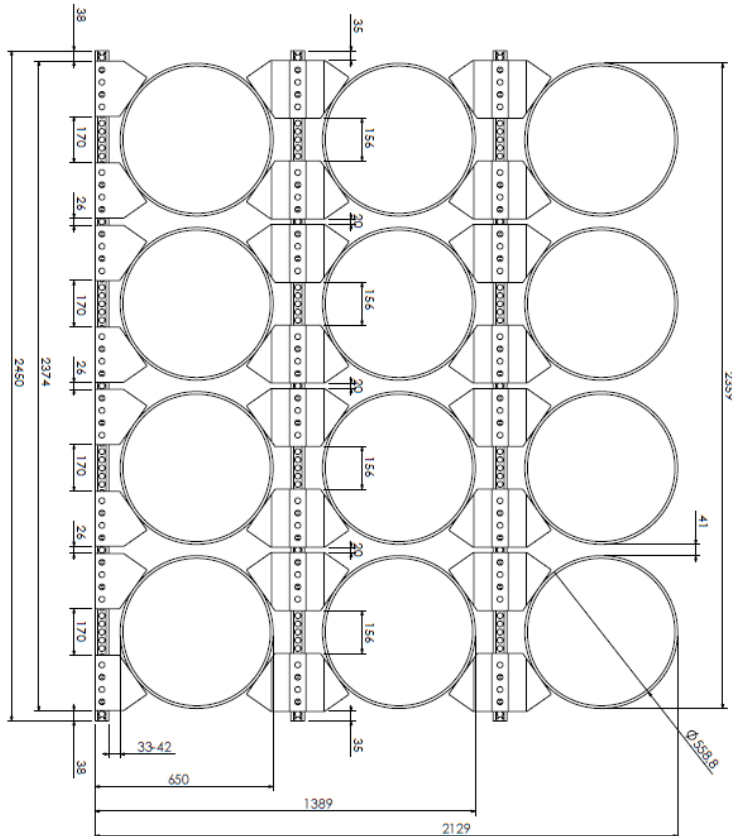




STANDARD TRUCK CONFIGURATION



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All dimensions are in mm
Drawing scale 1:15

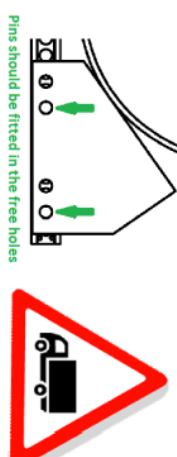
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System88 - Truck

Block in middle	Type L
Number of pipes	16
Outside diameter [mm]	558.8
Outside diameter [inch]	22
Actual distance from pipe to profile [mm]	33-42
Actual distance between pipes [mm]	41

- Always check System88 instructions before use
- Maximum load of 7.875 kg on block B
- Always use the correct blocking technique
- Check your vehicle specifications for total maximum load
- Always use the correct blocking technique
- Replicate block in case it shows permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- The pipes must be secured by the blocks only and not touch the steel profile
- always use ratchet tie-downs in combination with rubber layer
- if using ratchet tie-downs, tighten tie-downs again after 10 minutes**
- if using ratchet tie-downs need re-tightening
- if using multiple pipes are transported at the same time, all pipes are secured
- Deviate from this advice only in consult with dhatec



Pins should be fitted in the free holes

The sum of all tie-downs must be 5.540 dcn for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6.470 dcn for 30 ton load (check label on tie-down)

Revision date:
3-6-2016

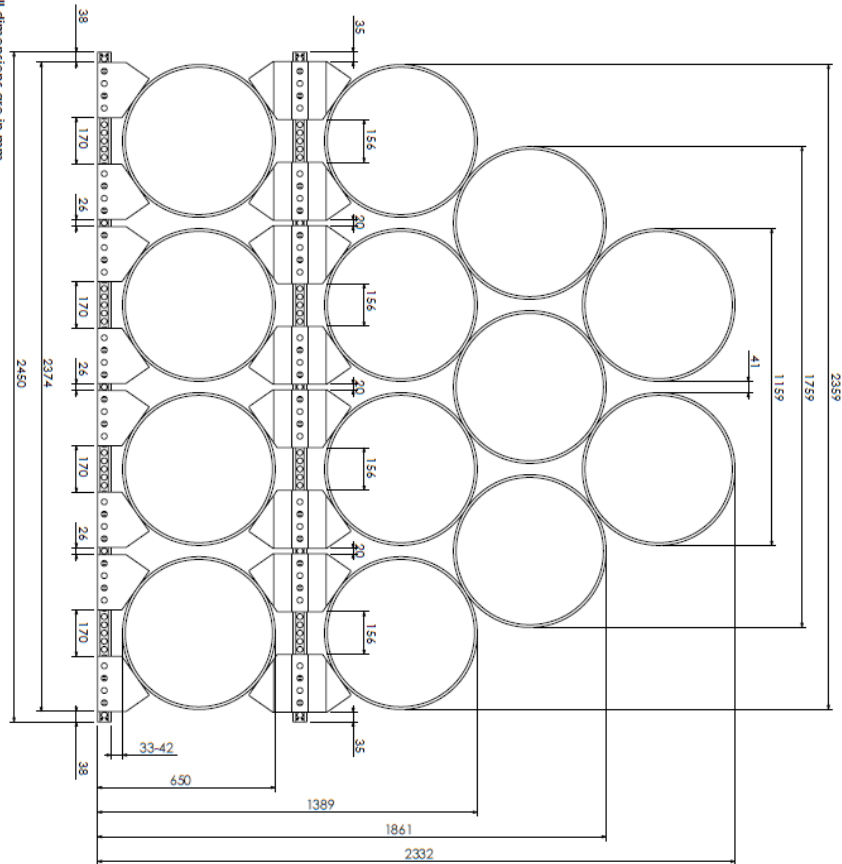




STANDARD TRUCK CONFIGURATION



Page B-04-1



All dimensions are in mm
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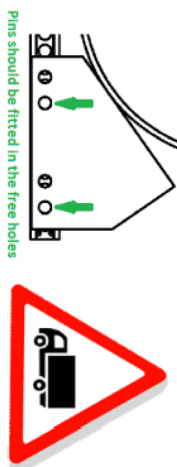
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System88 - Truck

Block	Type B	Ø 558.8
Block in middle	Type L	
Number of pipes	13	
Outside diameter [mm]	558.8	
Outside diameter [inch]	22	
Actual distance from pipe to profile [mm]	33-42	
Actual distance between pipes [mm]	41	

- Always check system88 instructions before use
- Maximum load of 4.725 ton on block L
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Always use proper tie-down technique
- Repetitive block in case it shows permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- The blocks can be provided with rubber layer, on request
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes**
- (** due to relaxation tie-downs need retightening)
- Make sure when multiple pipes are transported at the same time, all pipes are supported
- Deviate from this advice only in consult with dhatec



The sum of all tie-downs must be 4.725 ton for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 4.720 ton for 30 ton load (check label on tie-down)

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3-6-2016



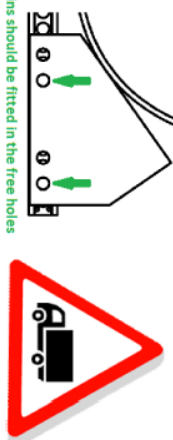
STANDARD TRUCK CONFIGURATION



System88 - Truck

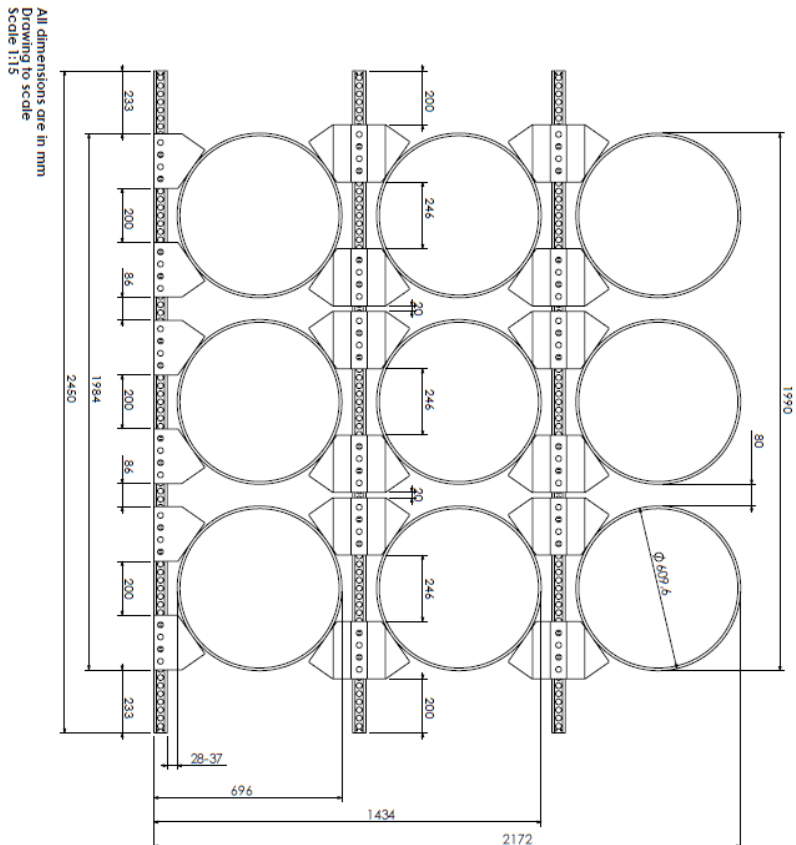
Block	Type B
Block in middle	Type L
Number of pipes	9
Outside diameter [mm]	407.6
Outside diameter [inch]	16
Actual distance from pipe to profile [mm]	28-37
Actual distance between pipes [mm]	80

- Always check system's instructions before use
- Maximum load of 4,925 lbs on block
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- The blocks must be secured with proper tie-down information
- The pins must be supported by the blocks only and not touch the steel profile
- The blocks can be provided with rubber footers, on request
- (If using rubber footers, tighten the tie-downs slightly after 10 minutes*)
- *Due to relaxation, the tie-downs need re-tightening
- If using more than multiple pins, tie-downs are transposed at the same time, all pins are secured
- Deviate from this advice only in consult with Ditchie



Pins should be fitted in the free holes

The sum of all tie-downs must be 5,560 DAN for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6,670 DAN for 30 ton load (check label on tie-down)



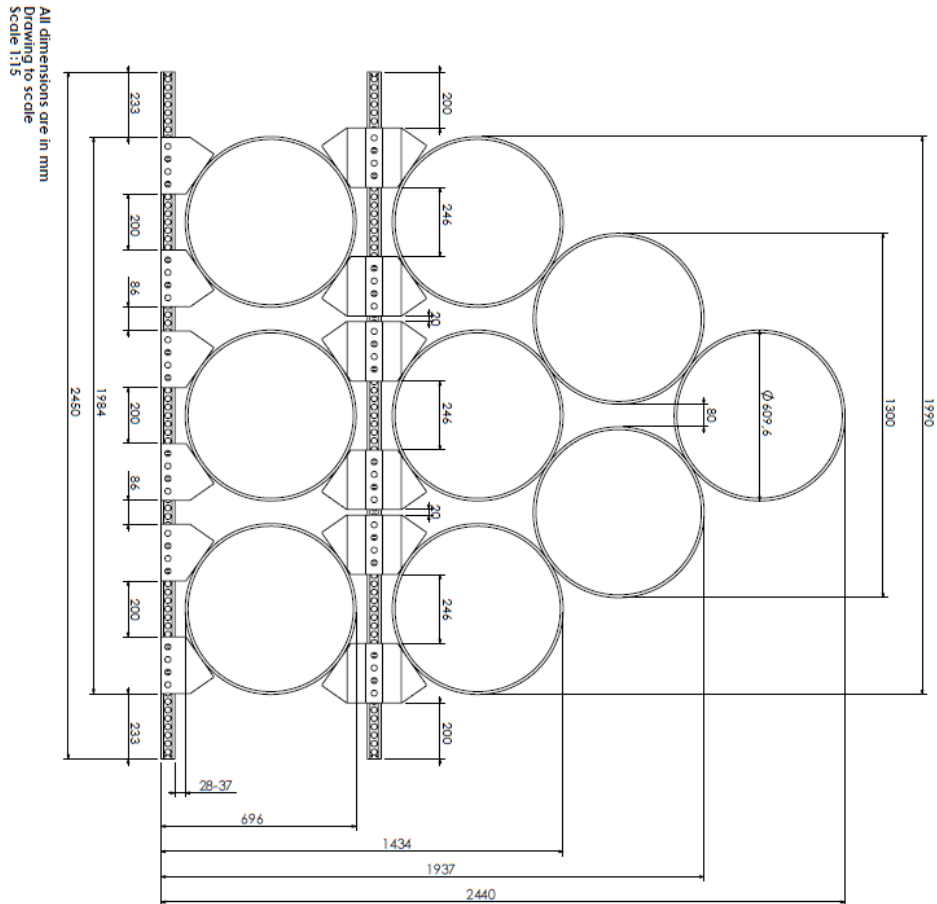
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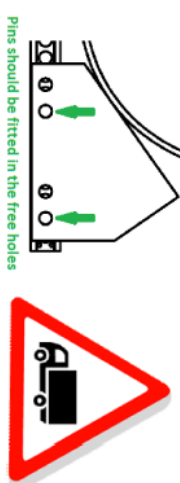
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System88 - Truck

Block	Type B
Block in middle	Type I
Number of pipes	9
Outside diameter [mm]	609.6
Inside diameter [mm]	34
Action distance from pipe to profile [mm]	28-37
Action distance between pipes [mm]	80

Ø 609.6

- Always check system88 instructions before use
- Maximum load of 7.925 kg on block B
- Check our website for total maximum load
- Always secure each block with 2 locking pin
- Replace block in case it shows permanent deformation
- The blocks can be supplied with rubber layer (on request)
- Always use ratchet tie-downs in combination with rubber layer
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes**
- Make sure to re-tension tie-downs once they are tightened at the same time, all pipes are secured
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

The sum of all tie-downs must be 5.540 daN for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 5.570 daN for 30 ton load (check label on tie-down)

Revision date:
3-6-2016

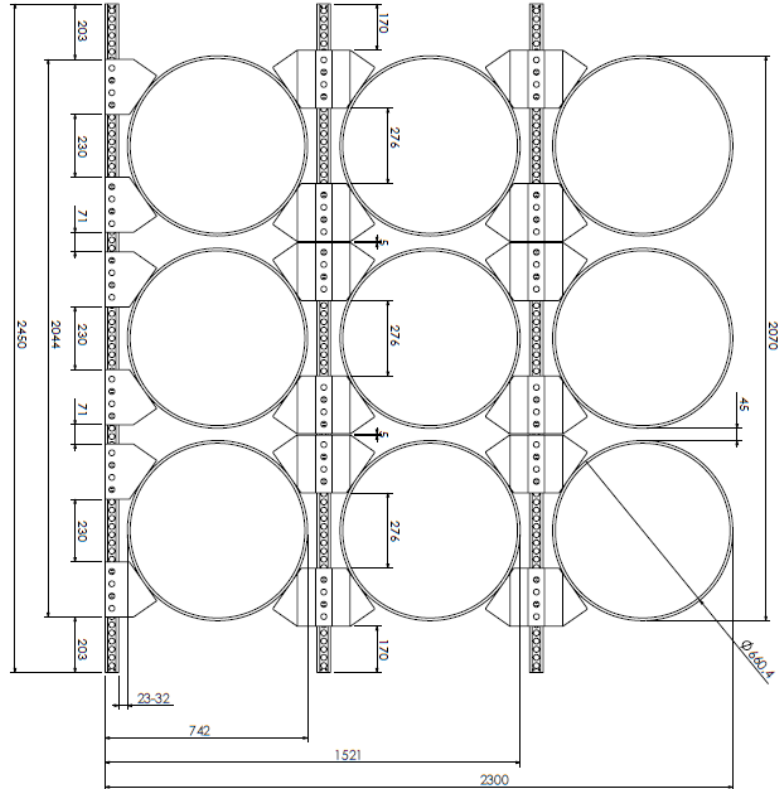




STANDARD TRUCK CONFIGURATION



Page B-06



All dimensions are in mm
Drawing to scale
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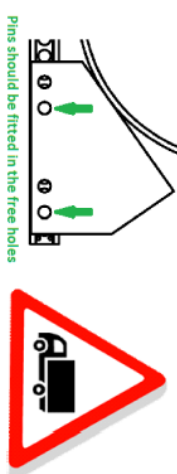
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System88 - Truck

Block	Type 8
Block in middle	Type 1
Number of pipes	9
Outside diameter [mm]	660.4
Outside diameter [inch]	26
Actual distance from pipe to profile [mm]	23-32
Actual distance between pipes [mm]	45

- Always check System88 instructions before use
- Maximum load of 4.725 ton on block 1
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- The pipes must be supported by the blocks only and not touch the steel profile
- The blocks can be provided with rubber layer on request
- If using rubber layer, the blocks must be secured with 2 locking pins
- (** due to relaxation the-downs need retightening)
- Make sure when multiple pipes are transported at the same time, all pipes
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes
The sum of all the-downs must be 4.540 ton for 25 ton load (check label on the-down)
The sum of all the-downs must be 4.570 ton for 30 ton load (check label on the-down)

Revision date:
3-6-2016

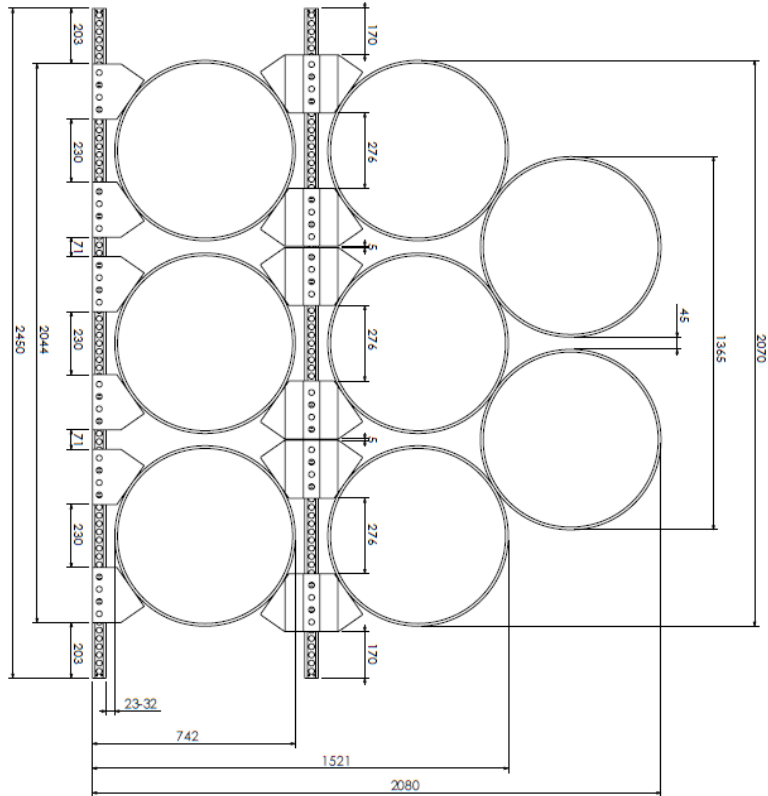




STANDARD TRUCK CONFIGURATION



Page B-06-1



All dimensions are in mm
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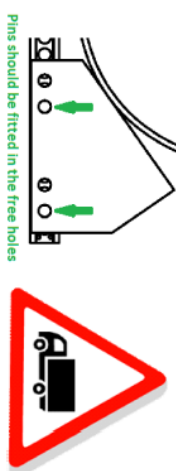
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System88 - Truck

Block	Type 8	Ø 660.4
Block in middle	Type L	
Number of pipes	8	
Outside diameter [mm]	660.4	
Outside diameter [inch]	26	
Actual distance from pipe to profile [mm]	23-32	
Actual distance between pipes [mm]	45	

- Always check System88 instructions before use
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- The pipes must be supported by the blocks only and not touch the steel profile
- The blocks can be provided with rubber layer on request
- If using rubber tie-downs, tighten tie-downs again after 10 minutes**
- ** due to relaxation tie-downs need retightening
- Make sure when multiple pipes are transported at the same time, all pipes
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

The sum of all tie-downs must be 5.540 daN for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 5.670 daN for 30 ton load (check label on tie-down)

Revision date:
3-6-2016



STANDARD TRUCK CONFIGURATION

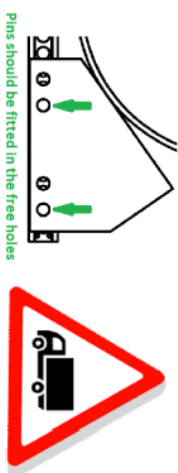


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System88 - Truck

System88 - Truck		Ø 711,2
Block	Block in middle	Type B
Number of pipes		Type L
Outside diameter [mm]		8
Outside diameter [inch]		711,2
Actiua distance from pipe to profile [mm]		28
		18-27
Actiua distance between pipes [mm]		54

- Always check systematic instructions before use
- Maximum load 4.725 kg on block 1
- Check your vehicle specifications for total maximum load
- Remove block in each step with 2 folding operation
- The pipes must be supported by the blocks only and not touch the steel profile
- The blocks can be prepared with rubber foot or anti-slip layer*
- If using rubber feet, always place them at least after 10 minutes**
- * due to relaxation the down-rows need reapplying
- ** if you remove multiple pipes or interchange of the same time all pipes are secured
- Deviate from this advice only in consult with Dithach



Pins should be fitted in the free holes

The sum of all tie-downs must be 5.5kN for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6.670 kN for 30 ton load (check label on tie-down)

**All dimensions are in mm
Drawing to scale
Scale 1:15**

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Revision date:
3-6-2016

STANDARD TRUCK CONFIGURATION

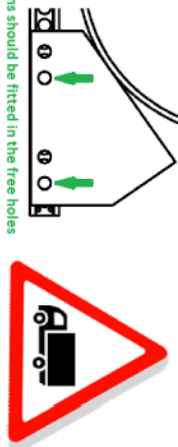
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System88 - Truck		Ø 762,0
Block		Type B
Block in middle		Type I
Number of pipes	9	
Outside diameter [mm]	762,0	
Actual diameter [inch]	3,02	
Actual distance from pipe to profile [mm]	13-20	
Actual distance between pipes [mm]	48	

- Always check systems instructions before use
- Maximum load of 4,255 lbs on block
- Check your vehicle specifications for total maximum load
- Always secure vehicle blocks with 2 locking pins
- The blocks must be placed with rubber lips on the steel profile
- The blocks can be supported by the blocks only and not touch the steel profile
- If using ratchet tie-downs, tighten the blocks again after 10 minutes**
- **Methods to relaxation the blocks need re-tightening
- More than multiple pipes are compressed at the same time, all pipes are secured
- Deviate from the advice only in consult with Dübach



Pins should be fitted in the free holes

The sum of all tie-downs must be 5,560 dan for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6,670 dan for 30 ton load (check label on tie-down)

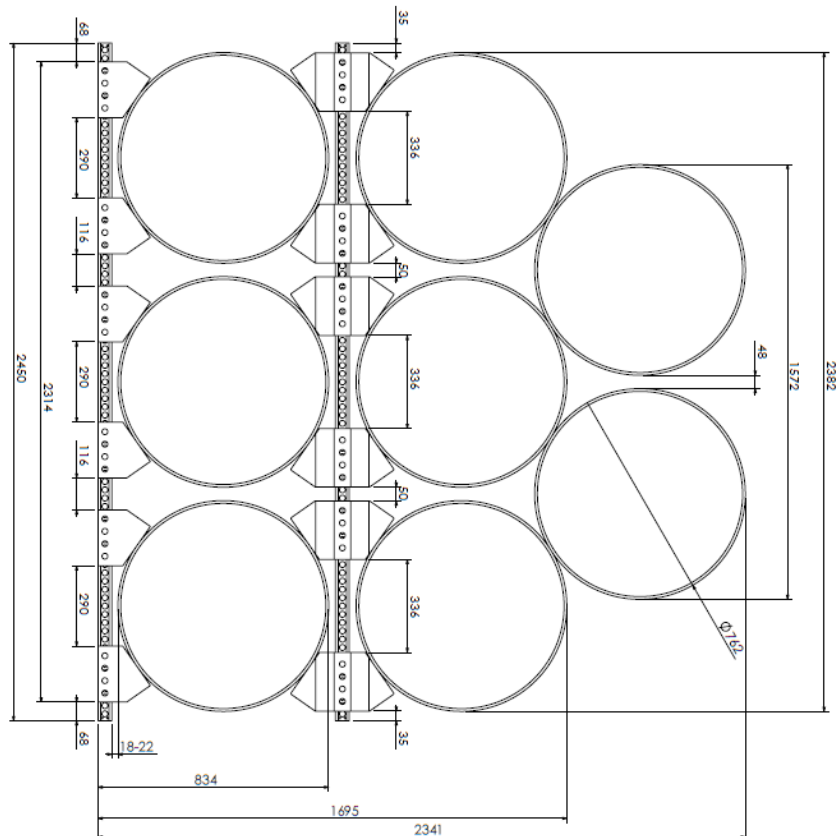
Revision date:
3-6-2016

STANDARD TRUCK CONFIGURATION



Assets in Transit Deserve Optimal Care

Page B-08-1



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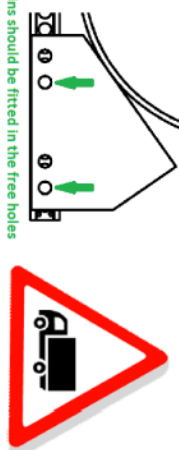
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System88 - Truck

Block	Type B
Block in middle	Type L
Number of pipes	8
Outside diameter [mm]	762.0
Outside diameter [inch]	30
Actual distance from pipe to profile [mm]	13-22
Actual distance between pipes [mm]	48

- Always check system's instructions before use
- Maximum load of 4,253 kg on block A
- Check your vehicle specification for total maximum load
- Always secure each block with 2 locking rings
- Always use correct tie-down technique and deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- Always use the correct tie-down technique and deformation
- If using ratchet tie-downs: tighten the ratchet again after 10 minutes**
- **Note: tie relaxation does not require re-tightening
- Multiple pipes are transported at the same time, all pipes are secured
- Deviate from the advice only in consult with Dübach



Pins should be fitted in the free holes

The sum of all tie-downs must be 5,560 dan for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6,670 dan for 30 ton load (check label on tie-down)

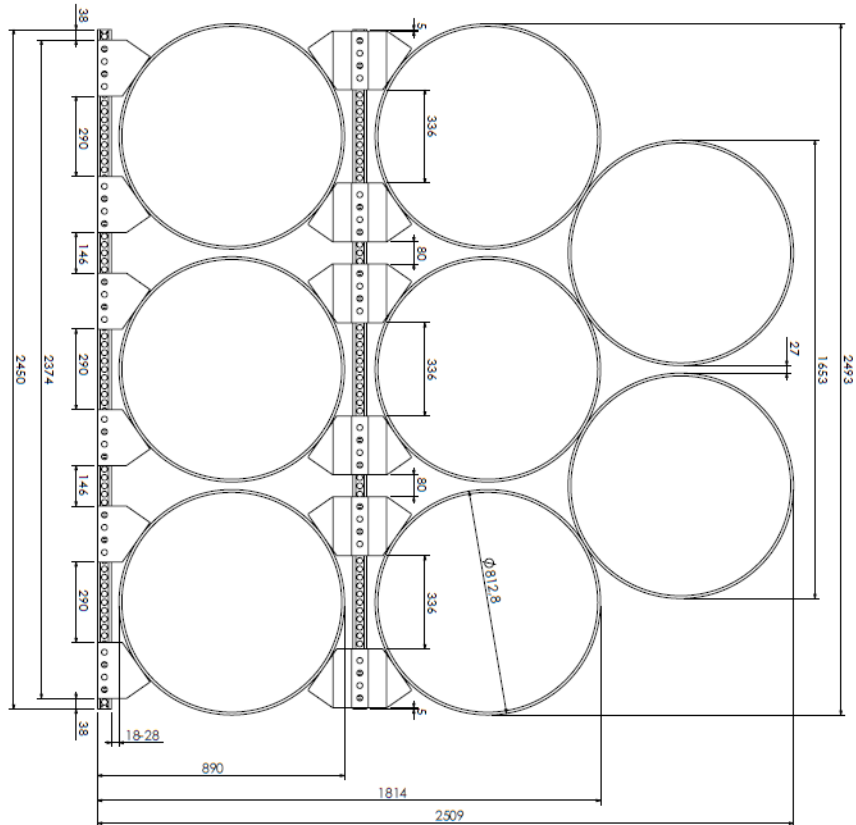
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STANDARD TRUCK CONFIGURATION



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All dimensions are in mm
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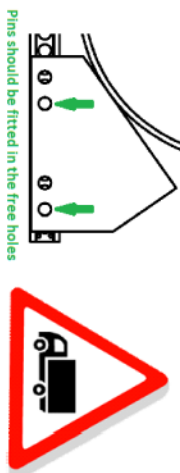
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System88 - Truck

Block	Type 8
Block in middle	Type 1
Number of pipes	8
Outside diameter [mm]	812.8
Outside diameter [inch]	32
Actual distance from pipe to profile [mm]	119.28
Actual distance between pipes [mm]	27

- Always check system88 instructions before use
- Maximum load of 7.875 kg on block 8
- Check your vehicle specifications for total maximum load
- Always use vehicle blocks with correct size
- Replace block in case it shows permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- The pipes must be supported by the blocks only and not touch the steel profile
- Always use ratcheted tie-downs in combination with rubber force*
- If using ratcheted tie-downs, tighten tie-downs again after 10 minutes**
- ** due to relaxation tie-downs need retightening
- Always use multiple pipes are transported at the same time, all pipes are secured
- Deviate from this advice only in consult with Dhatec



The sum of all tie-downs must be 5.550 dkn for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 4.470 dkn for 20 ton load (check label on tie-down)

Pins should be fitted in the free holes

Revision date:
3-6-2016



STANDARD TRUCK CONFIGURATION



Assets in Transit Deserve Optimal Care

Page B-10

Ø 863,6

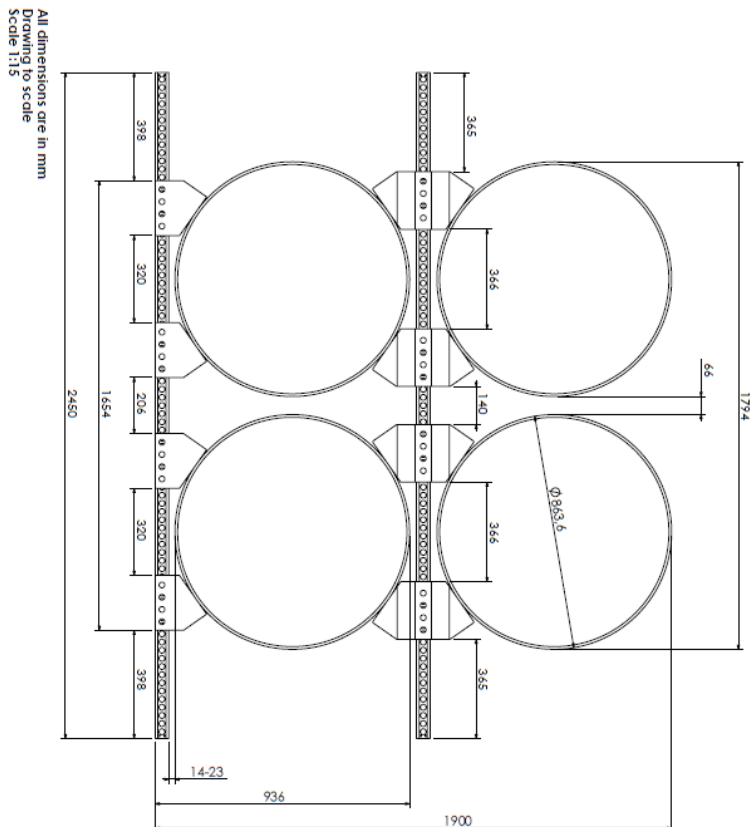
Block	Type B
Block in middle	Type L
Number of pipes	4
Outside diameter [mm]	863.6
Outside diameter [inch]	34
Actual distance from pipe to profile [mm]	14-23
Actual distance between pipes [mm]	66

- Always check system instructions before use
- Maximum load of 4.253 tps on block
- Always use proper block with 2 locking ring
- Check your vehicle specifications for total maximum load
- Always use proper block with 2 locking ring
- The pipes must be supported by the blocks only and not touch the steel profile
- The blocks can be used with rubber linings, copper linings or linings of other materials
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes**
- Make sure tie-downs are not damaged during the same time, all pipes are secured
- Deviate from the advice only in consult with Dabco



Pins should be fitted in the free holes

The sum of all tie-downs must be 5,560 dan for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6,670 dan for 30 ton load (check label on tie-down)



All dimensions are in mm
Drawing to scale
Scale 1:15

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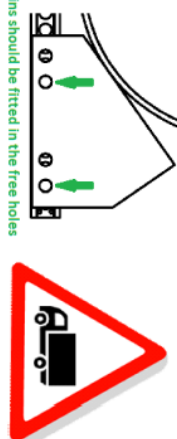
Revision date:
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STANDARD TRUCK CONFIGURATION



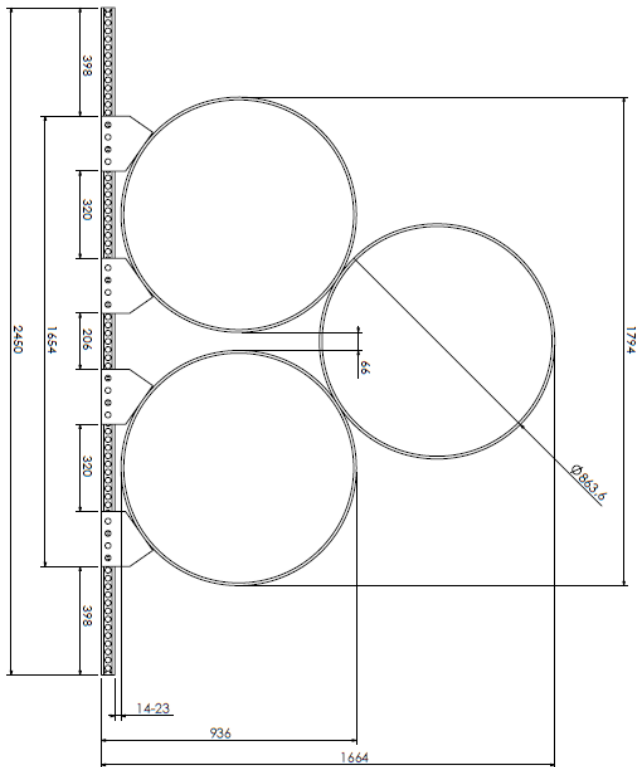
System88 - Truck		Ø 863,6
Block		Type 8
Block in middle		Type 1
Number of pipes		3
Outside diameter [mm]		863,6
Outside diameter [inch]		3,4
Actual distance from pipe to profile [mm]		14-23
Actual distance between pipes [mm]		66

- Always check system's instructions before use
- Maximum load of 225 kg on block A
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- The pipes must be supplied by the blocks only and not touch the steel profile
- The blocks can be provided with rubber layer, on request (layer 1)
- If using rubberised tie-downs, tighten tie-downs again after 10 minutes**
- If using standard tie-downs, tighten tie-downs again after 10 minutes**
- If using more than multiple pipes, are clamped at the same time, all pipes are secured
- Deviate from this advice only in consult with Dabree



Pins should be fitted in the free holes

The sum of all tie-downs must be 5,560 dan for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6,670 dan for 30 ton load (check label on tie-down)



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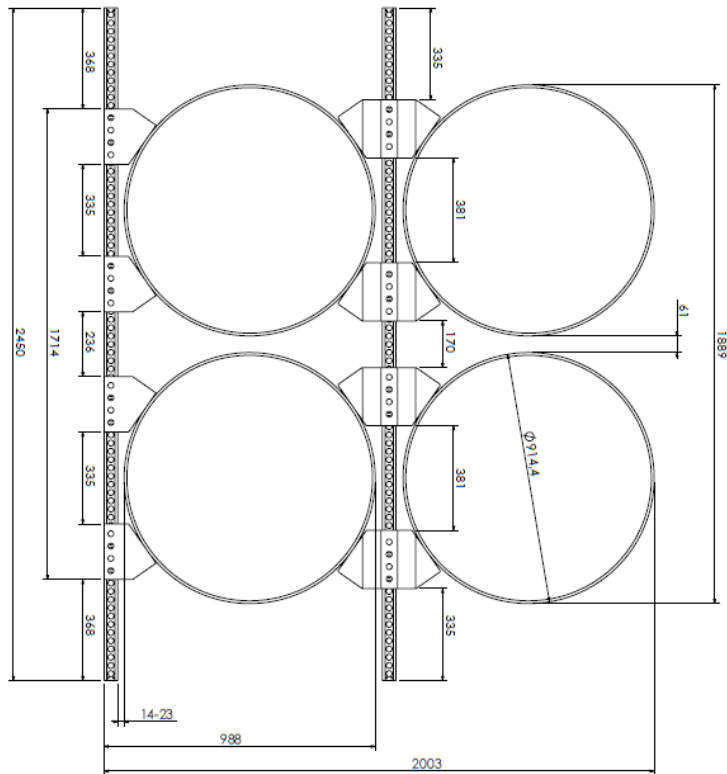




STANDARD TRUCK CONFIGURATION



Page B-11



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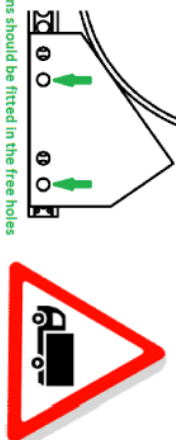
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System88 - Truck

Block	Type B	Ø 914.4
Block in middle	Type L	
Number of pipes	4	
Outside diameter [mm]	914.4	
Outside diameter [inch]	36	
Actual distance from pipe to profile [mm]	14-23	
Actual distance between pipes [mm]	61	

- Always check system88 instructions before use
- Maximum load of 7.875 kg on block B
- Check your vehicle specifications for total maximum load
- Always use correct blocking technique with correct pins
- Replace block in case it shows permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- The blocks must be secured with the correct pins
- ("always use ratchet tie-downs in combination with rubber layer")
- if using ratchet tie-downs, tighten tie-downs again after 10 minutes**
- In case of relaxation tie-downs need retightening
- Lock down then multiple pipes are transported at the same time, all pipes are secured
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

The sum of all tie-downs must be 5.540 dcn for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6.420 dcn for 30 ton load (check label on tie-down)

Revision date:
3-5-2016



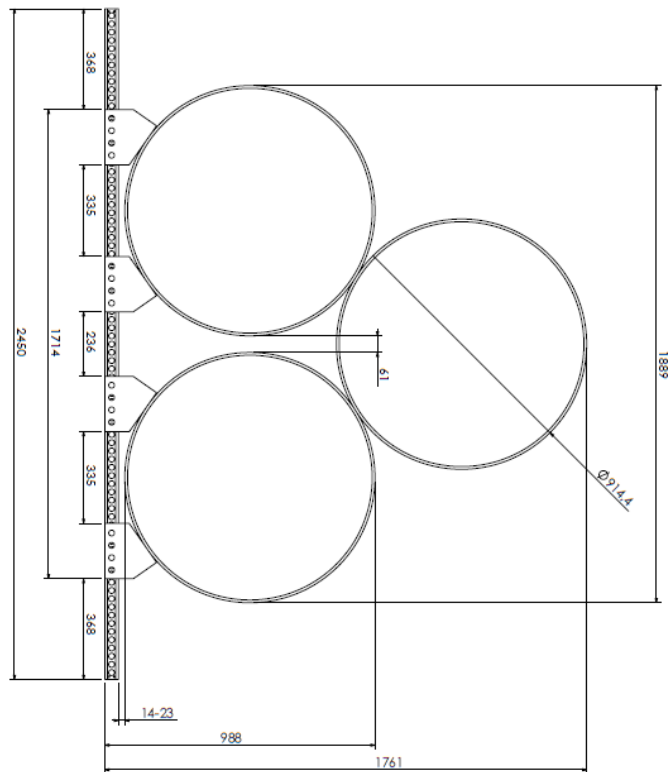


STANDARD TRUCK CONFIGURATION



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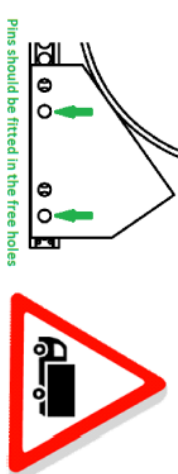
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System88 - Truck Ø 914.4

Block	Type B
Block in middle	Type L
Number of pipes	3
Outside diameter [mm]	914.4
Outside diameter [inch]	36
Actual distance from pipe to profile [mm]	14-23
Actual distance between pipes [mm]	61

- Always check system88 instructions before use
- Maximum load of 7.575 kg on block B
- Check vertical space between blocks for total maximum load
- Always secure each block with 2 locking pin
- Replace block in case it shows permanent deformation
- The blocks should be secured with the steel profile
- The blocks can be provided with rubber layer* on request
- (* always use rubbered tie-downs in combination with rubber layer)
- If using rubbered tie-downs, tighten tie-downs again after 10 minutes**
- ** If the tie-downs are not secured with the steel profile
- Make sure when multiple pipes are transported at the same time, all pipes are secured
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

The sum of all tie-downs must be 5.540 dcn for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 4.570 dcn for 30 ton load (check label on tie-down)

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IBAN no. NL55 RABO 0172 9113 62



Revision date:
3-6-2016



Technical drawing of a four-bore engine block (Fig. 1) showing front and side views with dimensions.

Front View Dimensions:

- Overall width: 2450
- Distance between cylinder centers (left): 1774
- Distance between cylinder centers (right): 1774
- Distance between cylinder centers (total): 3540
- Distance from left edge to first cylinder center: 338
- Distance from first cylinder center to second cylinder center: 350
- Distance from second cylinder center to third cylinder center: 266
- Distance from third cylinder center to fourth cylinder center: 350
- Distance from fourth cylinder center to right edge: 338
- Distance from left edge to first cylinder center (total): 15-24
- Distance from left edge to second cylinder center: 1039
- Distance from left edge to third cylinder center: 2106
- Distance from left edge to fourth cylinder center: 2450

Side View Dimensions:

- Overall height: 1985
- Distance from top edge to first cylinder center: 305
- Distance from first cylinder center to second cylinder center: 396
- Distance from second cylinder center to third cylinder center: 200
- Distance from third cylinder center to fourth cylinder center: 396
- Distance from fourth cylinder center to bottom edge: 305
- Distance from top edge to first cylinder center (total): 55
- Distance from top edge to second cylinder center: 305
- Distance from top edge to third cylinder center: 601
- Distance from top edge to fourth cylinder center: 902
- Distance from top edge to bottom edge: 1985

Other Dimensions:

- Distance from left edge to first cylinder center (total): 15-24
- Distance from left edge to second cylinder center: 1039
- Distance from left edge to third cylinder center: 2106
- Distance from left edge to fourth cylinder center: 2450

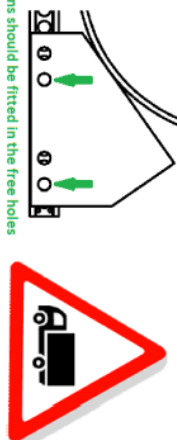
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System88 - Truck		Ø 965,2
Block		Type B
Block in middle		Type 1
Number of pipes	4	
Outside diameter [mm]	945,2	
Outside diameter [inch]	38	
Actual distance from pipe to profile [mm]	15-24	
Actual distance between pipes [mm]	55	

- Always check system's instructions before use
- Maximum load of 4,255 kg on block A
- Check your vehicle specifications for total maximum load
- Replicate block in use 3 times, permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- (** always use ratchet tie-downs in combination with ratchet layer)
- If using ratchet tie-downs, tighten the blocks again after 10 minutes**
- Made sure when multiple pipes are transported at the same time, all pipes are secured
- Deviate from this advice only in consult with Dethlefs



Pins should be fitted in the free holes

The sum of all tie-downs must be 5,560 dan for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 6,670 dan for 30 ton load (check label on tie-down)

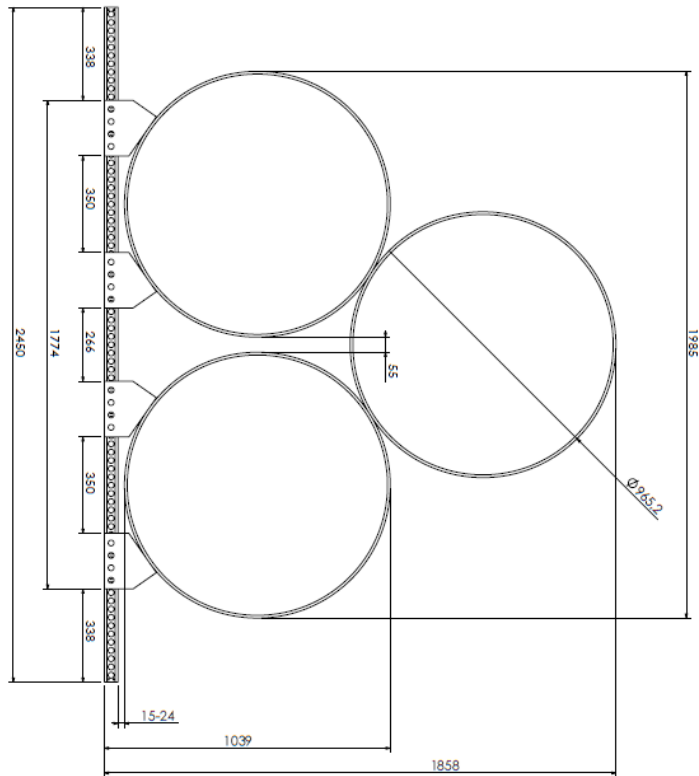
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STANDARD TRUCK CONFIGURATION



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All dimensions are in mm
Scale 1:15

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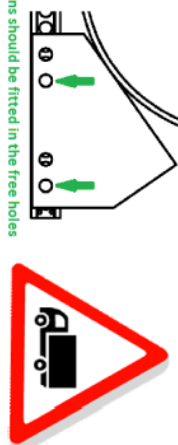
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System88 - Truck

Block	Type B	Type L
Number of pipes	3	3
Outside diameter [mm]	965.2	965.2
Outside diameter [inch]	38	38
Actual distance from pipe to profile [mm]	15-24	15-24
Actual distance between pipes [mm]	55	55

- Always check System88 installation before use
- Maximum load of 4.725 kg on block L
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Always use each block with its own locking deformation
- Keep block L close to the vehicle to prevent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- The blocks can be provided with rubber layer on request
- The blocks can be provided with rubber layer on request
- If using rubber layer, the blocks must be replaced after 10 minutes*
- ** due to relaxation the blocks need repositioning
- Make sure when multiple pipes are transported at the same time, all pipes are supported
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

The sum of all tie-downs must be 2540 daN for 25 ton load (check label on tie-down)
The sum of all tie-downs must be 4870 daN for 50 ton load (check label on tie-down)

Revision date:
3-6-2016

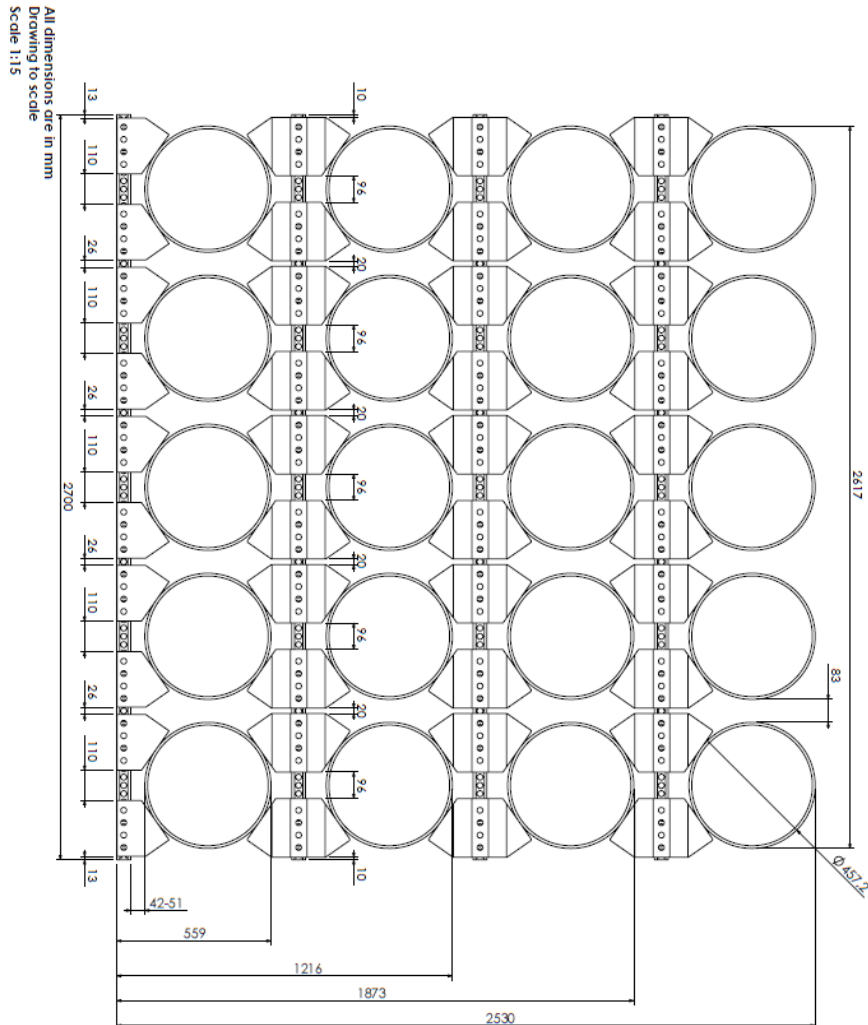




STANDARD TRAIN CONFIGURATION
It is not allowed to stack pipes Ø 457,2 mm in PYRAMIDS on System88 Block B and L.



Page B-02



All dimensions are in mm
Drawing to scale
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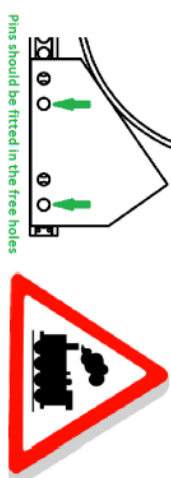
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System88 - Train

Block	Type B
Block in middle	Type L
Number of pipes	20
Outside diameter [mm]	457.2
Outside diameter [inch]	18
Actual distance from pipe to profile [mm]	42.51
Actual distance between pipes [mm]	83

- Always check System88 instructions before use
- Maximum load of 7.975 kg on block B
- Maximum load of 4.725 kg on block L
- Always use the correct stacking method
- Always secure each block with 2 locking pins
- Replace block in case it shows permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- The pipes must be secured to prevent movement in the same time, all pipes are secured
- Make sure when multiple pipes are transported of the same time, all pipes are secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- * If the pipes are secured with ratchet tie-downs
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

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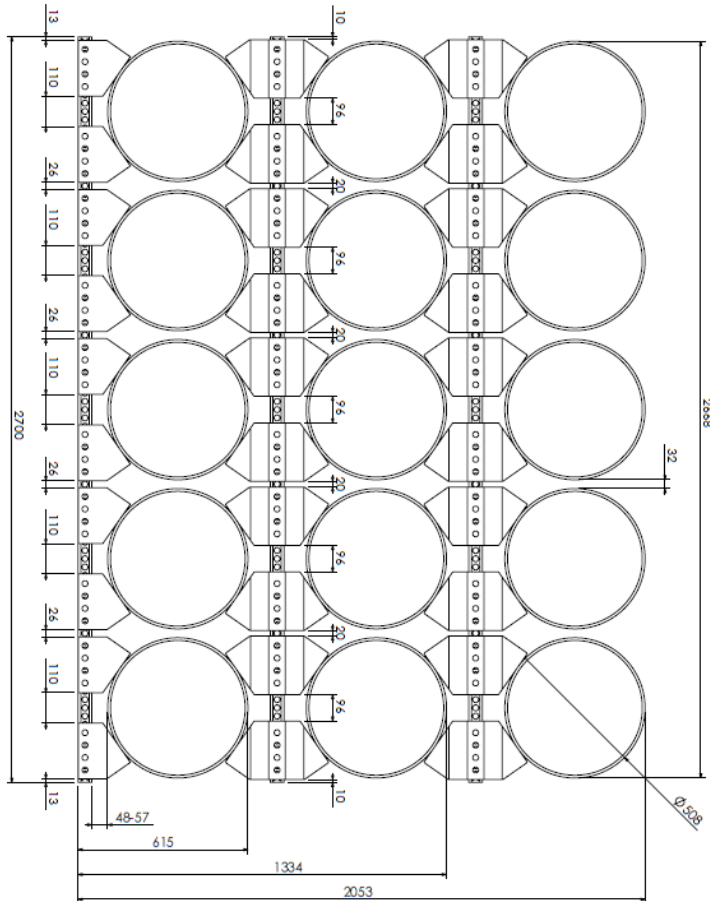




STANDARD TRAIN CONFIGURATION



Page B-03



All dimensions are in mm
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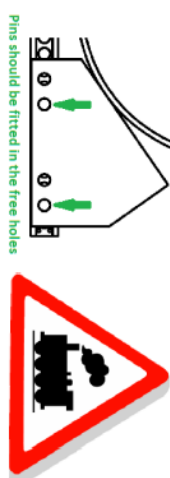
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System88 - Train

Block	Type B	Type L
Block in middle	15	15
Number of pipes	15	15
Outside diameter [mm]	508.0	508.0
Outside diameter [inch]	20	20
Actual distance from pipe to profile [mm]	48-57	48-57
Actual distance between pipes [mm]	32	32

- Always check System88 instructions before use
- Maximum load of 7.875 kg on block 8
- Maximum load of 4.725 kg on block 1
- Check your vehicle specifications for total maximum load
- Do not use the system on uneven or soft ground
- Replace block in case it shows permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- Make sure when multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs: tighten tie-downs again after 10 minutes*
- * If using ratchet tie-downs need tightening again after 10 minutes
- Beware from this device only in contact with driver



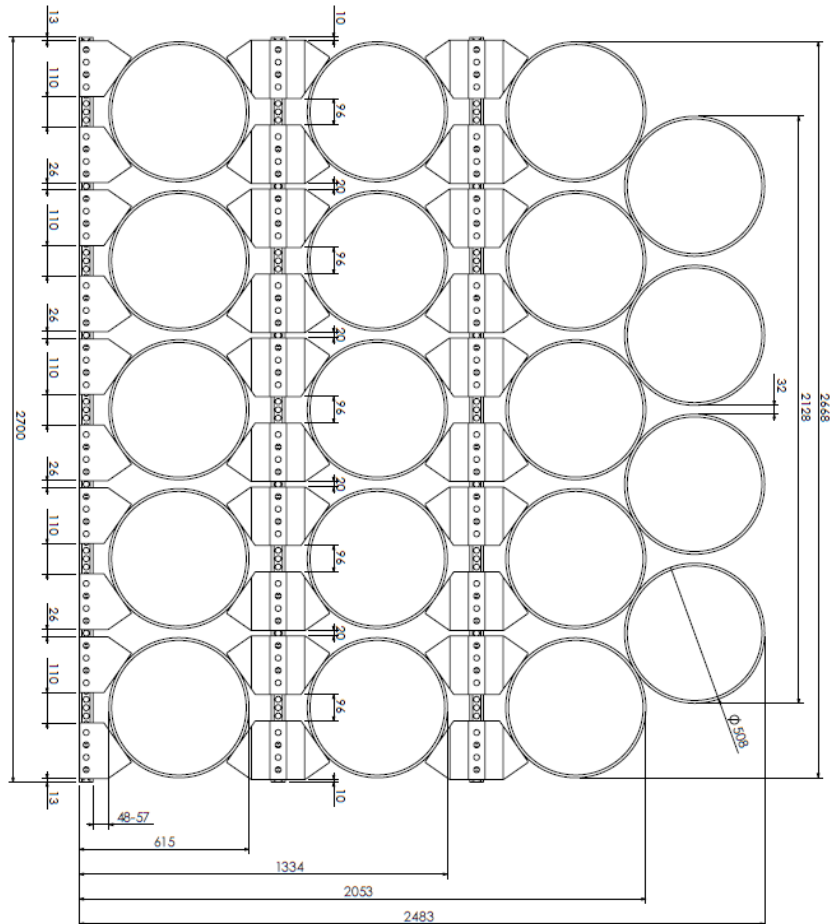
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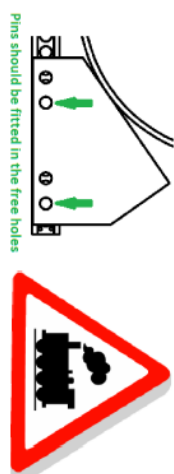
Page B-03-1



System88 - Train

Block	Type B
Block in middle	Type L
Number of pipes	19
Outside diameter [mm]	508.0
Outside diameter [inch]	20
Actual distance from pipe to profile [mm]	48-57
Actual distance between pipes [mm]	32

- Always check System88 instructions before use
- Maximum load of 4.725 kg on block B
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- Always use the correct tie-down technique
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs: tighten tie-downs again after 10 minutes* (* due to relaxation tie-downs need retightening)
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

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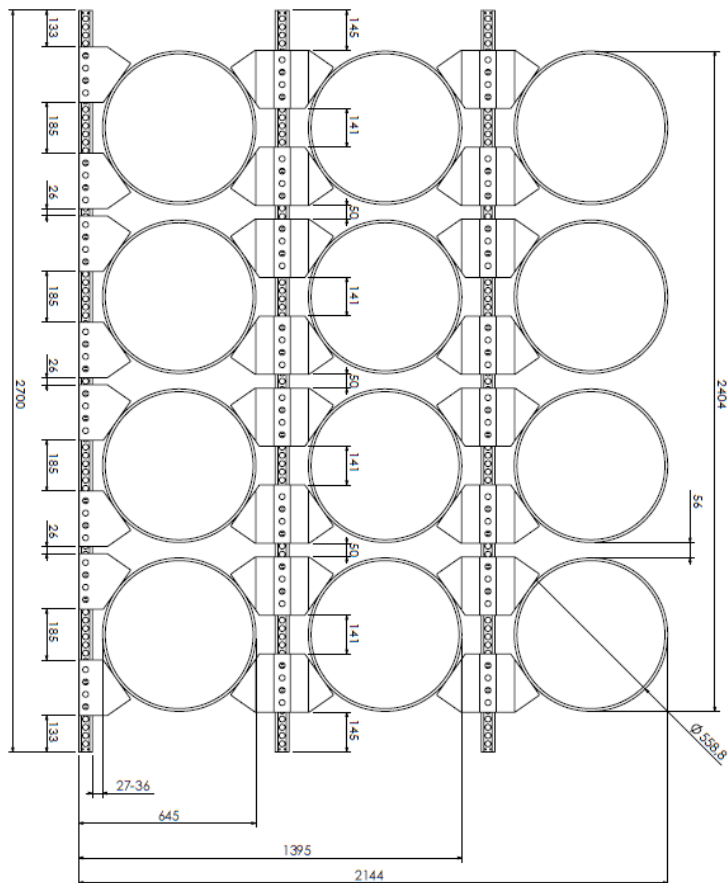




STANDARD TRAIN CONFIGURATION



Page B-04



All dimensions are in mm
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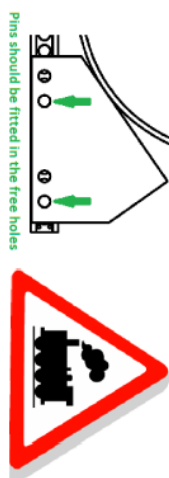
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System88 - Train

Block	Type 8	Ø 558.8
Block in middle	Type 1	
Number of pipes	12	
Outside diameter [mm]	558.8	
Outside diameter [inch]	22	
Actual distance from pipe to profile [mm]	27.34	
Actual distance between pipes [mm]	54	

- Always check system88 instructions before use
- Maximum load of 4.725 kg on block 1
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When multiple pipes are transported at the same time, all pipes must be secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes* (due to relaxation tie-downs need retightening)
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

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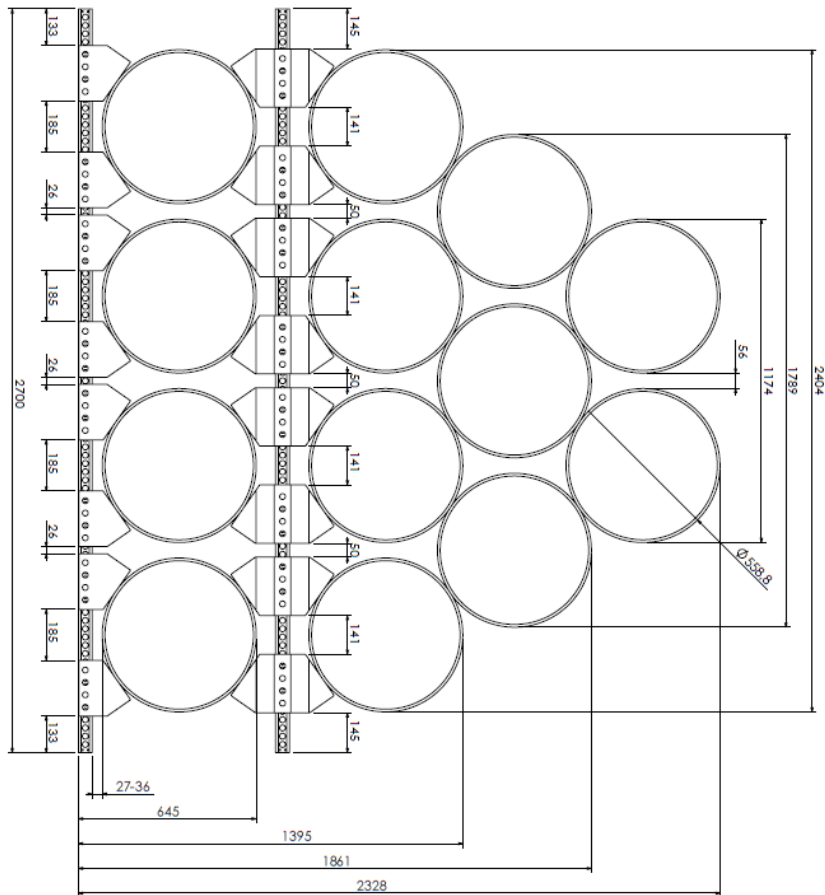




STANDARD TRAIN CONFIGURATION



Page B-04-1



All dimensions are in mm
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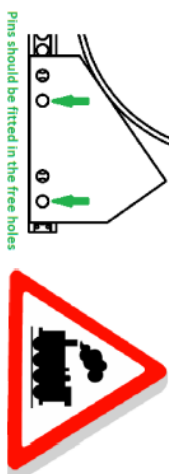
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System88 - Train

Block	Type B
Block in middle	Type L
Number of pipes	13
Outside diameter [mm]	558.8
Outside diameter [inch]	22
Actual distance from pipe to profile [mm]	27-36
Actual distance between pipes [mm]	56

- Always check System88 instructions before use
- Maximum load of 7.875 kg on block 8
- Check your vehicle specifications for total maximum load
- Always secure your load with 2 ratchet tie-downs
- The pipes must be supported by the blocks only and not touch the steel profile
- Make sure when multiple pipes are transported of the same time, all pipes are secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- *If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

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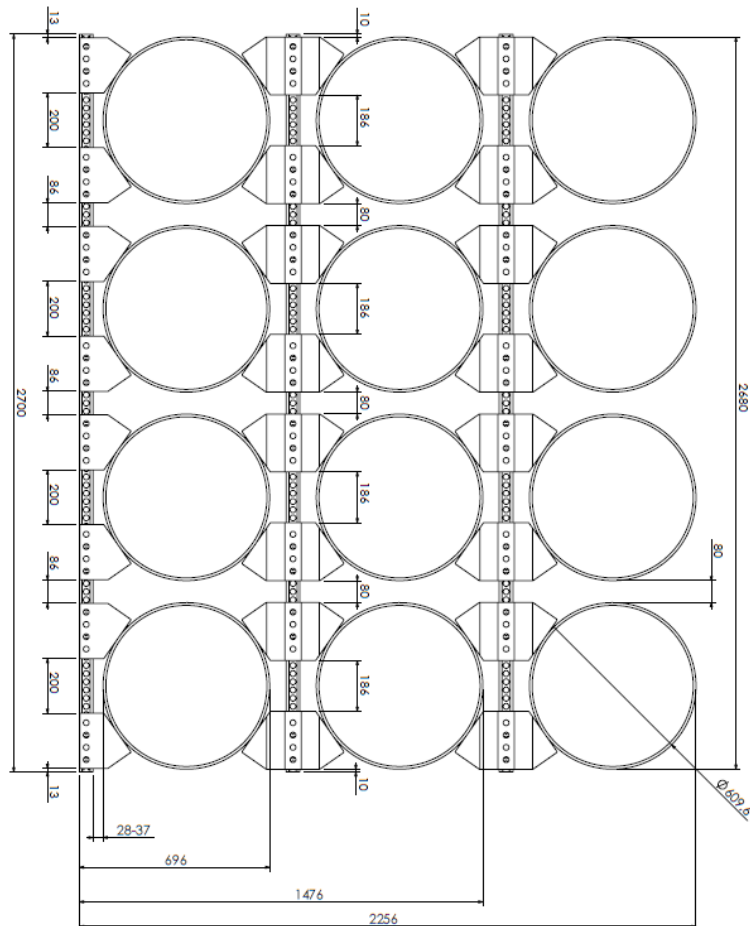




STANDARD TRAIN CONFIGURATION



Page B-05



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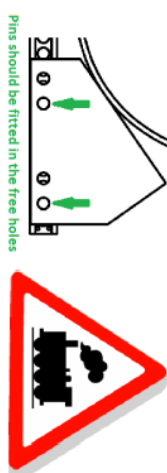
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System88 - Train

Block	Type B	Type L
Block in middle	12	12
Number of pipes	12	12
Outside diameter [mm]	609.6	609.6
Outside diameter [inch]	24	24
Actual distance from pipe to profile [mm]	28-37	28-37
Actual distance between pipes [mm]	80	80

- Always check System88 instructions before use
- Maximum load of 7.075 kg on block B
- Check your vehicle specifications for total maximum load
- Check your vehicle specifications for maximum axle load
- The pipes must be supported by the blocks only and not touch the steel profile
- Replace block in case it shows permanent deformation
- Make sure when multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs: Tighten tie-downs again after 10 minutes*
- * If you use ratchet tie-downs, you must use them in accordance with the instructions of the manufacturer
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

Revision date:
3-6-2016



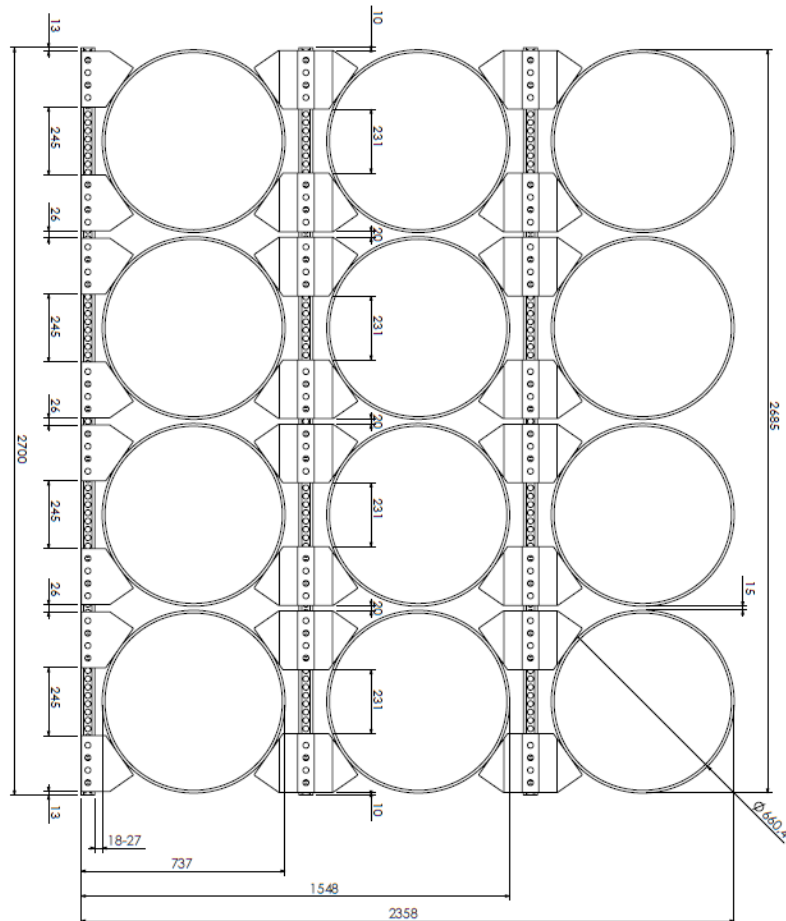


STANDARD TRAIN CONFIGURATION



Assets In Transit Deserve Optimal Care

Page B-06



All dimensions are in mm
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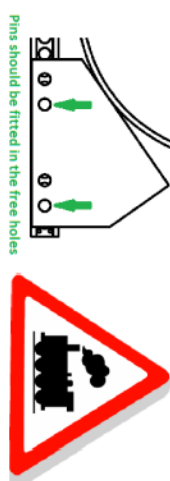
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System88 - Train

Block	Type 8	Ø 660.4
Block in middle	Type 1	
Number of pipes	12	
Outside diameter [mm]	660.4	
Actual distance from pipe to profile [mm]	26	
Actual distance between pipes [mm]	18-27	
	15	

- Always check System88 instructions before use
- Maximum load of 4,725 kg on block 8
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- Make sure when multiple pipes are transported at the same time, all pipes
- if using ratchet tie-downs: tighten tie-downs again after 10 minutes*
(* due to relaxation tie-downs need retightening)
- Deviate from this advice only in consult with Dhatec



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Page B-06-1



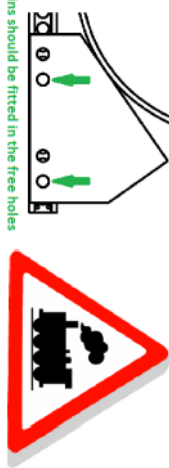
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System88 - Train

System88 - Train		Ø 660.4
Block		Type B
Block in middle		Type L
Number of pipes		13
Outside diameter [mm]		440.4
Outside diameter [inch]		16
Actual distance from pipe to profile [mm]		18-27
Actual distance between pipes [mm]		15

- Always **click** systematic instructions before use
- Maximum load of 2,572 kg on block 8
- Maximum load of 2,572 kg on block 9
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- The load must be distributed evenly over the entire length of the pipes
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- Move one turn multiple pipes are transported at the same time, oil pipes
- If using ratcheted tie-downs, tighten tie-downs again after 10 minutes*
 (* due to relaxation the only needed tightening!)
- Deviate from this advice only in consult with Dethlefs



Pins should be fitted in the free holes

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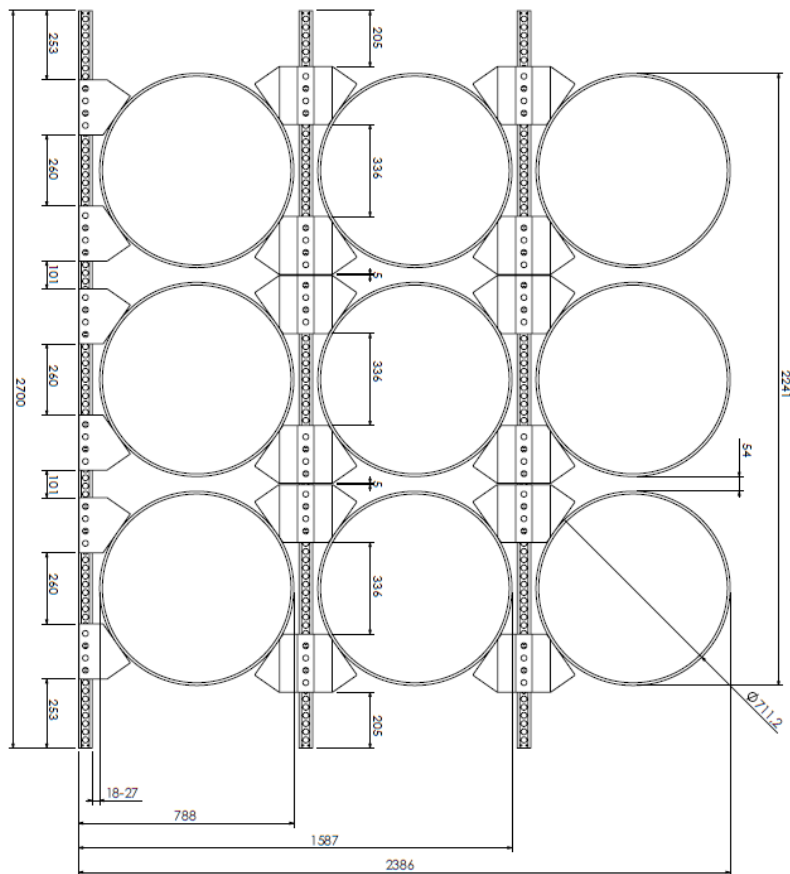


STANDARD TRAIN CONFIGURATION



Assets In Transit Deserve Optimal Care

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All dimensions are in mm
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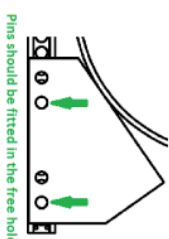
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System88 - Train

Block	Type B	Ø 711.2
Block in middle	Type L	
Number of pipes	9	
Outside diameter [mm]	711.2	
Outside diameter [inch]	28	
Actual distance from pipe to profile [mm]	18-27	
Actual distance between pipes [mm]	54	

- Always check System88 installation before use
- Maximum load of 7.025 kg on block L
- Check your vehicle specifications for total maximum load
- The pipes must be supported by the blocks only and not touch the steel profile
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs: tighten tie-downs again after 10 minutes* (due to relaxation tie-downs need retightening)
- *deviate from this advice only in consult with Dhatec



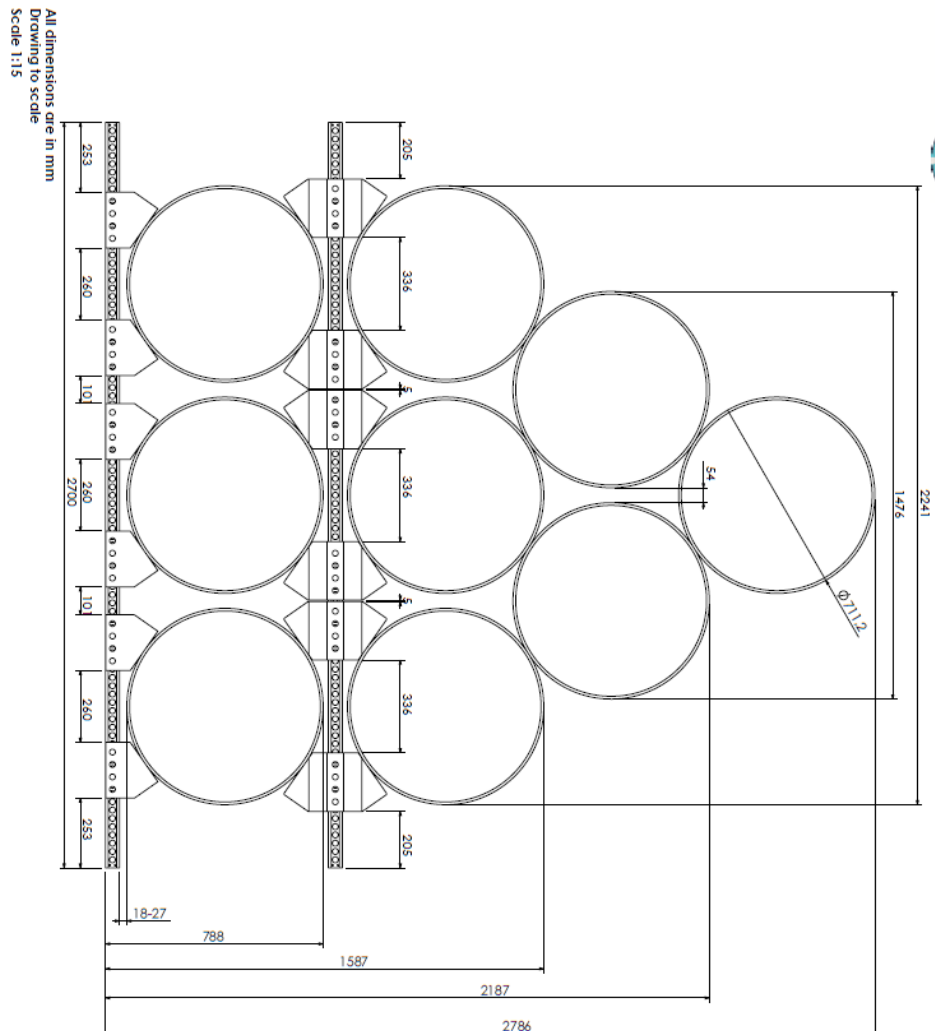
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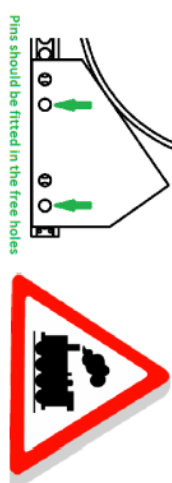


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System88 - Train

Block	Type B
Block in middle	Type L
Number of pipes	9
Outside diameter [mm]	711.2
Outside diameter [inch]	28
Actual distance from pipe to profile [mm]	18-27
Actual distance between pipes [mm]	54

- Always check System88 instructions before use
- Maximum load of 7.875 kg on block B
- Check your vehicle specifications for total maximum load
- Always secure your load with 2 x 5000 kg ratchet straps
- The pipes must be supported by the blocks only and not touch the steel profile
- Replice block in case it shows permanent deformation
- Make sure when multiple pipes are transported of the same time, all pipes are secured
- If using latched tie-downs: tighten tie-downs again after 10 minutes*
- If using ratchet tie-downs: tighten tie-downs again after 10 minutes*
- Deviate from this advice only in consult with Dhatec



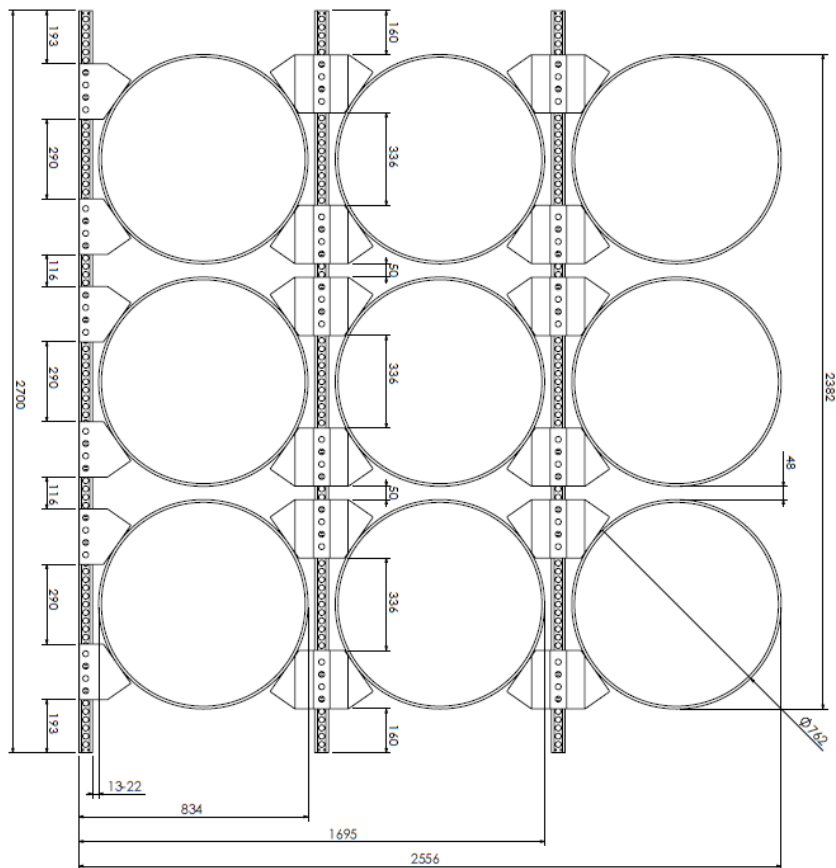
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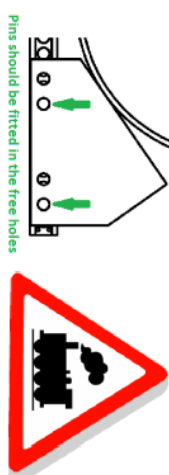


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System88 - Train

Block	Type B	Ø 762.0
Block in middle	Type L	
Number of pipes	9	
Outside diameter [mm]	762.0	
Outside diameter [inch]	30	
Actual distance from pipe to profile [mm]	13-22	
Actual distance between pipes [mm]	48	

- Always check system88 instructions before use
- Maximum load of 7.675 kg on block B
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Pipes must be supported by the blocks only and not touch the steel profile
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When more than multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- * due to relaxation tie-downs need tightening
- Deviate from this device only in consult with Dhatec



Pins should be fitted in the free holes

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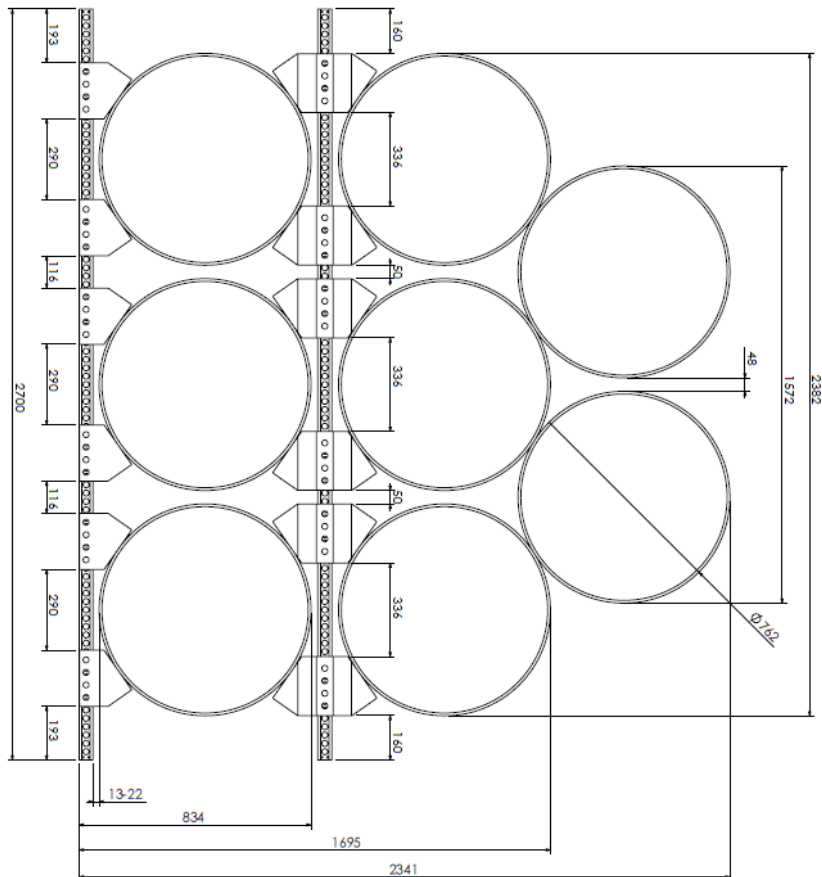




STANDARD TRAIN CONFIGURATION



Page B-08-1



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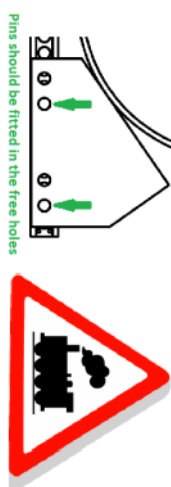
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System88 - Train

Block	Type 8
Block in middle	Type 1
Number of pipes	8
Outside diameter [mm]	762.0
Outside diameter [inch]	30
Actual distance from pipe to profile [mm]	13-22
Actual distance between pipes [mm]	48

- Always check system88 instructions before use
- Maximum load of 7.875 kg on block 8
- Check your vehicle specifications for loaded maximum load
- Always secure your block with a lock pin
- Replace block in case it shows permanent deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- Make sure when multiple pipes are transported of the same time, all pipes are secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- * If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- Deviate from this advice only in consult with Dhatec



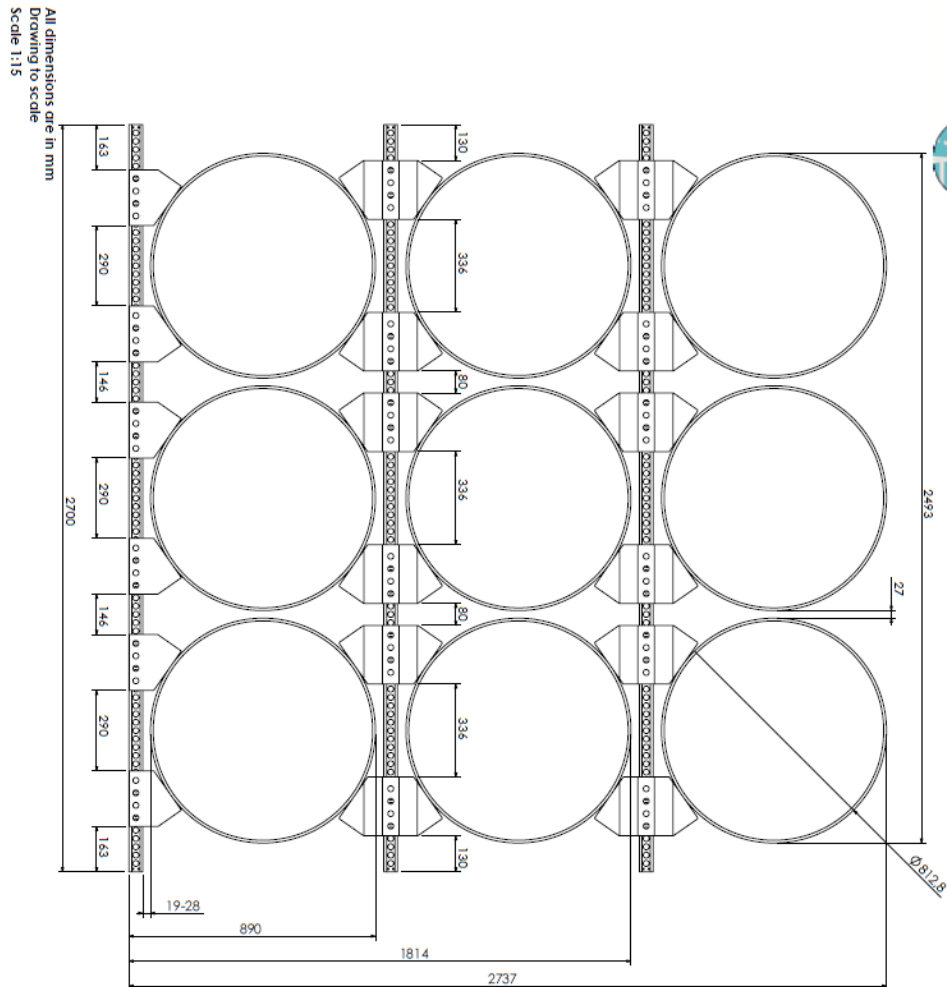
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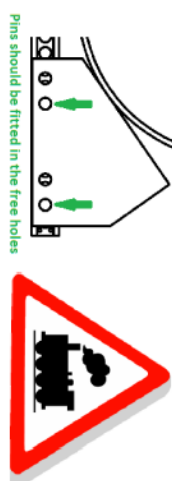


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System88 - Train

Block	Type 8	Ø 812.8
Block in middle	Type 1	
Number of pipes	9	
Outside diameter [mm]	812.8	
Outside diameter [inch]	32	
Actual distance from pipe to profile [mm]	15-28	
Actual distance between pipes [mm]	27	

- Always check System88 instructions before use
- Maximum load per block is 4,725 kg on Block 1
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 lashing pins
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- Make sure when multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs: tighten tie-downs again after 10 minutes* (* due to relaxation the downers need retightening)
- Deviate from this advice only in consult with Dhatec

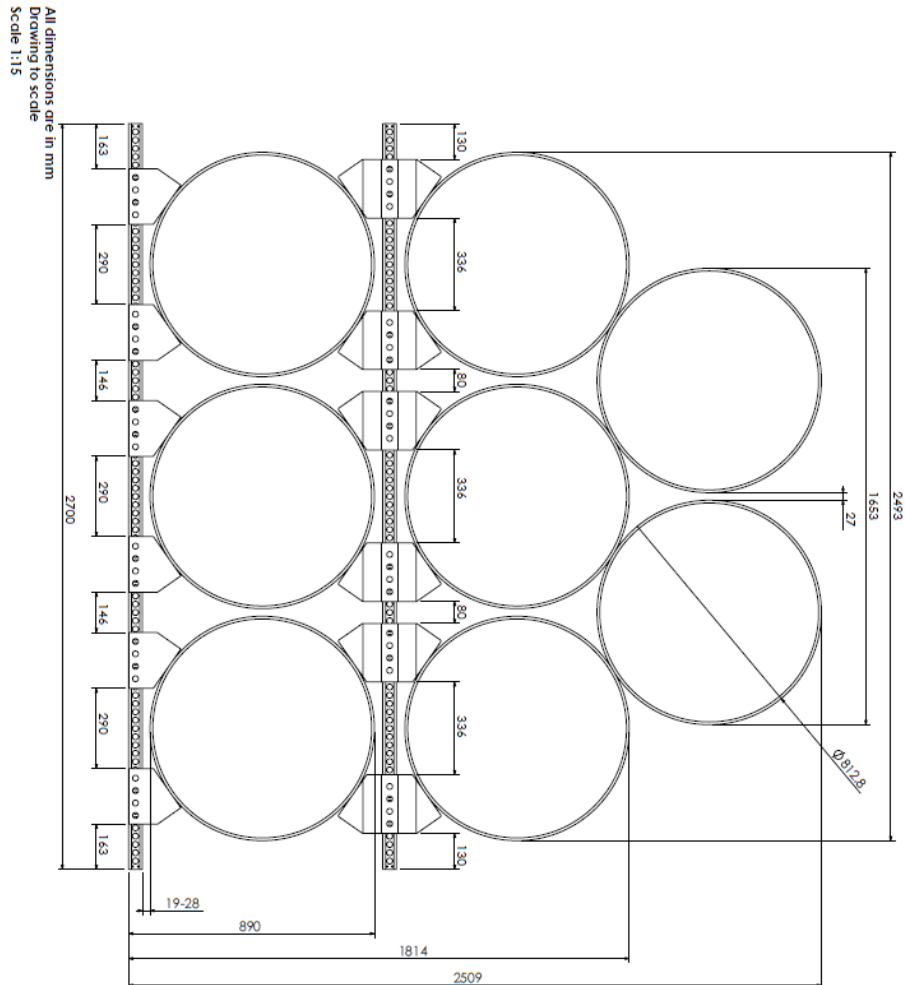


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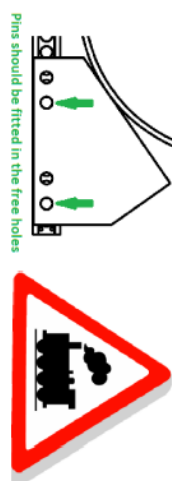
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System88 - Train

Block	Type B
Block in middle	Type L
Number of pipes	8
Outside diameter [mm]	812,8
Outside diameter [inch]	32
Actual distance from pipe to profile [mm]	17-28
Actual distance between pipes [mm]	27

- Always check System88 instructions before use
- Maximum load of 7.275 kg on block B
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- Replace block in case it shows permanent deformation
- Pipes must be supported by the block and must not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- Make sure when multiple pipes are transported at the same time, all pipes are secured
- Use secured tie-downs: Tighten tie-downs again after 10 minutes* (* due to relaxation tie-downs need retightening)
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

Revision date:
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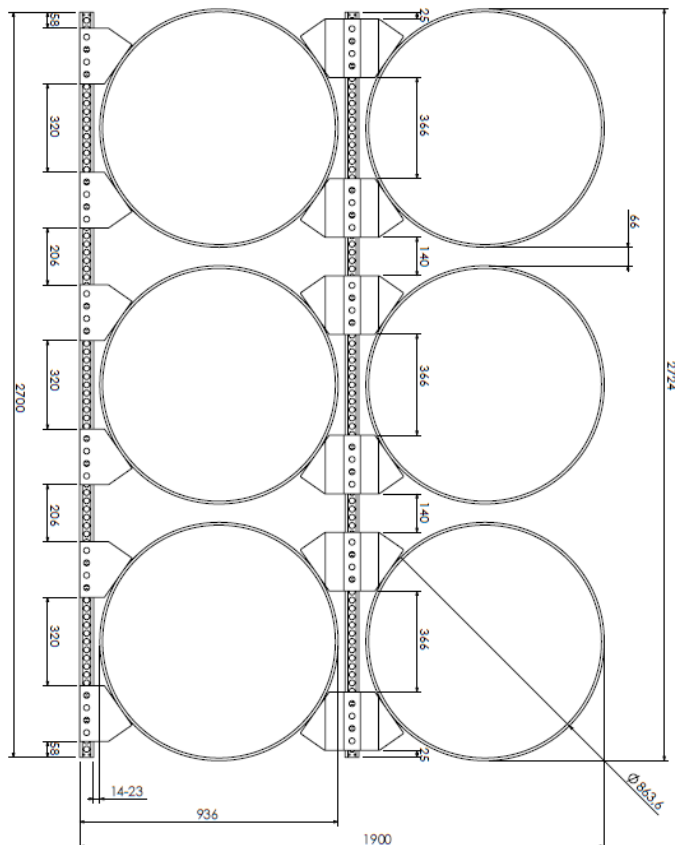




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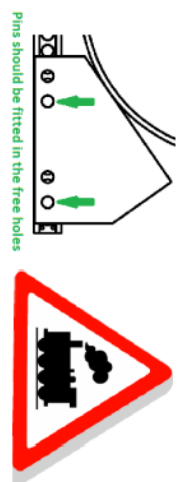
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System88 - Train

Block	Type B	Ø 863.6
Block in middle	Type L	
Number of pipes	4	
Outside diameter [mm]	863.6	
Outside diameter [inch]	34	
Actual distance from pipe to profile [mm]	14-23	
Actual distance between pipes [mm]	46	

- Always check System88 instructions before use
- Maximum load of 7.875 kg on block B
- Check your vehicle specifications for total maximum load
- Check your vehicle specifications for maximum height
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs: tighten tie-downs again after 10 minutes* (due to relaxation tie-downs need retightening)
- Deviate from this advice only in consult with Dhattec



Pins should be fitted in the free holes

All dimensions are in mm
Drawing to scale
Scale 1:15

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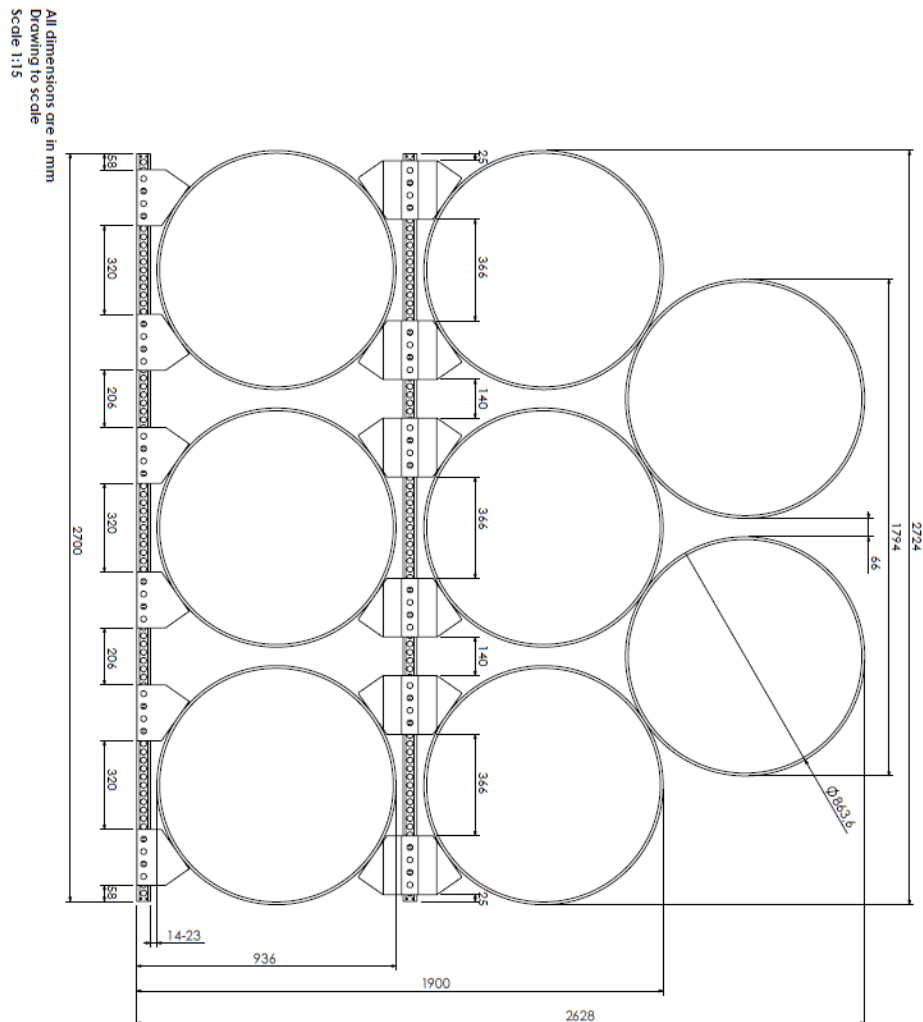
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VAT no. NL809430539 B01
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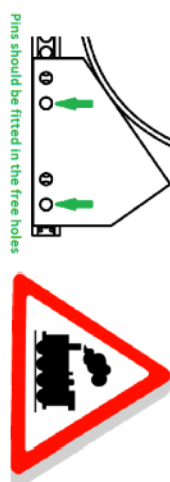


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System88 - Train

Block	Ø 863.6
Block in middle	Type B
Number of pipes	8
Outside diameter [mm]	863.6
Outside diameter [inch]	34
Actual distance from pipe to profile [mm]	14-23
Actual distance between pipes [mm]	45

- Always check System88 instructions before use
- Always use the correct pin type (Type B)
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- Always use the correct pin type (Type B)
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- Make sure when multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- (* due to relaxation tie-downs need retightening)
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

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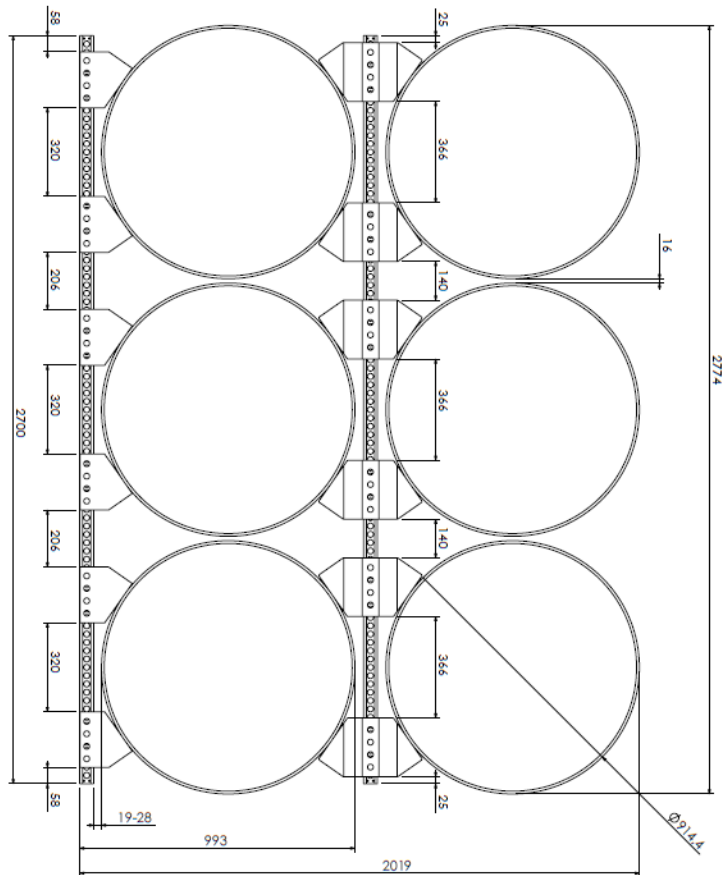




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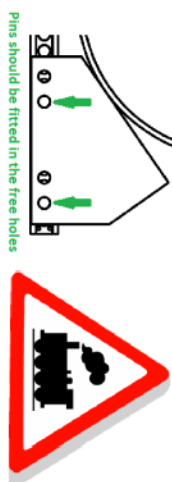
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IBAN no. NL55 RABO 0172 7113 92

System88 - Train

Block	Type B	Ø 914.4
Block in middle	Type L	
Number of pipes	4	
Outside diameter [mm]	914.4	
Outside diameter [inch]	36	
Actual distance from pipe to profile [mm]	19-28	
Actual distance between pipes [mm]	16	

- Always check System88 instructions before use
- Maximum load of 7.875 kg on block B
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Always use the correct tie-down technique
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes* (due to relaxation tie-downs need retightening)
- Deviate from this device only in consult with Dhatec



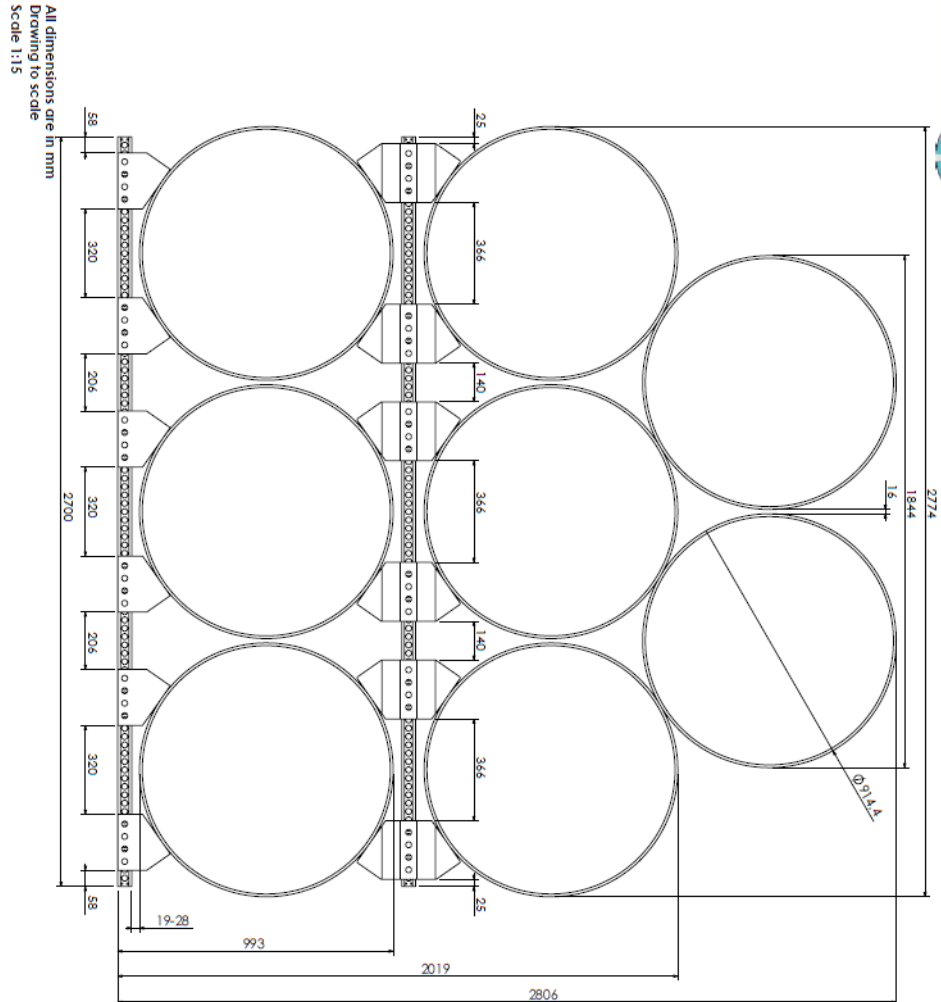
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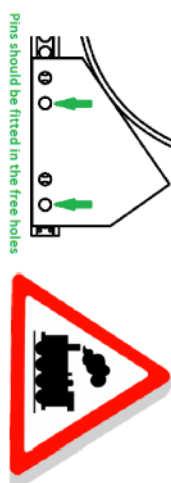
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System88 - Train

Block	Type B
Block in middle	Type L
Number of pipes	8
Outside diameter [mm]	914.4
Outside diameter [inch]	36
Actual distance from pipe to profile [mm]	17-28
Actual distance between pipes [mm]	16

- Always check System88 instructions before use
- Maximum load of 7.875 kg on block B
- Maximum load of 4.725 kg on block L
- Check your vehicle specifications for total maximum load
- Do not use System88 on uneven ground with 2% longitudinal deformation
- Replace block every 8 hours to avoid longitudinal deformation
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When transporting multiple pipes use transported at the same time, all pipes are secured
- If using ratchet tie-downs: tighten tie-downs again after 10 minutes*
(* due to relaxation tie-downs need retightening)
- *Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes



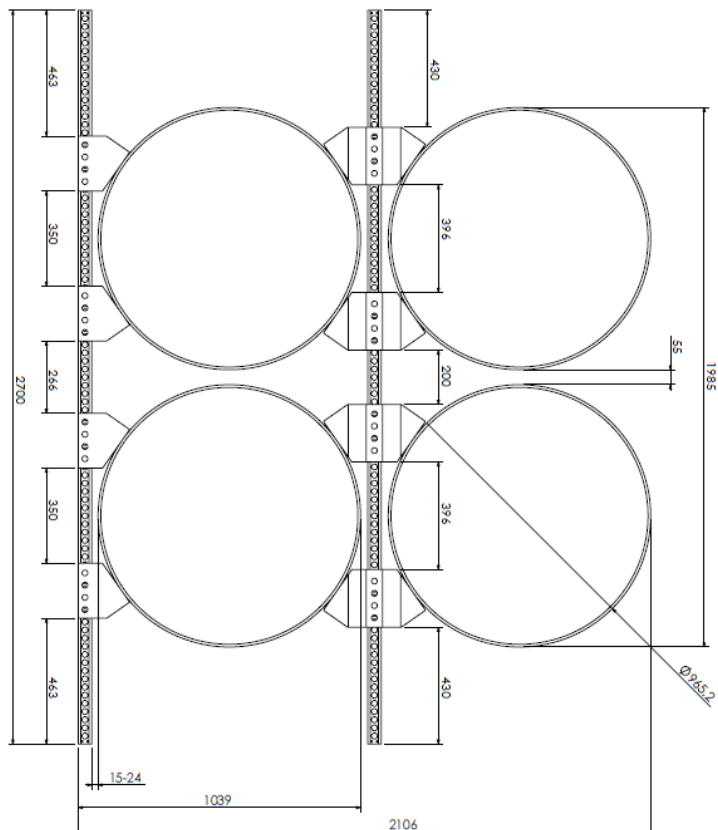
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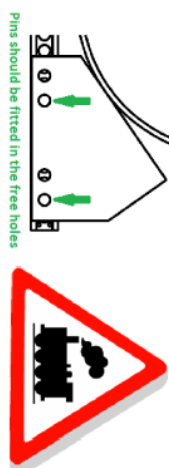
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System88 - Train

Block	Type 8
Block in middle	Type 1
Number of pipes	4
Outside diameter [mm]	765.2
Outside diameter [inch]	30.12
Actual distance from pipe to profile [mm]	15-24
Actual distance between pipes [mm]	55

- Always check System88 instructions before use
- Maximum load of 7.275 kg on block 8
- Maximum load of 4.275 kg on block 1
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- Replace block in case a shows permanent deformation
- The locking pins should not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- Make sure when multiple pipes are transported at the same time, all pipes
- Using ratchet tie-downs: tighten tie-downs again after 10 minutes*
- (* due to relaxation tie-downs need re-tightening)
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

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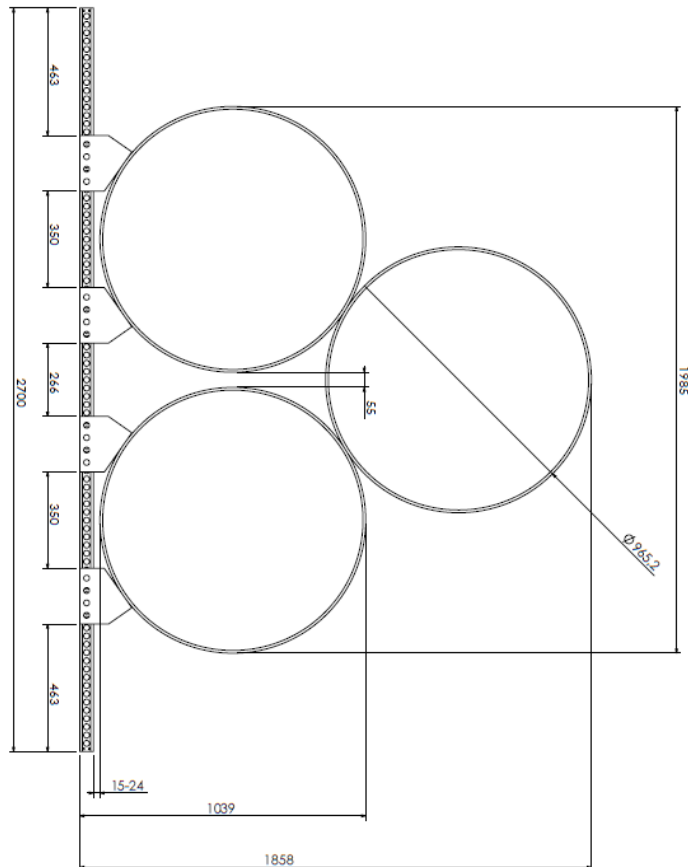




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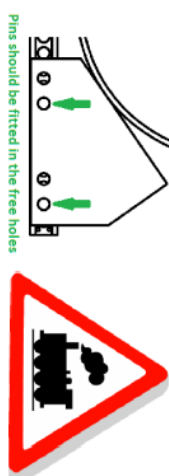
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System88 - Train

Block	Type B	Ø 965.2
Block in middle	-	-
Number of pipes	3	-
Outside diameter [mm]	965.2	-
Outside diameter [inch]	38	-
Actual distance from pipe to profile [mm]	15-24	-
Actual distance between pipes [mm]	55	-

- Always check system88 instructions before use
- Always transport system88 on a level surface
- Maximum load of 4.725 kg on block I
- Check your vehicle specifications for total maximum load
- Always secure each block with 2 locking pins
- Locking pins should be secured by the system88 verification
- The pipes must be supported by the blocks only and not touch the steel profile
- We recommend to use tie-downs to secure the pipes
- When multiple pipes are transported at the same time, all pipes are secured
- If using ratchet tie-downs, tighten tie-downs again after 10 minutes*
- * due to relaxation tie-downs need retightening
- Deviate from this advice only in consult with Dhatec



Pins should be fitted in the free holes

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Appendix C Calculation for securing pipe loads

1. Calculation for securing pipe loads (March 2th 2011)

Securing the load of pipes, total 27.000 kg (ref. [1],[2],[3],[4])

See figure 2 for maximum inertial forces of the load to be considered

Load of pipes on trailer 27.000 kg (F_g)

1.1. Calculation of needed tie-downs **WITH** the use of (Dhatec) Anti-skid layers between trailer and System88 and between System88 and pipes with $\mu = 0,6$

1.1.1. Load securing in driving direction

Inertial forces in driving direction, conform VDI 2700^[4] p.9

In forward direction **for trucks**: 0.8G

$F_m \text{ vorwärts} = 0,8 \times F_g = 0,8 \times 27.000 = 21.600 \text{ kg}$

Friction force with friction coefficient between pipes and PE-Blocks with the use of anti-skid layers $\mu = 0,60$ ^[4] VDI p.10

$F_w = \mu \times F_g = 0,60 \times 27.000 = 16.200 \text{ kg}$

Load securing force needed^[1] TLN p.149

$F_z = F_m \text{ vorwärts} - F_w = 21.600 - 16.200 = 5.400 \text{ kg} = 5.400 \text{ daN}$

The standard tension force (S_{TF}) is mentioned on the label of each tie-down and depends on the model of the ratchet. For the calculation, we assume that Dhatec ratchets are used with a S_{TF} of 750 daN. This information can be found on the label of the tie-down. When the load is lashed the tension in the belt is according to *DIN EN 12195 – 1*[3] 1,5 times the S_{TF} that is mentioned on the label. For this example, the needed tie-downs to secure the load is:

$5.400 \text{ daN} / (0,6 \times 1,5 \times 750 \text{ daN}) = \mathbf{8 \text{ Dhatec tie-downs.}}$

1.1.2. Load securing rectangular on driving direction

Inertial forces rectangular on driving direction, conform VDI 2700^[4]

$F_m \text{ sideways} = 0,5 \times F_g = 0,5 \times 27.000 = 13.500 \text{ kg}$

Friction coefficient between pipes and PE-Blocks

with the use of anti-skid layers: $\mu = 0,60$ ^[4] VDI p.10

$F_w = \mu \times F_g = 0,60 \times 27.000 = 16.200 \text{ kg}$

Load securing force needed^[1]

$F_z = F_m \text{ vorwärts} - F_w = 13.500 - 16.200 < 0 \text{ kg}$

For securing the load rectangular to the driving direction no additional tie-downs are needed.

1.1.3. Load securing contrary to driving direction

For securing the load against forces contrary to the driving direction no tie-downs are needed while the inertial forces for securing the load against moving backwards relative to the trailer are the same as the inertial forces during cornering. The calculation would therefore be the same as 1.1.2.

Conclusion: For securing a pipe load with a total weight of 27.000 kg, when using System88 for transport WITH antiskid layers with a friction coefficient of $>0,6$ between all contact surfaces, 8 tie-downs with a S_{TF} (standard tensioning force) of 750 daN are needed.

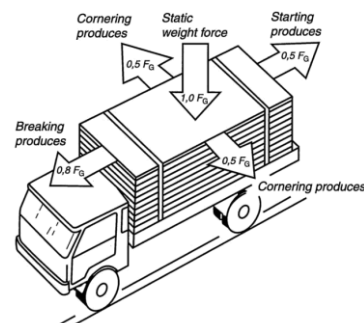


Fig. 26: Maximum inertial forces of the load to be considered for load safety (from VDI2700^[4])

References:

- [1] Smit, A., Lampen, A., Ladingzekering, Handboek van Transport en Logistiek Nederland voor het goed vastzetten van Lading, ISBN 90-75363-35-4, Februari 2003.
- [2] Kugele, M., Lampen, A., Sander, R., Dekra Praxisratgeber Ladungssicherung, Dekra Fachbuchreihe Fuhrpark, ISBN 978-3-938255-34-6, Juni 2007.
- [3] Ladungssicherung auf Straßenfahrzeugen - Aufbauten an Nutzfahrzeugen - Mindestanforderungen; Deutsche Fassung EN 12642, Januar 2006.
- [4] Verein Deutscher Ingenieure, VDI 2700 Ladungssicherung auf Straßenfahrzeugen, Berlin Beuth Verlag, November 2004.

2. Calculation for securing pipe loads (March 2th 2011)

Securing the load of pipes, total 27.000 kg (ref. [1],[2],[3],[4])

See figure 2 for maximum inertial forces of the load to be considered

Load of pipes on trailer 27.000 kg (F_g)

2.1. Calculation of needed tie-downs WITHOUT the use of (Dhatec) Anti-skid layers the friction between pipes and blocks is $\mu = 0,3$

2.1.1. Load securing in driving direction

Inertial forces in driving direction, conform VDI 2700^[4] p.9

$F_m \text{ vorwärts} = 0,8 \times F_g = 0,8 \times 27.000 = 21.600 \text{ kg}$

Friction force with friction coefficient between pipes and PE-Blocks without the use of anti-skid layers with $\mu = 0,3$

$F_w = \mu \times F_g = 0,30 \times 27.000 = 8.100 \text{ kg}$

Load securing force needed^{[1]TLN p.149}

$F_z = F_m \text{ vorwärts} - F_w = 21.600 - 8.100 = 13.500 \text{ kg} = 13.500 \text{ daN}$

The standard tension force (S_{TF}) is mentioned on the label of each tie-down and depends on the model of the ratchet. For the calculation, we assume that ratchets are used with a S_{TF} of 750 daN. This information can be found on the label of the tie-down. When the load is lashed the tension in the belt is according to *DIN EN 12195 – 1*[3] 1,5 times the S_{TF} that is mentioned on the label. For this example, the needed tie-downs to secure the load is:

$13.500 \text{ daN} / (0,3 \times 1,5 \times 750 \text{ daN}) = 40 \text{ Dhatec tie-downs.}$

2.1.2. Load securing rectangular on driving direction

Inertial forces rectangular on driving direction, conform VDI 2700^[4]

$F_m \text{ sideways} = 0,5 \times F_g = 0,5 \times 27.000 = 13.500 \text{ kg}$

Friction coefficient between pipes and PE-Blocks is 0,3:

$F_w = \mu \times F_g = 0,30 \times 27.000 = 8.100 \text{ kg}$

Load securing force needed^[1]

$F_z = F_m \text{ vorwärts} - F_w = 13.500 - 8.100 = 5.400 \text{ kg}$

The needed securing force is already covered by the tie down that are mentioned under 2.1.1. For securing the load rectangular to the driving direction no additional tie-downs are needed.

2.1.3. Load securing contrary to driving direction

For securing the load against forces contrary to the driving direction no additional tie-downs are needed while the inertial forces for securing the load against moving backwards relative to the trailer are the same as the inertial forces during cornering. The calculation would therefore be the same as 2.1.2.

Conclusion: For securing a pipe load with a total weight of 27.000 kg for transport WITHOUT using antiskid mats, 40 tie-downs with a S_{TF} (standard tensioning force) of 750 daN are needed.

References:

- [1] Smit, A., Lampen, A., Ladingzekering, Handboek van Transport en Logistiek Nederland voor het goed vastzetten van Lading, ISBN 90-75363-35-4, Februari 2003.
- [2] Kugele, M., Lampen, A., Sander, R., Dekra Praxisratgeber Ladungssicherung, Dekra Fachbuchreihe Fuhrpark, ISBN 978-3-938255-34-6, Juni 2007.
- [3] Ladungssicherung auf Straßenfahrzeugen - Aufbauten an Nutzfahrzeugen - Mindestanforderungen; Deutsche Fassung EN 12642, Januar 2006.
- [4] Verein Deutscher Ingenieure, VDI 2700 Ladungssicherung auf Straßenfahrzeugen, Berlin Beuth Verlag, November 2004.

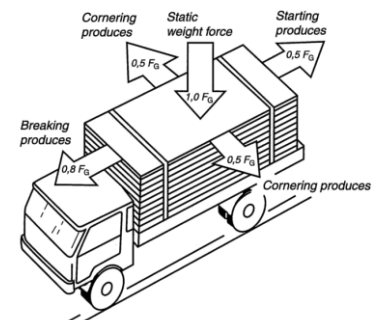


Fig. 27: Maximum inertial forces of the load to be considered for load safety (from VDI2700^[4])