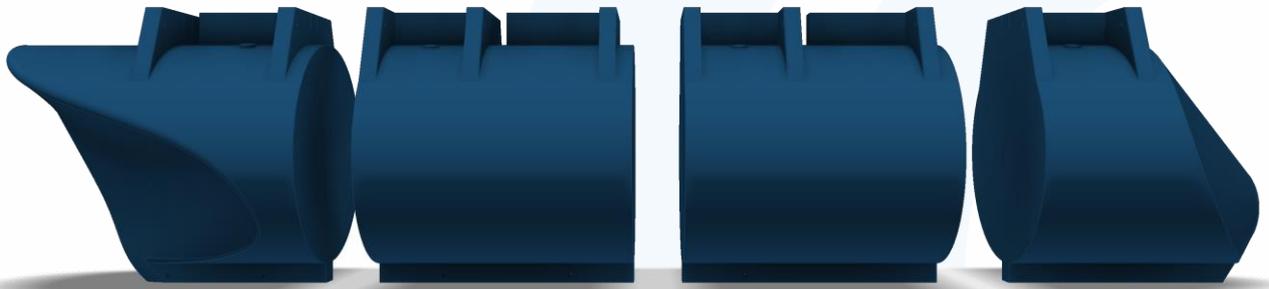


ABC pontoon series technical documentation



In this collection of documents you will find all the information on series ABC pontoon floats.

Information provided in the following order:

1. Short owner's manual
2. Pontoon float technical datasheets
3. Pontoon floats geometry information
4. ABC series principal assembly drawings
5. ABC series fastening elements
6. ABC series transportation
7. Full owner's manual
8. Warranty information
9. Properties of materials usually used for ABC series manufacturing

 Østfold Bil og Båtservice AS - Ryggeveien 157, 1570 Dilling Norge

 bilogbatservice@gmail.com

Short owner's manual

Do not submerge pontoons into the water when they are hot. If you fail to comply with this recommendation, possibility of additional deformations from water pressure to the pontoon wall could occur.

Do not leave pontoon floats to freeze in winter. Ice drift is a powerful force which cuts even metal, so there is possibility that pontoons will be damaged and punctured or deformed. In general case, freezing ice, pushed pontoon floats upwards.

Do not add more weight on pontoon then it is recommended. It is crucial to understand the buoyancy characteristics of bodies, and that volume reserve is a must for safe use of pontoons, therefore sufficient buoyancy and stability reserve must be left unused.

Do not overload the pontoons when assembling them on the shore/ground. Otherwise use framing to avoid such occurrence of point load when assembling pontoons on the shore/ground.

When warehousing the pontoon floats, protect them from damaging solar UV radiation with covers or shade. Following this recommendation will help you to increase longevity of the pontoons.

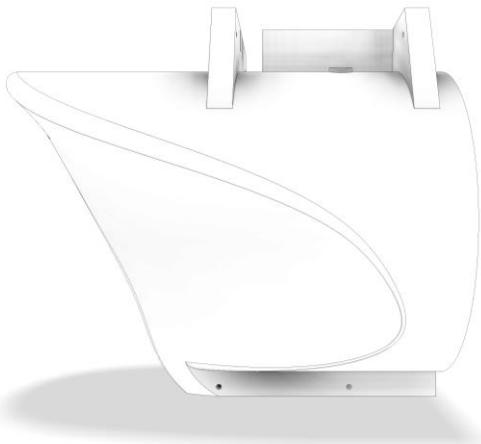
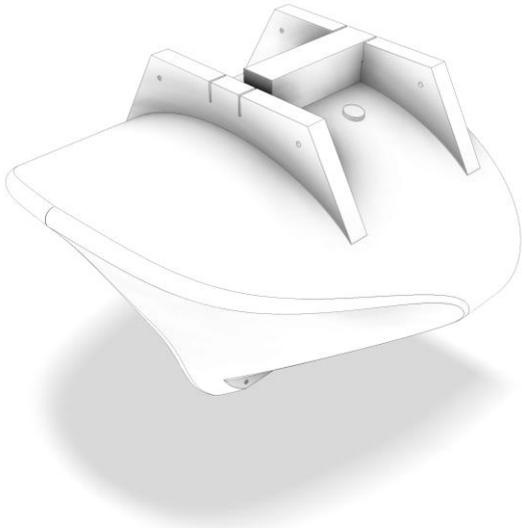
Avoid fire and heat.

Plastic does not have stiffness of steel. Geometric deformations are likely and unavoidable when putting pontoon float under force.

More information on the pontoon floats is available in the following technical data, geometry, assembly, owner's manual and other documents.

Pontoon float A

technical data sheet



Usual application

Pontoon float designed for construction of C and D category pleasure crafts, marinas and other floating constructions.

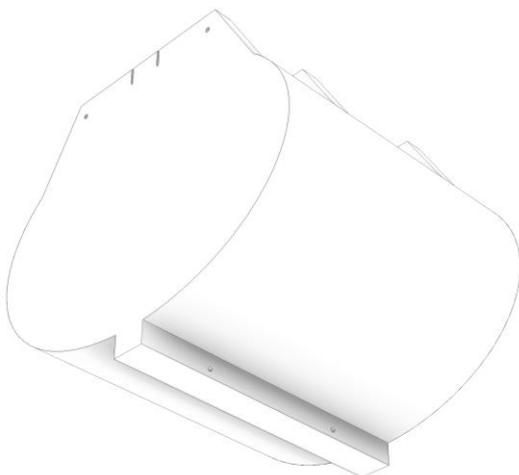
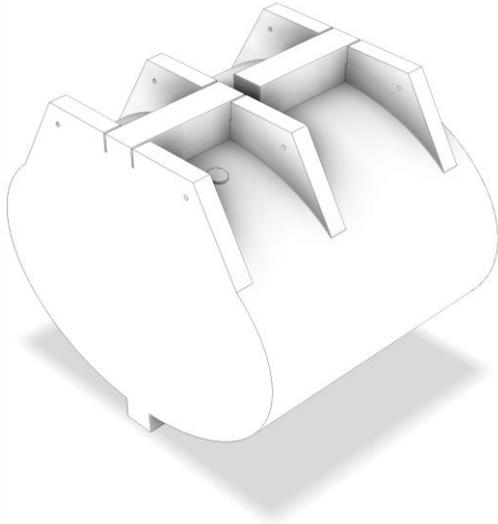
Technical data

Parameter	Value
Length / Width / Height	980/980/850 mm
Volume	335 l
Mass	Approx. 22,5 kg
Material ^[1]	Polyethylene
Standard colour	Milk-white,black.
Other colours	Available upon request
Critical displacement ^[2]	125 kg
Max draft	410 mm
Dimensional deviation ^[3]	Up to 3,5%
Volume loss due to pressure ^[4]	Up to 15% maximum
PE wall thickness	Approx. 7 mm in critical areas
Fastening points	Look assembly drawings
UV protection	From UV10
Operating temperature	From -25°C to +50°C
Foaming	None

[2] - Critical displacement value is recommended considering the best practices of ship design and leaving sufficient volume for safe stability and buoyancy. [3] - Dimensional deviation without effects of force, pressure or temperature difference on the plastic pontoon. [4] - Submerging pontoon loses volume due to pressure. Volume loss increases with depth up to given value.

Other crucial and important information on plastic pontoon floats is available in owner's manual, geometry drawings and other related documentation. Product design, technical data, dimensions subject to change without notice. Document version: A1_190531.

Pontoon float B-EPS technical data sheet



Usual application

Pontoon float designed for construction of C and D category pleasure crafts, marinas and other floating constructions.

Technical data

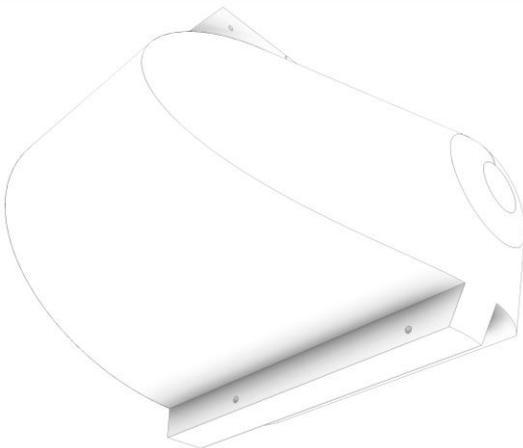
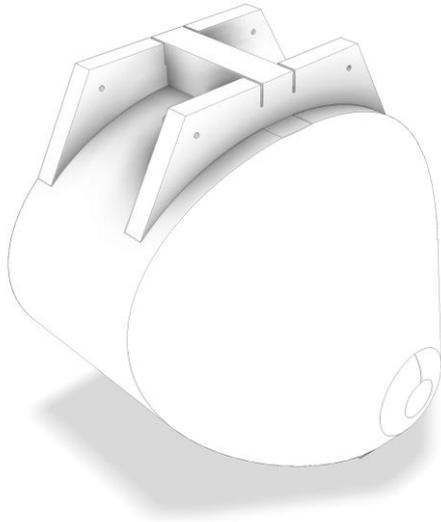
Parameter	Value
Length / Width / Height	800/980/850 mm
Volume	445 l
Mass	Approx. 27 kg
Material ^[1]	Polyethylene
Standard colour	Milk-white, black
Other colours	Available upon request
Critical displacement ^[2]	220 kg
Max draft	410 mm
Dimensional deviation ^[3]	Up to 3,5%
Volume loss due to pressure ^[4]	Up to 15% maximum
PE wall thickness	Approx. 5 mm in critical areas
Fastening points	Look assembly drawings
UV protection	From UV10
Operating temperature	From -25°C to +50°C
Foaming	EPS 70 class ^[5]
Water intake of a punctured pontoon float	Short term up to 4% volume, long term up to 10% volume

[2] - Critical displacement value is recommended considering the best practices of ship design and leaving sufficient volume for safe stability and buoyancy. [3] - Dimensional deviation without effects of force, pressure or temperature difference on the plastic pontoon. [4] - Submerging pontoon loses volume due to pressure. Volume loss increases with depth up to given value. [5] - Class referring to the compressive strength under standard EN826.

Other crucial and important information on plastic pontoon floats is available in owner's manual, geometry drawings and other related documentation. Product design, technical data, dimensions subject to change without notice. Document version: A1_190531.

Pontoon float C

technical data sheet



Usual application

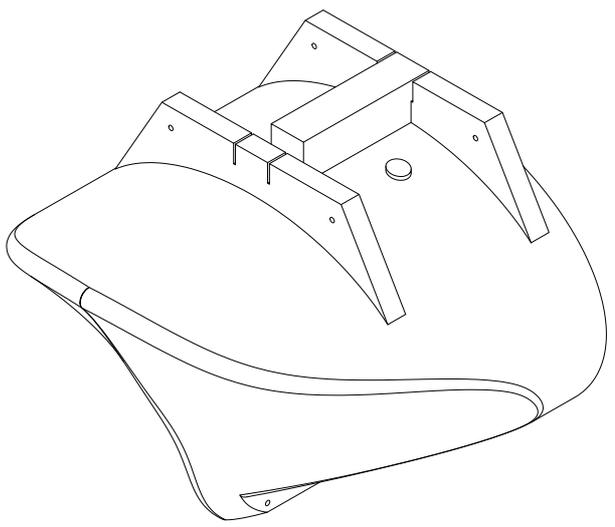
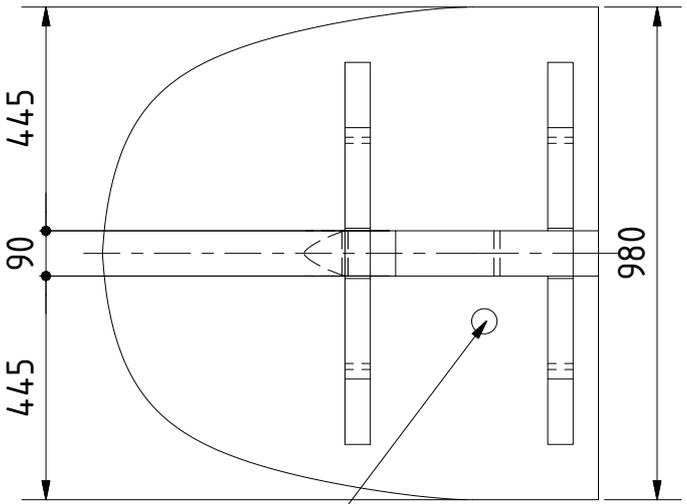
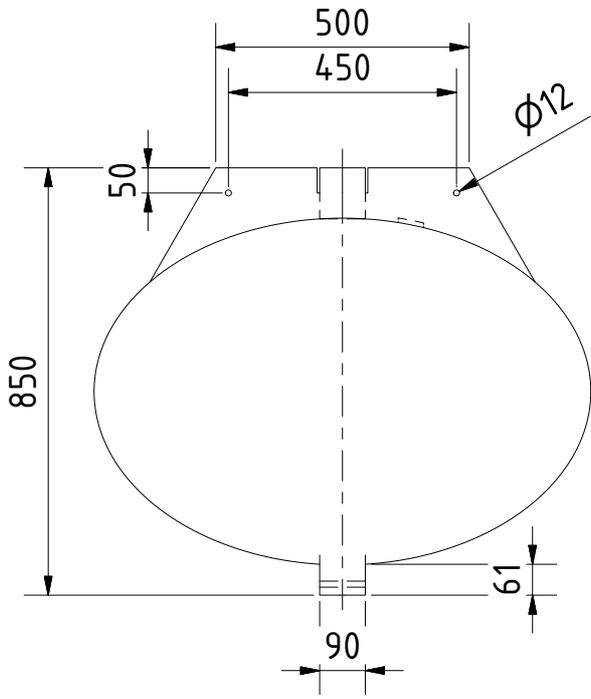
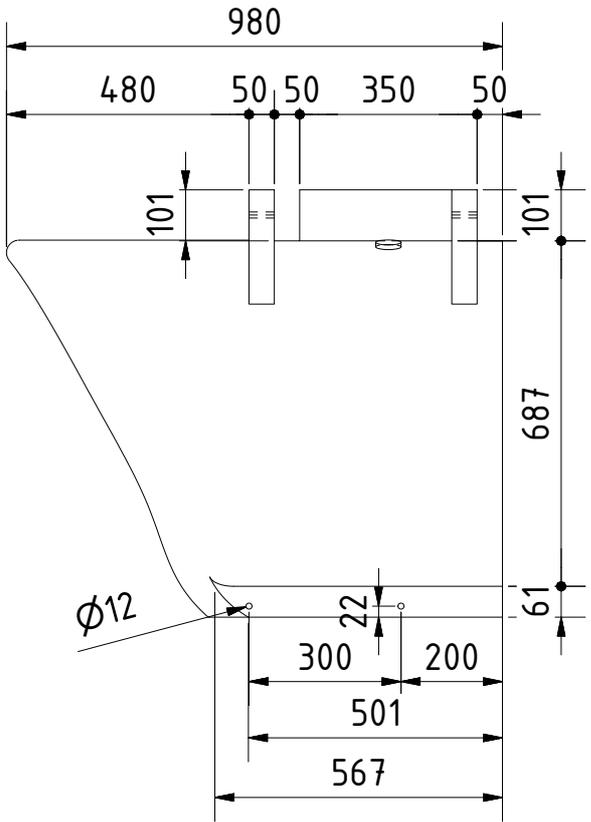
Pontoon float designed for construction of C and D category pleasure crafts, marinas and other floating constructions.

Technical data

Parameter	Value
Length / Width / Height	780/980/850 mm
Volume	325 l
Mass	Approx. 22,5 kg
Material ^[1]	Polyethylene
Standard colour	Milk-white, black.
Other colours	Available upon request
Critical displacement ^[2]	180 kg
Max draft	410 mm
Dimensional deviation ^[3]	Up to 3,5%
Volume loss due to pressure ^[4]	Up to 15% maximum
PE wall thickness	Approx. 7 mm in critical areas
Fastening points	Look assembly drawings
UV protection	From UV10
Operating temperature	From -25°C to +50°C
Foaming	None

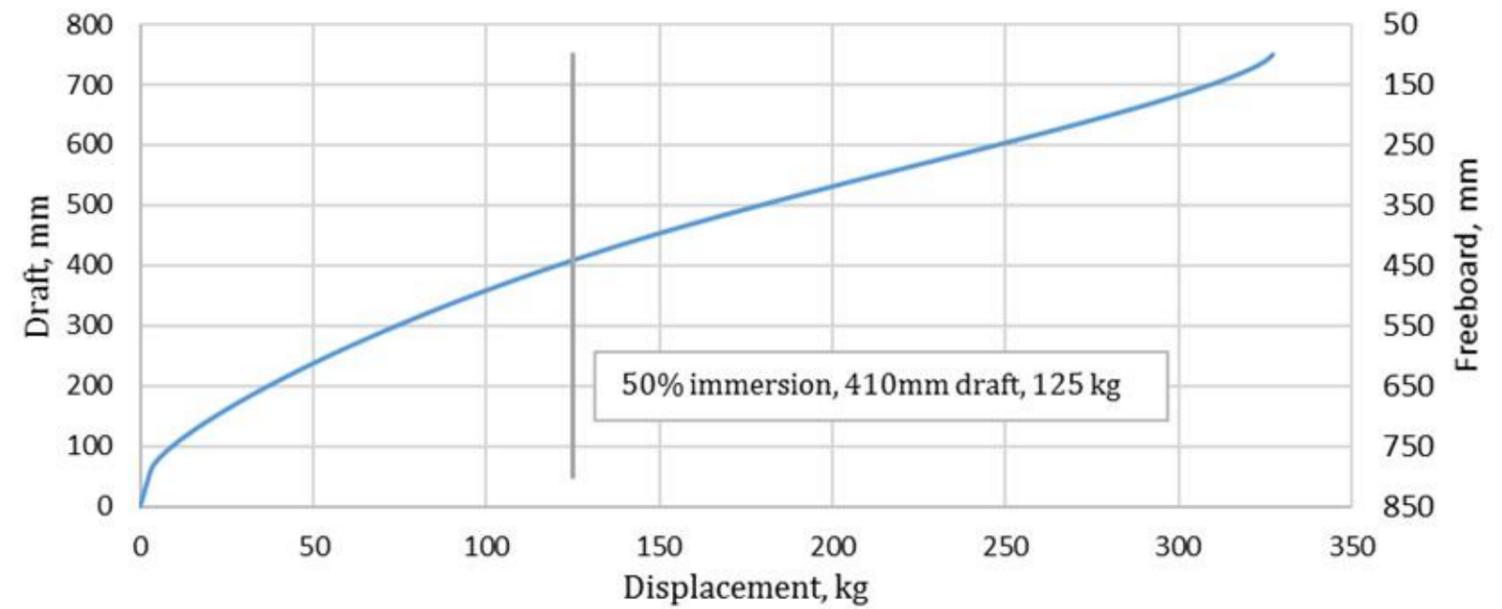
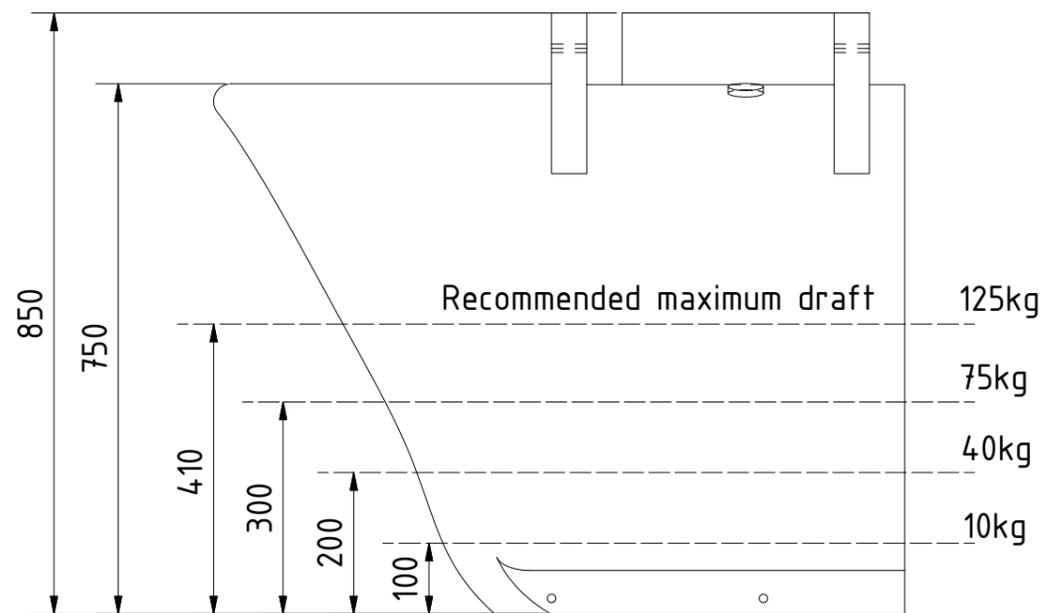
[2] - Critical displacement value is recommended considering the best practices of ship design and leaving sufficient volume for safe stability and buoyancy. [3] - Dimensional deviation without effects of force, pressure or temperature difference on the plastic pontoon. [4] - Submerging pontoon loses volume due to pressure. Volume loss increases with depth up to given value.

Other crucial and important information on plastic pontoon floats is available in owner's manual, geometry drawings and other related documentation. Product design, technical data, dimensions subject to change without notice. Document version: C1_190531.



- 1) Dimensions are in millimeters
- 2) Dimensions may fluctuate up to 3,5% for general dimensions due to manufacturing tolerances.
- 3) Design, dimensions and specifications subject to change without notice.

			Title Pontoon type A dimensions		
	Date	Name			Part number Type_A
Designer.					1 / 9
Checked					A4
Approved			Mass N/A		
Project number					
Document name Pontoon ABC series.idw					
Revision					



Total volume of pontoon - 335l

Buoyancy values above are calculated for fresh water. If using the above given information to calculate for salted water application, use appropriate conversion factors.

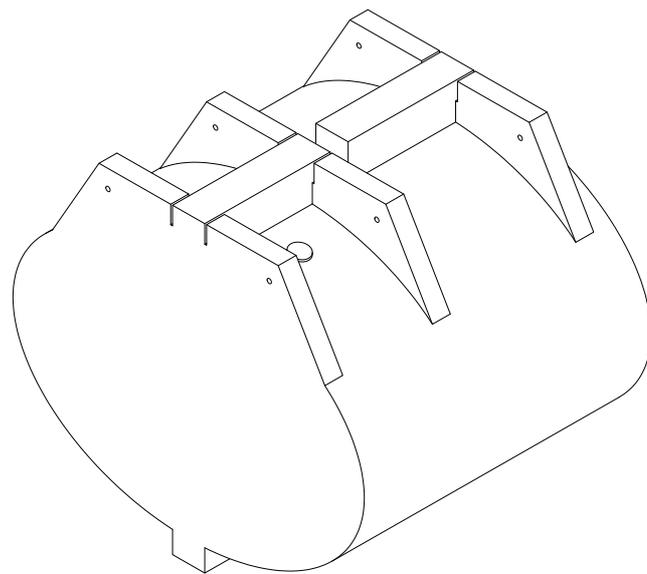
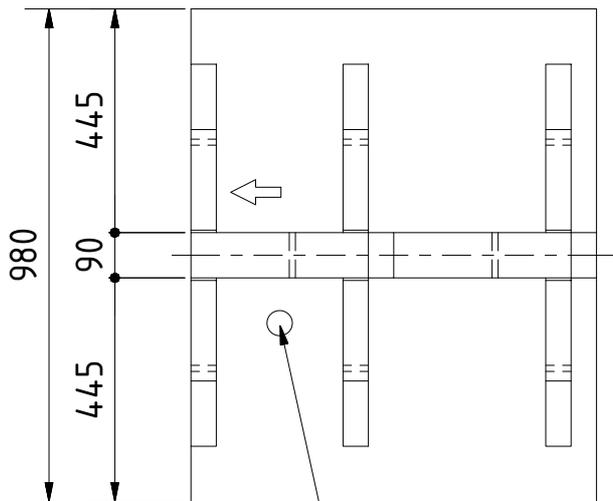
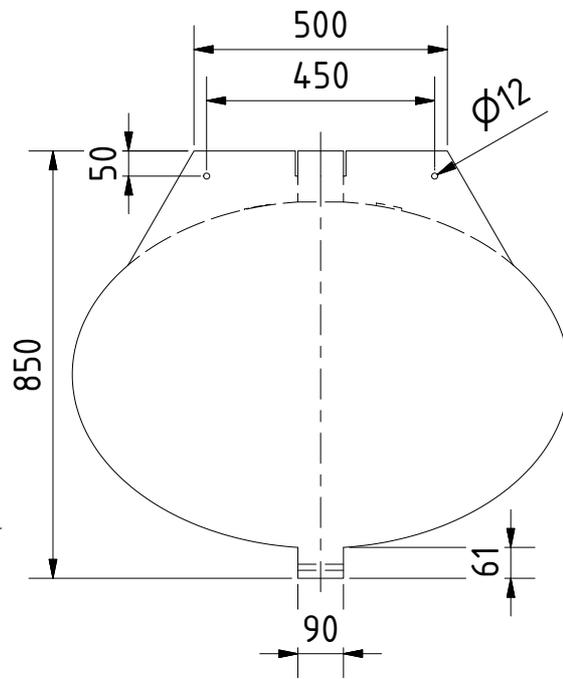
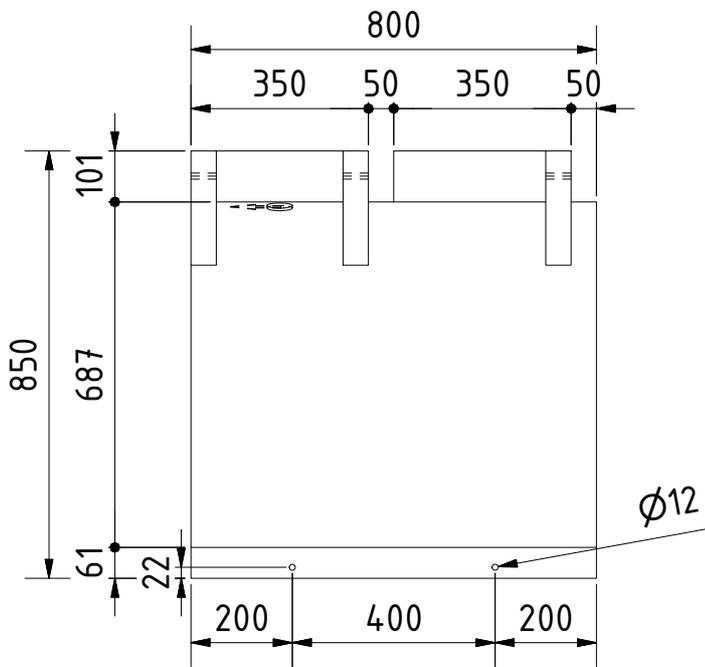
Pontoon self-weight is not accounted for in the values above. The draft/freeboard of finished floating body is calculated for the whole project, when all the weights are accounted for.

Recommended maximum immersion value is based on a ship design criteria that buoyancy surplus is an essential quality for static stability and emergency buoyancy of floating bodies.

All dimensions are in millimeters.

Design, dimensions and specifications subject to change without notice.

	Date	Name	Title		
Designer.			Pontoon type A buoyancy		
Checked					
Approved					
Project number			Part num	Type_A	2 / 9
Document name			A3		
Pontoon ABC series.idw			Mass	N/A	
Revision					

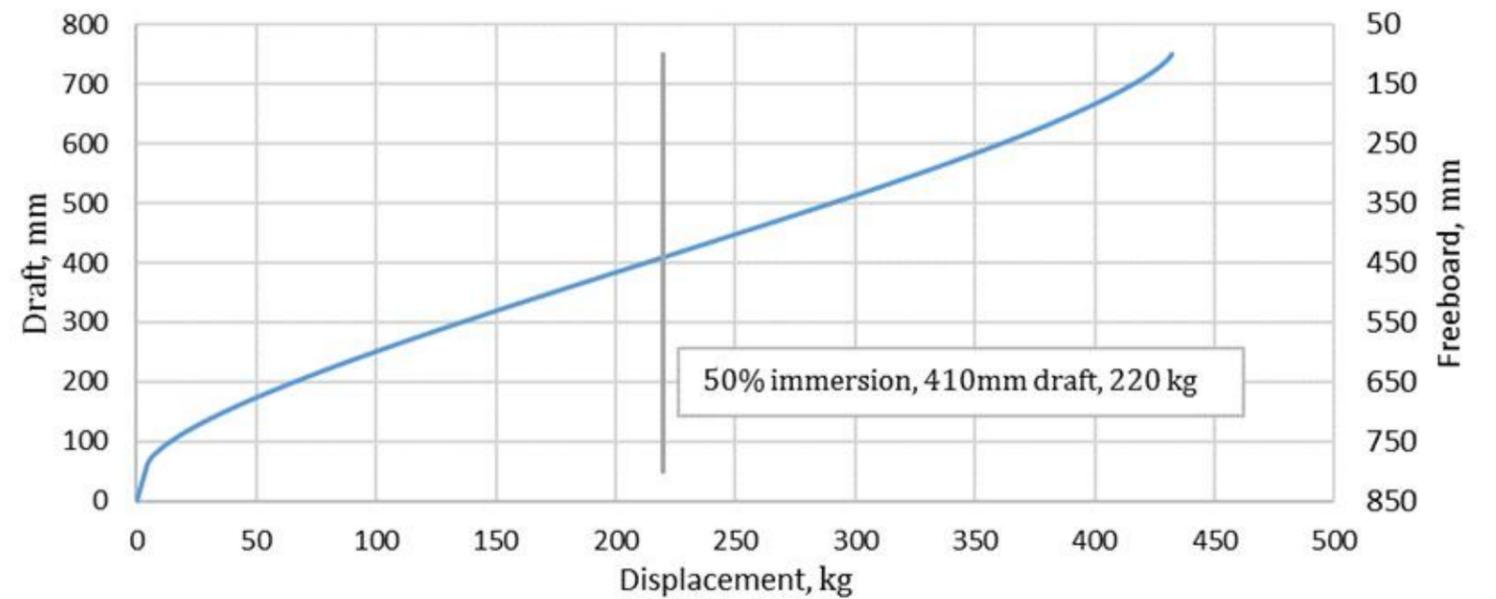
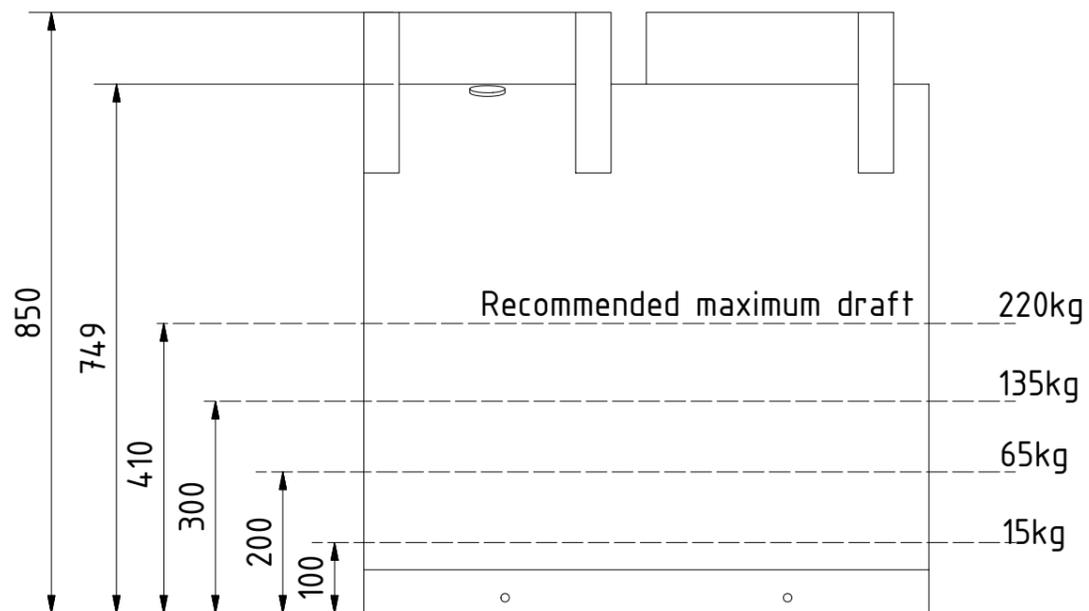


Pontoon plug

In case of foamed pontoons, 2 additional plugs are present on the float

- 1) Dimensions are in millimeters
- 2) Dimensions may fluctuate up to 3,5% for general dimensions due to manufacturing tolerances.
- 3) Design, dimensions and specifications subject to change without notice.

	Date	Name	Title	
Designer.			Pontoon type B dimensions	
Checked				
Approved				
Project number			Part number	
Document name			Type_B	
Revision				
Pontoon ABC series.idw			3 / 9	
			A4	
Mass		N/A		



Total volume of pontoon - 445l

Buoyancy values above are calculated for fresh water. If using the above given information to calculate for salted water application, use appropriate conversion factors.

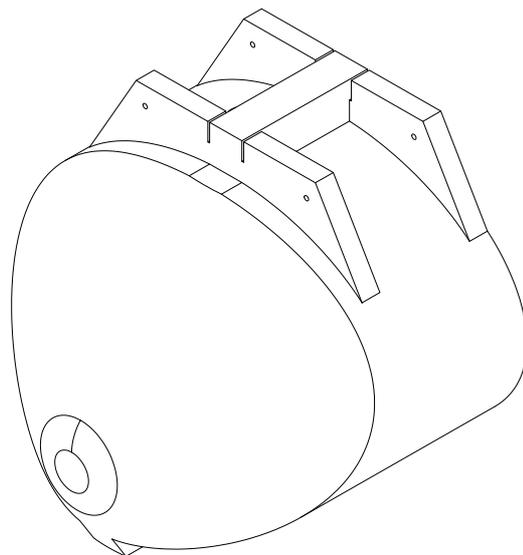
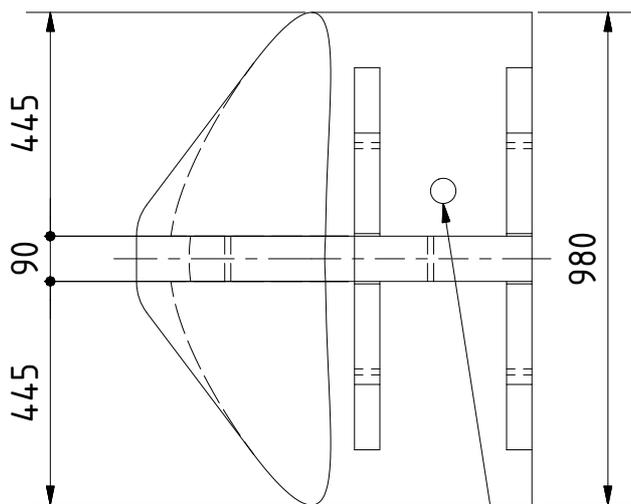
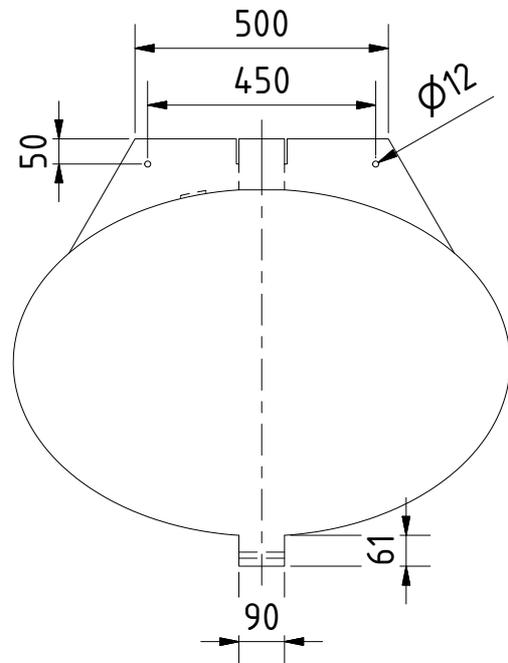
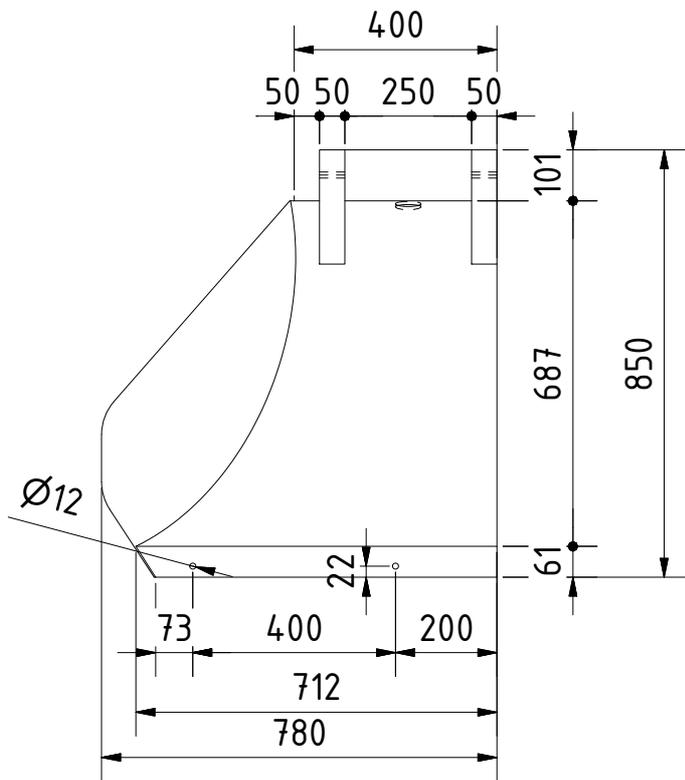
Pontoon self-weight is not accounted for in the values above. The draft/freeboard of finished floating body is calculated for the whole project, when all the weights are accounted for.

Recommended maximum immersion value is based on a ship design criteria that buoyancy surplus is an essential quality for static stability and emergency buoyancy of floating bodies.

All dimensions are in millimeters.

Design, dimensions and specifications subject to change without notice.

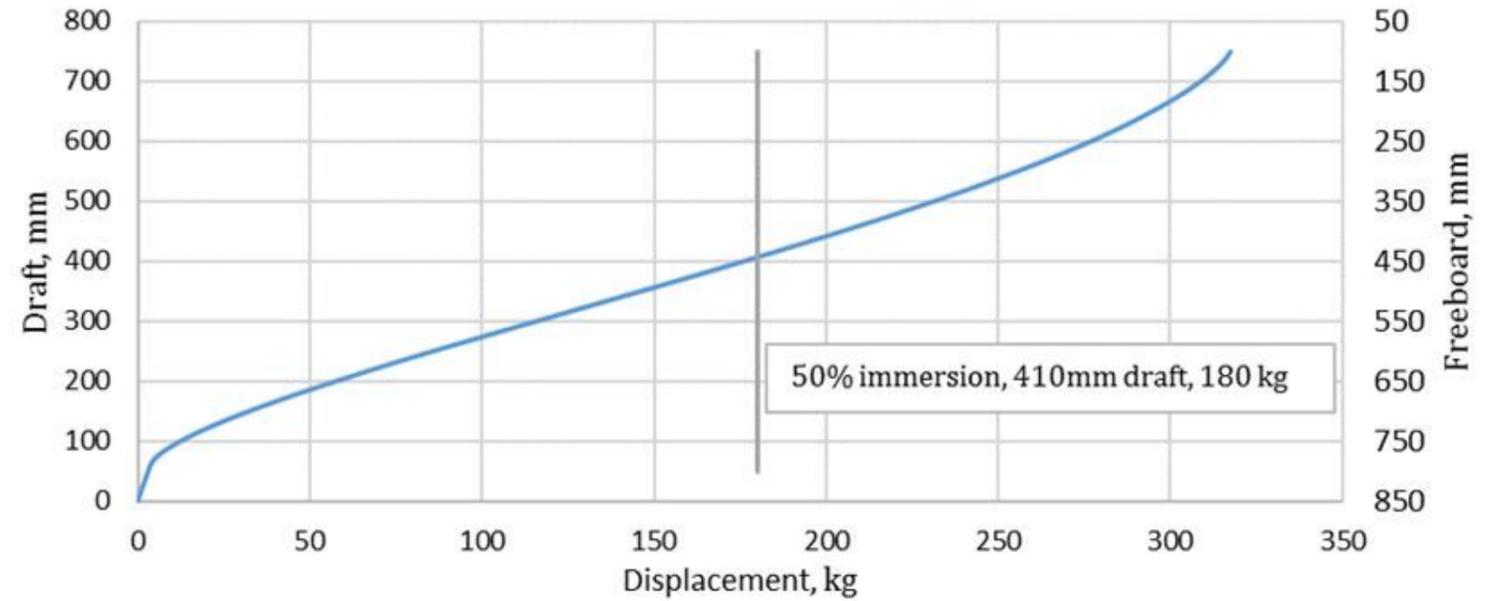
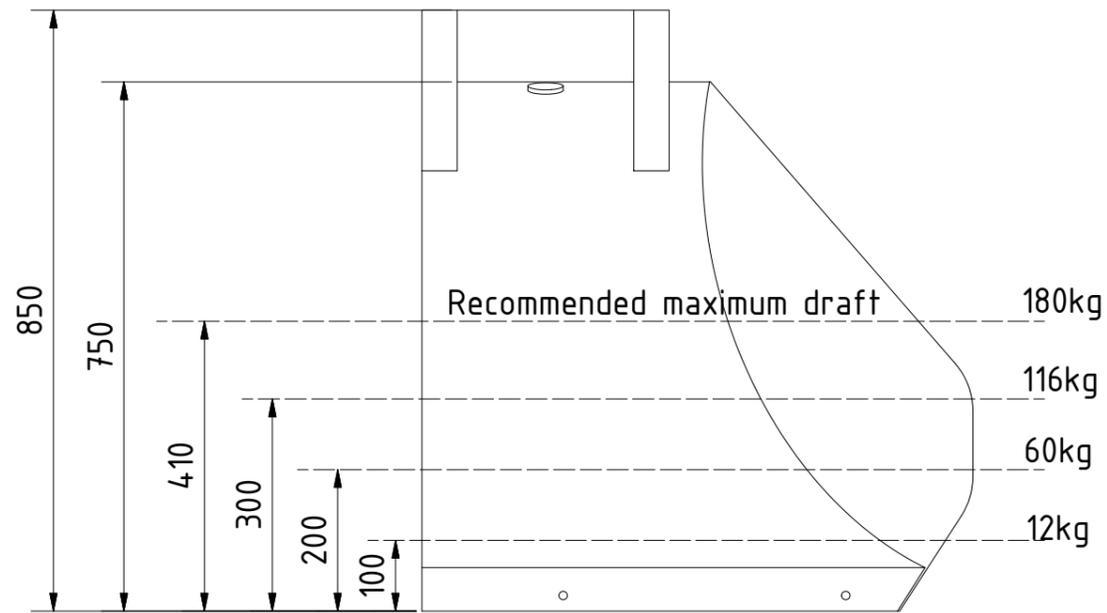
		Date	Name	Title	
Designer.				Pontoon type B buoyancy	
Checked					
Approved					
Project number			Part number		
			Type_B		4 / 9
Document name Pontoon ABC series.idw					A3
Revision			Mass	N/A	



Pontoon plug

- 1) Dimensions are in millimeters
- 2) Dimensions may fluctuate up to 3,5% for general dimensions due to manufacturing tolerances.
- 3) Design, dimensions and specifications subject to change without notice.

	Date	Name	Title	
Designer.			Pontoon type C dimensions	
Checked				
Approved				
Project number			Part number	
Document name			Type_C	
Pontoon ABC series.idw				
Revision			Mass	N/A
			5 / 9	
			A4	



Total volume of pontoon - 325l

Buoyancy values above are calculated for fresh water. If using the above given information to calculate for salted water application, use appropriate conversion factors.

Pontoon self-weight is not accounted for in the values above. The draft/freeboard of finished floating body is calculated for the whole project, when all the weights are accounted for.

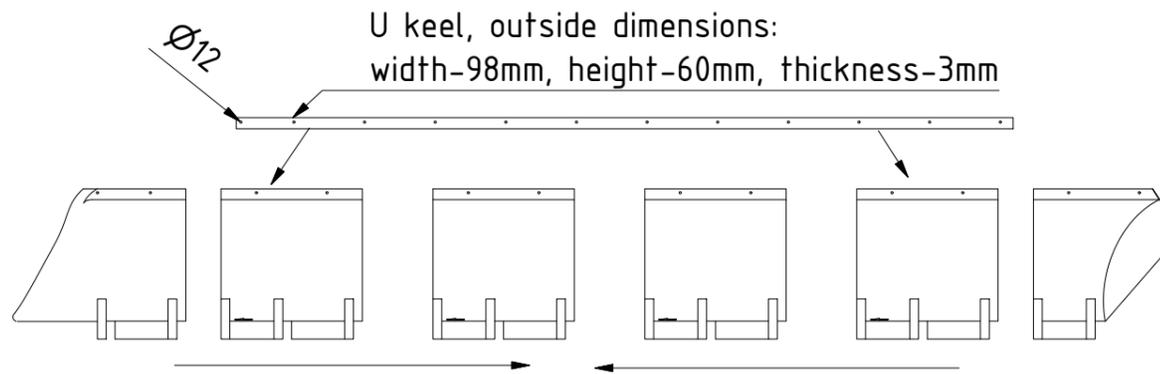
Recommended maximum immersion value is based on a ship design criteria that buoyancy surplus is an essential quality for static stability and emergency buoyancy of floating bodies.

All dimensions are in millimeters.

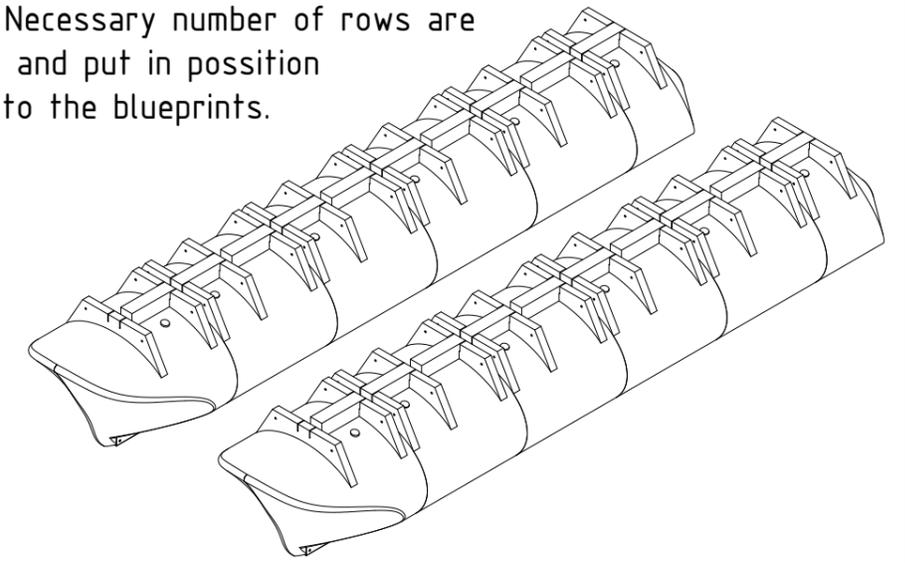
Design, dimensions and specifications subject to change without notice.

<table border="1"> <tr> <th>☐</th> <th>Date</th> <th>Name</th> <th>Title</th> </tr> <tr> <td>Designer.</td> <td></td> <td></td> <td rowspan="3">Pontoon type C buoyancy</td> </tr> <tr> <td>Checked</td> <td></td> <td></td> </tr> <tr> <td>Approved</td> <td></td> <td></td> </tr> </table>	☐	Date	Name	Title	Designer.			Pontoon type C buoyancy	Checked			Approved			Project number		Part numb Type_C
☐	Date	Name	Title														
Designer.			Pontoon type C buoyancy														
Checked																	
Approved																	
Document name Pontoon ABC series.idw		6 / 9															
Revision		Mass	N/A														

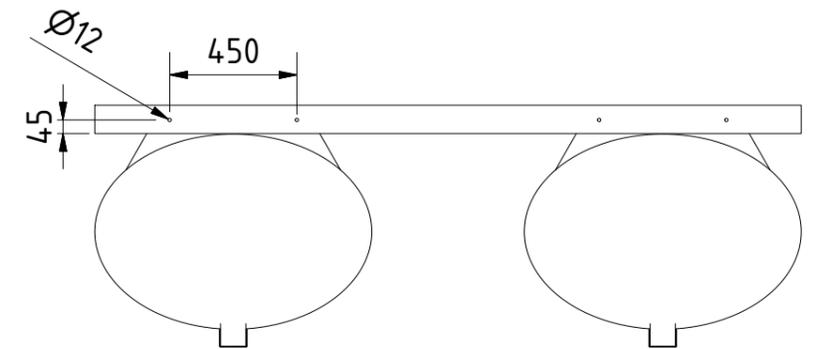
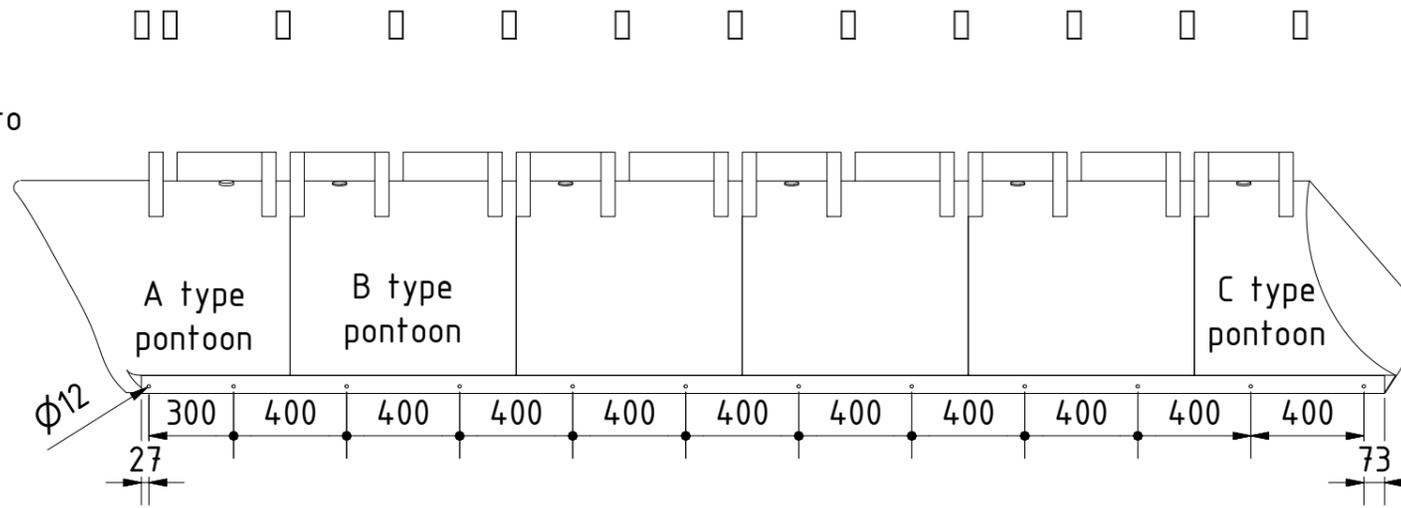
1st step. pontoons are assembled into rows upside down on a flat surface. U keel is attached with already predrilled holes.



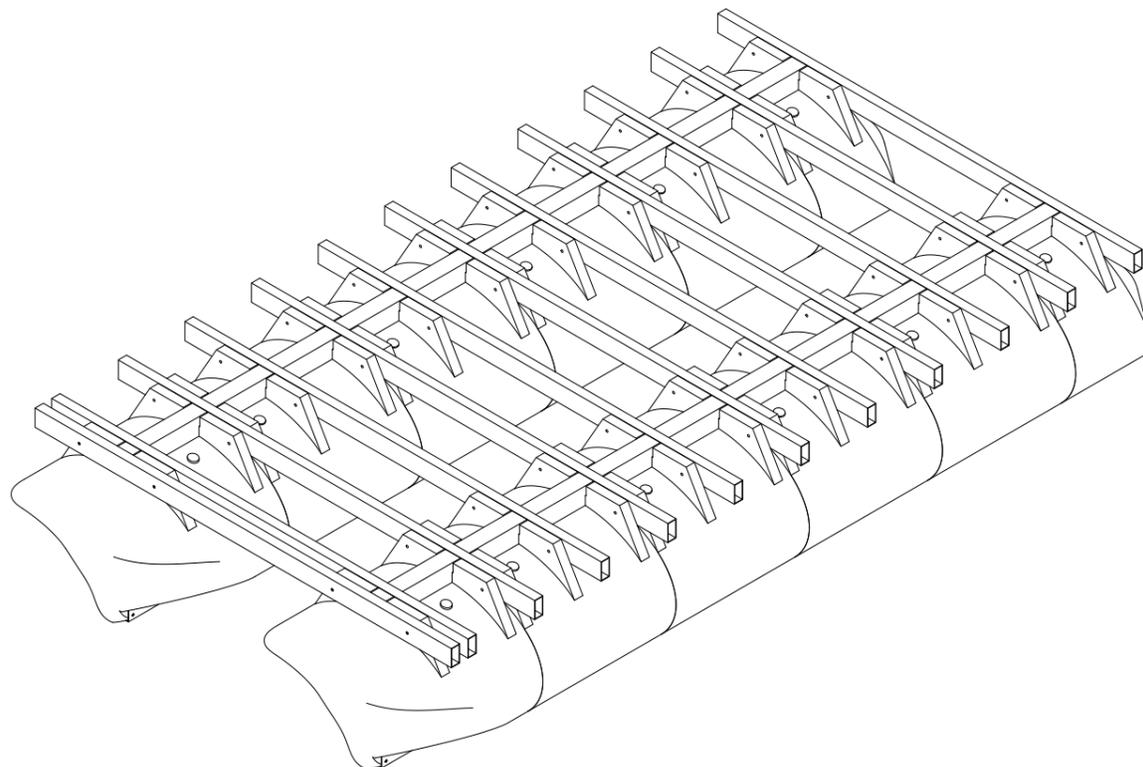
2nd step. Necessary number of rows are assembled and put in position according to the blueprints.



3rd step. Framing with predrilled holes is put into place and pontoons are attached to it.

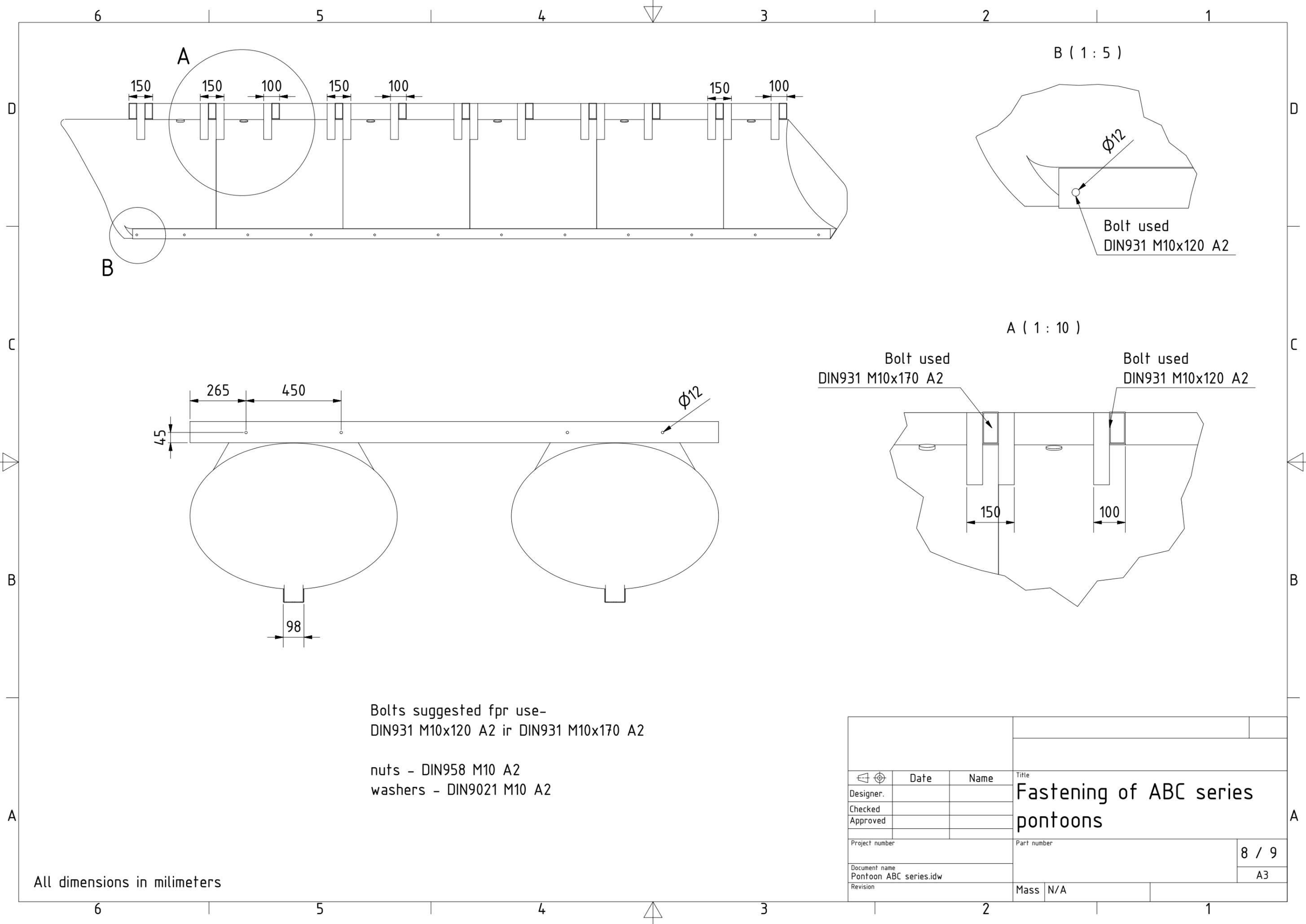


That is it. Main platform is assembled, simply as ABC. The next step is to attach decking, surrounding profile, guards, superstructure, railing and the rest.



All dimensions in milimeters

	Date	Name	Title		
Designer.			ABC series assembly principle		
Checked					
Approved					
Project number			Part number		
			assembly		7 / 9
Document name Pontoon ABC series.idw					A3
Revision			Mass	N/A	



Bolts suggested for use-
 DIN931 M10x120 A2 ir DIN931 M10x170 A2

nuts - DIN958 M10 A2
 washers - DIN9021 M10 A2

All dimensions in milimeters

	Date	Name	Title		
Designer.			Fastening of ABC series pontoons		
Checked					
Approved					
Project number		Part number		8 / 9	
Document name Pontoon ABC series.idw				A3	
Revision		Mass	N/A		

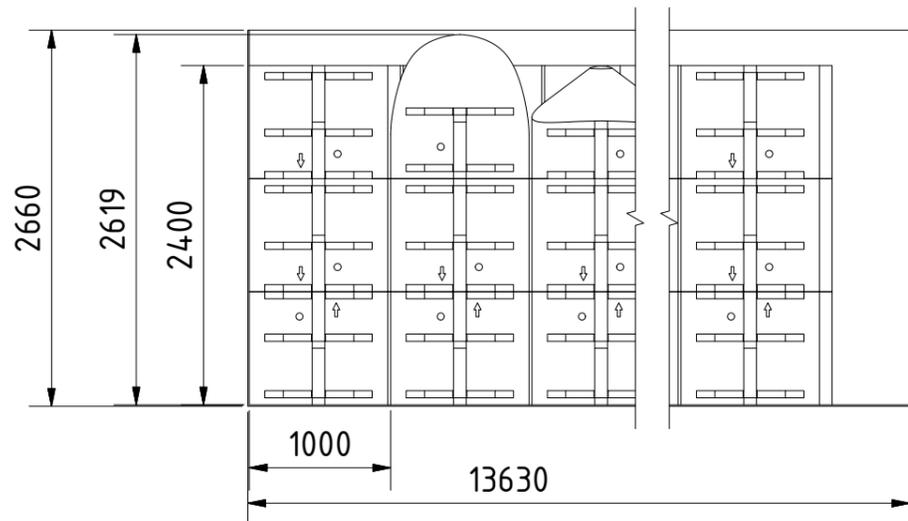
Comments:

- 1) ABC series pontoons could be transported both by road and sea.
- 2) Pontoon floats have a very low coefficient of friction. During transportation floats must be secured extensively and sufficiently.
- 3) Pontoons could be loaded both in vertical and horizontal direction. Usually vertical loading is more fitting as more pontoons safely could be loaded. Loading capabilities for different types of transport are presented in the table below.
- 4) Pontoons are loaded by hand and placed loosely in order to fit maximum amount into the volume.
- 5) Pontoons are considered a non dangerous cargo.
- 6) For international shipping, the following HS codes might be used HS 8906 (90), HS 8907 (90), HS 3925 (10). Codes mentioned here are just a suggestion and only the customs officials or sufficiently qualified shipping agents could confirm.

Pontoon loading capacity for standard transportation volumes			
Type	Length x width x height	No. of pontoons vertically	No. of pontoons horizontally
Eurotent	13,6 x 2,46 x 2,65m	117 units	-
20'	5,86 x 2,33 x 2,35m	34 units	42 units
40'	11,99 x 2,33 x 2,35m	70 units	84 units
40' Hcube	11,99 x 2,33 x 2,56m	105 units	-
45' Hcube	13,53 x 2,33 x 2,56m	117 units	-

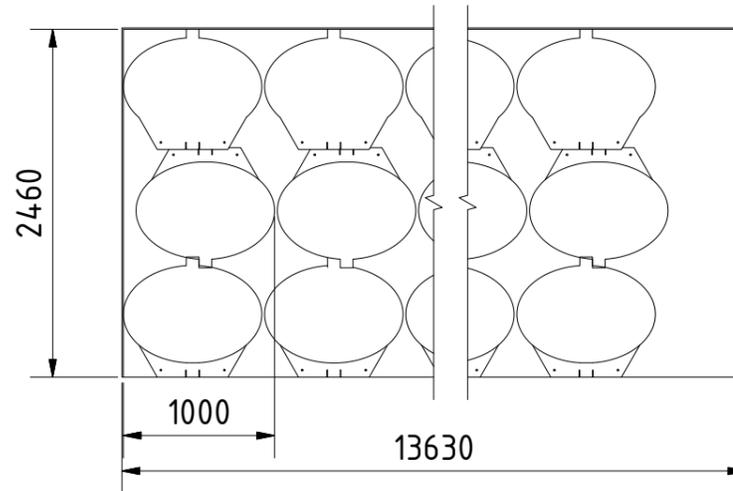
Usually pontoon floats are transported by road transport with Eurotent type lorry truck (it is important to confirm minimum height and width of a truck). For Eurotent, for every liner meter 9 pontoon floats could be fitted. Pontoons are put into towers of 3 as shown in the scheme below. A and C type pontoons could be put only on the very top of pontoon tower.

Vertical loading example for Eurotent and Hcube volumes
View from side

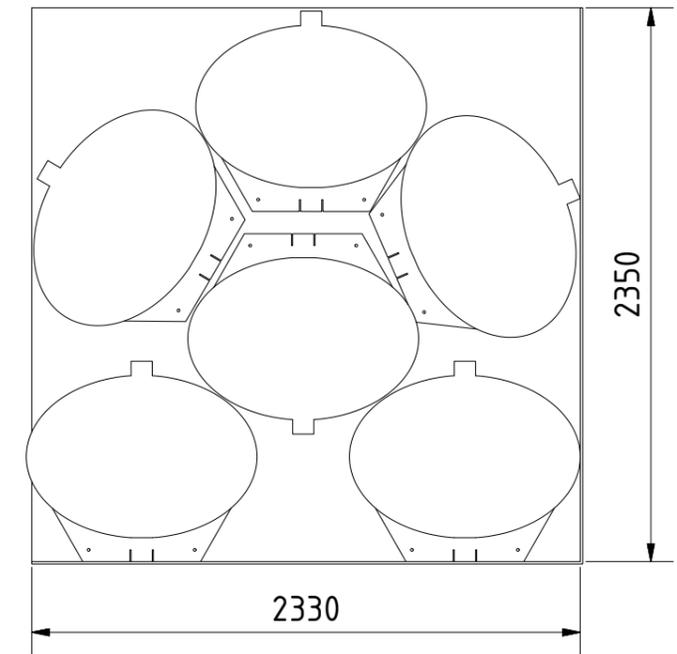


Dimensions are in millimeters

View from the top



Horizontal loading example
View from back



		UAB "Rotoplus"	
	Date	Name	Title
Designer.		M	Shipping of ABC series pontoons
Checked			
Approved			
Project number		Part number	
		20' DV_Horizontally	
Document name		9 / 9	
Pontoon ABC series.idw		A3	
Revision		Mass	N/A

 Østfold Bil og Båtservice AS
 bilogbatservice@gmail.com

Pontoon Owner's manual

Version: Pontoon owner's manual

Preface

Congratulations with the purchase of your pontoon floats.

Please read this manual including other related documents to this manual carefully and familiarize yourself with the product before starting any work with the floats.

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Definitions

Technical documents – this manual and other technical documents related to this manual.

Standard conditions – atmospheric conditions when water and air temperature is about 20°C, air pressure about 101,3kPa. Pontoon float is in temperature equilibrium with the surroundings (meaning pontoon is at 20°C) , there is no pressure or temperature difference between inside and outside of the pontoon float.

Pontoon float's function

Pontoon float is designed for construction of pleasure craft (category D (foam filled and unfilled pontoon floats), category C (foam filled pontoons only) for ships up to 12m, according to European Union directive 2013/53/EU), internal water vessels and other floating constructions.

Prohibition

It is strictly prohibited to do the following with the pontoon floats, or any actions that could damage the pontoon float.

- Puncture
- Drop
- Weld
- Melt
- Burn
- Drill
- Attach any parts to the float other than in places designed for that purpose
- Load bigger load than allowed in the technical data sheet
- Leave to freeze in the ice
- Deform
- Damage in any other way

Comment on pontoon float production technology

Pontoon floats are made using rotomoulding technology.

This technology is an automatic plastic product forming method. Plastic is melted in a mould and formed around the mould walls while spinning in a furnace, then sequentially cooled until hardened and given the usual geometric form. Finished product is homogenous and does not have any joints or seams. The line on the final product dividing pontoon in half is not a seam, but a mark formed during the manufacturing process. Product in all cases have a hole shape opening on the top of the pontoon float, this is a technological opening and therefore is not a defect.

Despite the popular notion that plastic products manufactured using rotational moulding technology doesn't have internal mould in stress (residual stress), this is not entirely true. Every plastic manufacturing process, including rotational moulding, introduces some mould in stress(residual stress), which needs to be accounted for when designing the product using plastic pontoon floats.

During the manufacturing process static electricity is generated on the outer product wall, which for a limited time attracts dust and fine particles from air and environment therefore, delivered products might seem dirty. This does not affect any of the product properties. Dust can be easily washed away with jet of water or using dry/wet cloth.

General information and pontoon geometry

Pontoon's geometry

More detail products dimensions including dimensions and locations of all the openings, mounting points and other features are provided in the geometric dimensional documents of the product concerned.

Due to the properties of the rotomoulding technology, local and general deviations (wall waviness, other deformations) of geometric dimensions are possible under standard conditions. The straight walls at the ends of pontoons could be wavy. These discrepancies do not affect the performance of the are not considered to be manufacturers defect.

Pontoon float weight

The weight of each type of pontoon float is provided in the technical data sheet.

The type of plastic and its mechanical properties

To get information on the plastic type, name and its properties see the pontoon's technical data sheet and material's data sheet or inquire the manufacturer.

When designing, assembling and using the pontoons, it is important to be aware that the materials used in pontoon's manufacturing have the following properties:

- Plastic becomes more malleable with increasing temperature, and as far it is from normal conditions, the more this property is expressed.
- Plastic contracts and expands with temperature deviations more than other construction materials as metals, woods, etc.
- Plastic may have moulded in residual stress, as it is unavoidable in plastic moulding industry.
- Plastic gets harder with decreasing temperature, therefore its resistance to impact decreases. With extreme cold temperatures plastic may become brittle.
- Plastics have creep property. With prolonged exposure to constant pressure or force, plastic can slowly plastically deform and therefore products geometry could change.
- With prolonged exposure to UV and sun rays, temperature expansion and contraction cycles and other effects, mechanical properties of plastic may decrease.

Generally, the plastic used for manufacturing is LLDPE (linear low density polyethylene). This material has good resistance to different chemicals effect, has a good mechanical resistance to impact ratio.

Manufacturer possesses an ability to change the material in accordance to the circumstances where the product will be used. In any case, information about material used is present in pontoon float's technical data sheet.

Wall thickness

Wall thickness resulting in a product manufactured using rotomoulding technology is not constant. Manufacturer shapes product walls using wall thickness map which is chosen accordingly so the resulting product would have the best mechanical characteristics.

Information about the wall thickness of the pontoon could be found in product technical data sheet.

Colour and surfaces

Differences in colour from pontoon to pontoon are possible for the new product.

Due to difference in product wearing speed some colour differences may appear.

Due to the nature of the technological process of rotomoulding, surface might have slightly whitened areas or minor scratches, these discrepancies do not affect product performance and are not considered as defects.

Scratches might appear on the surfaces during transportation or handling of the pontoons. To keep the surfaces as good as new, don't drag the pontoon floats on hard surfaces¹ and handle them with care.

Pontoon's technological plug

During the rotomoulding process the hole forms on the top of the pontoon float. This hole during normal operation must be kept closed with a plug that has a small hole², or other solution similar in operational properties, in order to equalize the pressure difference. The pressure difference appears when pontoon's inside temperature differs from the outside temperature, and this difference if not dealt with, can deform the pontoon's geometry.

If the manufacturer's provided plug is changed to use other plugging solution, this solution must be equally efficient in pressure equalizing capabilities.

It is not recommended to close this hole shut. However, if pontoon is foamed by EPS or other foam, this requirement could be ignored, and technological hole could be shut with a plug without small vent.

In case pontoons must be sealed shut and air-tightness is required for the product's function, such information is given in the technical data sheet

Water intake by the foamed pontoon

EPS foam (expanded polystyrene) has intrinsic property to take in water over time with direct exposure to it in cases when pontoon is punctured, overflowed, or has any direct connection to water over prolonged periods of time. Such water intake shown by the studies is 4% of total pontoon volume. In special cases when exposure is prolonged even more, intake could be 10%

¹ Asphalt, concrete, gravel and other.

² Recommended hole diameter – 2,5mm

and greater by total pontoon volume. Therefore, it is important to change punctured pontoon floats as over time they will lose buoyancy characteristics.

Loads

Displacement and water pressure

Displacement is the amount of fluid displaced (mass – kg) by a floating or submerged body at corresponding submersion value (draft – submersion distance). Displacement shows how much weight can a body's geometry carry at a corresponding draft value. The floating body's mass is not accounted for in the displacement value.

For a pontoon, displacement values are given in a pontoon's technical data sheet in two ways:

1. Displacement value at a draft in a main properties table. This displacement value is maximum displacement at construction/maximum draft. Floating body using pontoons, must be designed in a way that the load for one pontoon would not exceed the maximum displacement and draft values given.
2. Displacement values at other drafts.

Displacement has been calculated using theoretical calculations as well as checked in field. Provided numbers represent displacement in fresh, not salty, lake water under standard conditions. These values are improper for calculating displacement in saline water.

When designing the floating construction, it is important to account for a sufficient buoyancy reserve. Also note to not forget to add the weight of the pontoons when making buoyancy calculations.

Pontoon, when submerged, is subject to water pressure load which can additionally deform the wall and reduce the pontoon's displacement. Displacement value could decrease up to 15% and more in extreme cases, dependant on weather conditions and water pressure value. Such deformations due to pressure are residual if product was heated (direct sun rays, raised water or air temperature) when it was under the pressure/force load. Water pressure can change product's walls geometry without great thermal effect. In order to negate or minimize such pressure and heat effects, pontoon could be filled with foam. Previously mentioned deformations are not considered a product's defect.

Other displacement values and specific information on the impact of pressure to the pontoon's volume is present in technical data sheet and other related documents.

Weight loading on the shore

When constructing a structure on the shore, on which there will be a heavy superstructure or local weight that will concentrate on one point or a relatively small area, it is necessary to ensure that load on pontoon wouldn't exceed **220kg**. Otherwise pontoon platform frame structure should be supported, or framing should be constructed in such way that the load is evenly distributed over the rigid profiles, therefore reducing the load to pontoons concerned. This information is critical as apparent force when pontoon is loaded on shore, concentrates on narrow plane at the bottom of the pontoon, where it could break or split up due to exceeding load.

If pontoon used has a frame integrated inside the restriction on load amount on pontoon is invalid, however load should still be reasonable and spread if possible

More information on mechanical properties of the pontoon is given in the technical data sheet and plastic material data sheet.

Manufacturer is not liable for the consequences, losses or damage caused by failure to comply with this recommendation for limiting mechanical load or any resulting deformations or damages.

Load when in water

The pontoon structure with superstructure, people, luggage and other loads should weigh so much that the submersion of the pontoons in water does not exceed maximum draft value of the pontoon float.

Pontoon is not considered to be the main load bearing element of longitudinal strength, this function is performed by the frame. Only a sufficiently rigid frame, designed specifically for a structure, ensures the strength of the structure.

Mechanical shocks

Protect pontoons from mechanical shocks: dropping, puncturing with a sharp object, etc.

Especially keep pontoon floats from dropping when they are assembled into a structure. If dropped with a specific angle, the whole force could be transferred to a single pontoon, and it could break or rupture.

A floating structure may be punctured or pierced when it grounds or rides into another solid body.

The manufacturer cannot be held liable for such mechanical damage.

Loss of buoyancy

By breaking pontoon mechanically, the wall of the pontoon could be damaged to a point where it begins to let the water pass, and so it can drown.

When constructing a floating platform with pontoons, manufacturer recommends using sufficient amount of pontoons to segment the structure, so in case of the loss of buoyancy of one pontoon due to damage, whole structure won't lose significant part of its buoyancy.

If the pontoon is foamed, in the event of pontoon wall puncture, pontoon won't lose its buoyancy (unless part of foam was mechanically separated from the main foam mass), however some water intake will happen (hollows in between closed foam cells intake liquids), therefore making the pontoon float heavier and reducing its buoyancy. Puncturing of the foamed pontoon wall allows for foam block erosion which, with time will reduce the overall buoyancy of pontoon float.

It is a must to replace the punctured pontoon, whether pontoon is foamed or not.

The effects of natural factors and chemical elements

Pontoon contact with drinking water

In order to make sure that the material used to produce the pontoon has a WRAS certificate (or equivalent) and the pontoon float can be used to store potable water, it must be checked with the manufacturer for WRAS certificate number that proves the suitability of the product for contact with drinking water. The water temperature and the conditions to which this certificate applies are listed in the WRAS Certificate.³

Before using the pontoon to store water, pontoon's inside should be washed to remove any liquid residue, sediment, and other remains.

³ The WRAS certificate is a UK-based scheme that certifies the suitability of a product with drinking water. Link - https://www.wras.co.uk/approvals/what_is_a_wras_approval/

If the pontoon is foamed, it is prohibited to store potable water inside unless the manufacturer specifies otherwise.

Pontoon contact with other liquids and waste

Pontoon could be used both in salty and fresh water.

In all unfoamed pontoons, you can store water for washing or waste water.

If the pontoon is foamed, it is prohibited to store liquids inside unless the manufacturer specifies otherwise.

Pontoon contact with fuel

It is strictly forbidden to store fuel (gasoline, diesel and, other materials) inside the pontoon.

Pontoon's contact with other materials

Pontoon floats can be washed with soap with water. The product is resistant to most commonly used chemicals in households, but resistance is also dependent on environmental conditions. In order to find out the suitability of materials used for producing pontoon floats with other materials, consult an experienced specialist.

The manufacturer proposes not to paint pontoon floats and do not use antifouling agents as this substance may have unintended effects on the product.

If using pontoons in waters, where hazardous chemicals are present or there are traces of such materials, pontoon's surface may result in cracks. We recommend changing this damaged pontoon as soon as possible.

The manufacturer is not liable for any damage or loss incurred by the pontoon float when interacting with chemicals that may adversely affect the product.

The effect of heat and sun on the product

Due to the temperature effect, pontoon float can change their dimensions and / or deform. When connecting pontoons to structures, it is necessary to take into account the fact of the temperature expansion and contraction. Design, assemble and operate structure in such a way

as to avoid such damage to the product. Assembled pontoon row must be constructed in such way, that pontoons have enough space to freely expand, otherwise, restricted expansion of pontoon may result in unexpected stress in a pontoon and/or deformations.

Polyethylene has the property to soften with increasing temperature, and when loaded with a load or pressure, this force can deform the wall of the product. In order to protect the product from temperature distortion, it is necessary to follow the instructions in this manual regarding the mechanical load.

Materials used to produce pontoons are resistant to UV rays. This resistance is finite and over time, the product will lose its capability to withstand UV rays of the sun. UV rays over time weaken the product's mechanical properties and may blur colour.

Cracks might appear on product's surface that has been under sun light for a long time, it shows that the mechanical properties of the product may be weakened due to UV exposure. The manufacturer recommends replacing such pontoon.

Suns rays and UV rays might discolour or change the colour of the pontoon float. This change in colour can be inconsistent between same type pontoons from the same batch.

In order for product to serve for as long as possible, we suggest not to leave the pontoon floats in direct sunlight during construction uncoated, especially if they are stored in the open air for a long time. Only in this way will you ensure that the product will last for a long time and will have predictable mechanical properties.

The UV resistance class and information on how it affects the properties of the product are given in the technical data sheet and the UV stability explanation document.

Any changes due to UV rays or heat are not considered to be a manufacturer's failure.

The effects of coldness and ice on the product

Pontoon floats are not affected by frost, but the manufacturer does not recommend leaving the pontoon floats to freeze in ice during the winter.

Ice is an unmanageable element. Developing and moving ice can damage or deform pontoon floats. Especially dangerous for pontoons is moving ice. Due to moving ice pontoon could be cut or broken or damaged in other ways. Product is not made to withstand such force.

When using pontoons in water when the temperature changes, pressure difference between inside and outside of the pontoon may develop. Such pressure difference may deform the

product walls. It is necessary to ensure adequate ventilation of the pontoon through the pontoon plug, it must have a hole.

With decreasing temperature, plastic becomes harder and harder, which in turn decreases mechanical impact characteristics of the pontoon. With extreme cold temperatures, plastic may become brittle.

The manufacturer is not responsible for the loss and damage sustained by leaving the pontoon floats to freeze in ice.

Effect of fire

Pontoon floats are not fire resistant. They cannot be burned, heated vigorously, directed to with the flame of the welding machine, or otherwise thermally affected.

In case of foamed pontoons, floats must be kept away from fire by all means as foams might be very flammable under specific conditions.

When working around pontoons or protect them from heat or flame during operation.

When burning, pontoon may emit dangerous smoke and substances.

In case of fire, pontoons should be extinguished using a standard powder fire extinguisher.

Burning pontoons can be extinguished with water or other conventional firefighting equipment.

Operational advise

Deployment into the water

Before launching the built pontoon construction into the water, it is necessary to check if pontoons aren't hot (above temperature of standard conditions), and if it is, it is necessary to wait for the temperature to drop and equalize with the water temperature. Launching hot pontoons to cooler water could condition wall deformations due to temperature difference under water pressure.

Waves

Unfoamed pontoon floats could be safely deployed only in D category waters (D category as defined by the European Recreation Craft directive – 2013/53/EU). Using pontoons in other category waters, there is an increased risk, that waves could wash the technological hole of the pontoon, and pontoons could fill with water in time, decreasing the overall buoyancy of the pontoon. Foamed pontoons could be used for C category waters.

Unsanctioned modifications

Generally, manufacturer, as stated many times before, is against any modifications to the product, as the product properties could not be guaranteed due to such modifications, therefore manufacturer is not liable for any damage or unintended effects. However, in recognition of inevitability of some clients attempting modification operation regardless, some advice is given below on how to approach specific tasks in order to avoid or minimise potential damage.

- *Pontoon that is modified should be dropped from the floatation calculations of total lift force, as it could potentially become filled with water and lose buoyancy. In case of doing the static stability calculations, such pontoon should be investigated in 2 cases, 1st when it is giving buoyancy, 2nd when it is modelled as damaged tank filled with water.*
- *If attempting to seal holes (whether made intentionally or not) or breaks, it is good practice to activate the polyethylene surface before applying sealants (sealants must be suitable for polyethylene gluing and water/aggressive sea environment. Activation is done flaming the surface with open flame (carefully not overheating or setting material on fire) and mechanically scrubbing the surface.*
- *Some suggest flaming plastics to renew colour/shine, do this carefully not overheating the plastic or setting it on fire. By no means attempt this operation if pontoon is under load. Be especially careful with foam filled pontoons as fill might be highly flammable under some circumstances.*
- *If modified pontoon will be subject to increased temperatures, temperatures can't be high, generally not more than 50 °C as with increasing temperature polyethylene becomes malleable and loses mechanical properties.*

Condensation

Due to the varying day-night temperature, water may condensate inside the pontoon. This condensate, for an unfoamed pontoon, should be regularly discharged.

Integrity test

In case of suspicion of pontoon water-tightness, pontoon could be checked by applying very small pressure up to and no more than 0,2 barg (gauge pressure). When checking, pontoon should be emptied from any water or other liquid inside. Foamed pontoon should not be checked this way. Identification of punctured foamed pontoons is possible by checking the weight after it is concluded that water inside the pontoon is not due to condensation or wave over-washing the vent hole.

Wall thickness test

Wall thickness could be checked with ultra sound gauge. Use glycerine or similar sound wave carrier suitable for contact with polyethylene. Sound speed setting for measurement is 2259 m/sec.

Pontoon maintenance

Regular check

Manufacturer suggests doing a regular pontoon inspection. During the inspection check:

Are there any cracks or splits?

Are there any changes in colour?

Is there any accumulated water inside the pontoon?

Are there any punctures or holes? Are the walls of the pontoon intact?

Is there any other indication that the product has lost its properties and is not suitable for further use?

In case the product has sign of deterioration or damage, the concerned pontoon must be replaced.

Regular maintenance.

Manufacturer suggests doing the following regularly:

Wash the pontoons.

Remove any dirt, algae or aquatic animals attached to the surfaces of the pontoon.

Remove any liquid present inside of pontoon due to the condensation effect.

Other information

Repairs

Pontoon floats are irreparable. If it is mechanically or chemically damaged, cracked, the open holes may not be fused back by any means. It is impossible to ensure that repaired product will regain the original product properties therefore it is necessary to change the damaged pontoons.

Recycling

Pontoons are made out of polyethylene. Product is recyclable. To dispose of the pontoon - give it to the operator who collects and disposes of the polyethylene waste.

If the pontoon is foamed, seek advice on such pontoon's disposal requirements with the operator who collects and disposes plastic waste.

Manufacturer's advice on working with pontoons

Manufacturer advises to entrust design, construction, repair and other activities requiring specific knowledge to professionals or subjects with a high degree of experience in related field. Only in this case, the user of the product will ensure that the pontoon floats are used properly and in accordance with their intended purpose.

Assembly of the pontoons

Good practice and manufacturer's recommendations for pontoon collection are given in the pontoon assembly Instructions. The methods provided in this instruction are not a sole correct

way to assemble the pontoon floats, modifications to the methodology of assembly are possible depending on the different conditions or unforeseen circumstances.

Foaming

In order to improve mechanical or aesthetic characteristics of the product or buoyancy in case of pontoon puncture, pontoons may be supplemented with two-component polyurethane closed cell foam, polystyrene closed cell foam or by other means which carries similar result. The customer is responsible for foaming, manufacturer can only advise on foaming materials or procedure, unless provides the product that is already foamed. Information about foaming is presented in product's technical data sheet.

Transmission of documents

When pontoons change the owner, the present owner must ensure that all documentation and information about the product is transferred to the new owner. The information transmitted must be in durable medium. The information transfer requirement is also valid for the entity that resells the manufacturer's products.

Disclaimer

Owner's manual and related documents are hereinafter referred to as technical documentation.

The information provided in the technical documentation is correct to the best of our knowledge, but we do not know all the conditions and circumstances in which our product will be used in different cases, therefore, we will not accept any liability for any damage or loss incurred in using our product. The information in the technical documentation describes typical product features, but these properties are not limiting and may vary depending on the circumstances beyond our control limits.

The manufacturer can advise on the assembly of pontoons or give preliminary calculations on amount of parts or materials required for the project in the form of drawings or other documents, however such documents are not considered to be a construction documentation as manufacturer is not a designer or a marine architect, therefore the manufacturer's liability is limited

We take no responsibility for the work done by other parties and the mistakes made by misuse or inaccurate interpretation of the information in the technical documentation including design, construction, operation, repair, maintenance and other work.

The user of the product is solely responsible for the safe operation of the product.

Guarantee

Defective product is a product which due to manufacturer's mistake in the production process has a hole or there is a crack that allows water to flow inside pontoon float.

The quality of the goods delivered to the buyer by the manufacturer must be in accordance with the characteristics specified in the product technical data sheet. If the manufacturer and the buyer did not discuss the quality of the goods individually, their quality should not be less than what the buyer can reasonably expect, considering materials, technology, etc. used in the process of manufacture of the relevant goods.

The warranty period starts to run from the date the product is presented to the customer.

The manufacturer must, throughout the warranty period, replace the goods of poor quality with other goods of the same model.

The buyer has to organize and cover the transportation costs of changing the defective goods himself.

The buyer must provide evidence that the goods are defective due to the manufacturer's fault.

The buyer must notify the manufacturer or sales representative of the discovery about the detected apparent product defect within 7 business days of receipt of the product.

The buyer must notify the manufacturer or sales representative of the discovery about the detected hidden defect within 7 business days of the date of the discovery.

The manufacturer does not provide any guarantee for goods that were damaged using product without following manufacturer's recommendations, or if the goods were modified without the knowledge and consent of the manufacturer or in absence of the modification process.

The manufacturer is not responsible for any damage to the goods during transport, and thus does not provide warranties for damaged goods in this way.

The products have a standard European Union guarantee for defective products where the defect occurred due to the fault of the manufacturer, in accordance with the applicable European Union legislation.

For business customers, the manufacturer gives a standard 1-year warranty. For the extended guarantee period, business client and the manufacturer agree on a separate agreement.



XZ 89342.00 and XZ 89342.10 Exp. Polyethylene Resins

Polyethylene Resins

Melt Index:	3.8
Density:	0.939

XZ 89342.00 Exp. Polyethylene Resin for rotational and injection moulding from Dow is specifically designed for applications requiring stiffness in combination with excellent mechanical properties and good processing.

The powder version is named **XZ 89342.10 Exp. Polyethylene Resin**.

Processing and Stabilization: XZ 89342.00 and XZ89342.10 Exp. Polyethylene Resin is fully heat and UV-stabilized resulting in a wide processing latitude, good color retention and long life expectancy.

Note: XZ 89342.00 and XZ89342.10 Exp. Polyethylene Resin should comply with FDA regulation 177.1520 and with most European food contact regulations when used unmodified and processed according to good manufacturing practices for food contact applications. Please contact your nearest Dow office regarding food contact compliance statements. The purchaser remains responsible for determining whether the use complies with all relevant regulations.

Applications:

- Tanks, large tanks
- Industrial storage containers
- Canoes, boats

Physical Properties ^(1,2)	Unit	Test Method	Values	
Melt Index, 190 °C/2.16 kg	g/10 min	ISO 1133	3.8	
Density	g/cm ³	ISO 1183	0.939	
Melting Point	°C	DSC	128	
Vicat Softening Point	°C	ISO 306 (A/120)	123	
Crystallisation Point	°C	DSC	106	
Deflection Temperature Under Load	°C	ISO 75	75	
Mechanical Properties ⁽¹⁾	Unit	Test Method	Values ⁽²⁾	Values ⁽³⁾
Hardness, Shore D		ISO R 868	59	-
Tensile Stress at Yield	MPa	ISO R 527	19	18
Tensile Strain at Yield	%	ISO R 527	12	12
Flexural Modulus	MPa	ISO 178	750	
ESCR 50 °C, 100% AntaroX	h	ASTM D-1693	>500	
10% AntaroX			>50	
Falling Dart Impact, 23 °C	J/mm	ISO 6603/2	15	15
-20 °C			20	20

(1) Typical values; not to be construed as specification limits.

(2) Compression moulded samples.

(3) Rotomoulded: Plates of 3-4 mm thickness.



Description

Revolve BH3539 is a rotational moulding hexene (C6) polyethylene black grade designed to provide stiffness and mouldability without sacrificing impact resistance. The grade is suitable for tank applications and has been approved by DIBt.



Features and Benefits

- Good impact properties
- Good mouldability
- Medium stiffness
- UV10

Available as,

- Black powder

Typical applications,

- Large tanks



Physical Properties

PHYSICAL PROPERTIES	TEST METHOD	VALUE	UNITS
MFI	ISO 1133	3.5	g/10min
Density	ISO 1183	0.939	g/cm ³
Tensile strength @ Yield (50 mm/min)	ISO 527	19.5	MPa
Flexural Modulus (1.3 mm/min)	ISO 178	815	MPa
HDT at 1.8 MPa	ISO 75-2	47	°C
ESCR at 100% Igepal	ASTM D1693	>1000	hr
ESCR at 10% Igepal	ASTM D1693	>470	hr
ARM Impact (-40°C, 3 mm thickness)	ARM-I Standard	102.6	J

This information is to the best of our knowledge accurate. However, the circumstances and conditions in which it may be used are beyond our control and we do not accept liability for any loss or damage that may occur nor do we offer any warranty of immunity against patent infringement. The values indicated in the tables only describe typical properties. They do not constitute specification limits.



Description

Revolve N-307 is a rotational moulding polyethylene hexene (C6) grade. It has been designed to provide an outstanding balance of properties such as stiffness, impact strength, mouldability, ESCR and creep. The grade carries a series of international approvals and certifications and complies with many international standards within the tank industry.



Features and Benefits

- Good stiffness
- DiBt approval
- Excellent impact strength
- TÜV approved resin
- UV10 stabilised

- Available as,
- Natural pellets & powder
 - Black pellets & powder
 - Coloured powder

- Typical applications,
- Water tanks
 - Diesel tanks
 - Heating oil tanks



Physical Properties

PHYSICAL PROPERTIES**	TEST METHOD	VALUE	UNITS
MFI	ISO 1133	3.5	g/10min
Density	ISO 1183	0.939	g/cm ³
Tensile strength @ Yield (50 mm/min)	ISO 527	17.7	MPa
Flexural Modulus (1.3 mm/min)	ISO 178	790	MPa
HDT at 1.8 MPa	ISO 75-2	50	°C
ESCR at 100% Igepal	ASTM D1693	>1000	hr
ESCR at 10% Igepal	ASTM D1693	400	hr
ARM Impact (-40°C, 3 mm thickness)	ARM-I Standard	108	J

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