TRELLEBORG INDUSTRIAL SOLUTIONS
TRELLEBORG SLOVENIJA

User manual:

Vega and Nova high-pressure lifting bags

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3.0. GENERAL INFORMATION ABOUT THE PRODUCT FAMILY

3.1. BASIC FUNCTIONS AND FIELD OF APPLICATION

SAVA conventional and flat lifting bags are designed for lifting, lowering, positioning, separating and moving loads of up to 100.3 t (110.3 US t), mainly in rescue operations; however, industrial applications are also possible.

3.2. IMPORTANCE OF INSTRUCTIONS

Please read the user manual carefully before using the product. Keep the manual for future reference. The user manual must be available to all users of lifting bags.

The long version of the user manual is available on the website at:
https://www.trelleborgslovenija.com/en/products-and-solutions/environmental-protection-and-rescue-products/downloads/manuals

Each lifting bag has the manufacturer's test report attached. In addition to the test report, a quick start guide for working with lifting bags is included.

A quick start guide for working with lifting bags is included with each product. It can also be found on the back page of the user manual. We suggest that you laminate the page and attach it to the lifting bag to make it available to users at all times.

3.2.1. INTERPRETATION OF PICTOGRAMS

The pictograms used in the user manual are explained in the table below. Other markings in the user manual are unambiguous and comprehensible.

Table 1: Explanation of the pictograms.

PICTOGRAM	MEANING	EXPLANATION
	**HAZARD**	A signal word indicating a potential high-risk hazard which, if not avoided, could result in death or serious injury.
	**WARNING**	A signal word indicating a potential medium-risk hazard which, if not avoided, could result in death or serious injury.
	**CAUTION**	A signal word indicating a potential low-risk hazard which, if not avoided, could cause minor or moderate injury.
	**INFORMATION**	A signal word indicating a risk of material damage and/or damage to property. There is no risk for injuries.

3.2.2. MEANING OF IMAGES IN THE USER MANUAL

All images, drawings and photographs in this user manual are for information and illustration only.

3.3. CONFORMITY TO STANDARDS

SAVA high-pressure lifting bags of the VEGA and NOVA type meet the requirements of EN13731:2007.

3.4. MANUFACTURER

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4.0. DEFINITIONS

The meaning of words and phrases in the user manual is explained in the table below.

Table 2: Definitions

WORD / PHRASE	MEANING
Conventional lifting bag	A high-pressure lifting bag that changes the shape and size of the load-bearing surface during filling with air or water.
Flat lifting bag	A high-pressure lifting bag whose design allows an almost uniform raising of its entire surface during filling with air or other media while maintaining the shape and size of the load-bearing surface.
Contact surface	The entire top or bottom surface of the bag.
Load-bearing surface	The surface of the lifting bag in contact with the load or object to be lifted during a lifting procedure; it determines the lifting capacity of the bag.
Controller	A device for the supply, discharge and control of the filling medium in the lifting bags.
Working pressure	Pressure in the lifting bag during operation.
Permissible pressure	Maximum inflation pressure in the lifting bag during operation, as specified by the manufacturer.
Inflation connection	The point on the lifting bag for connecting the inflation hoses.
Pressure regulator or pressure reducing valve	A device which reduces the pressure of the filling medium to a prescribed maximum pressure.
Safety valve	A device that protects the entire system by relieving the excessive pressure from the system.
Lifting capacity	Maximum weight of the load that can be lifted by the lifting bag at given pressure.
Connecting hoses	Hoses for connecting the controller and the lifting bags.
Inflation hose	A hose between the air source and the controller.
Visual inspection	Visual inspection of a product that is not pressurised.
Functional test	Inspection of a pressurised product.
Periodic test	A detailed periodic inspection by the manufacturer or a person authorised by the manufacturer.

5.0. SAFETY INFORMATION FOR THE USER

5.1. SAFETY INSTRUCTIONS BEFORE USE

Make sure that you carefully read the instructions before use.

Rescue teams need a training course according to the internal regulations applying to professional rescuers. For other users, training by the manufacturer or an authorised training provider is mandatory.

5.2. PERSONAL PROTECTIVE EQUIPMENT

Wear personal protective equipment when working with SAVA lifting bags. Firefighters and rescue team members should use the entire protective equipment set, as specified. Other users should wear a safety helmet, safety goggles, gloves and protective footwear.

5.3. ENVIRONMENTAL CONDITIONS AND RESTRICTIONS

Failure to follow the instructions may lead to risks to users and third parties and may result in various injuries; therefore it is mandatory to read the instructions before use.
WARNING: do not reach under a load that is not protected by mechanical safety supports.

Do not exceed the maximum inflation pressure.
Do not stack more than two conventional SAVA lifting bags on top of each other.
Keep inflating the SAVA lifting bag until the required or maximum height and/or maximum working pressure is reached.

It is not permitted to use any SAVA lifting bag in a manner other than that provided for in these instructions. The manufacturer assumes no liability for unauthorised use.

Use the specified personal protective equipment when working with SAVA lifting bags.
It is not permitted to use lifting bags and accessories which have not passed the periodic tests within the test intervals defined in 6.3.1.

The temperature range of use is –20 to +80°C (–4 to +176°F). The use of the product at temperatures below –20°C (-4°F) but not below –40°C (–40°F) is limited to a maximum of 1 hour, and at temperatures above +80°C (+176°F) to 30 minutes provided that the temperature does not to exceed +100°C (+212°F).

TEMPERATURE OF THE LIFTING OBJECT
If the surface temperature of the object to be lifted exceeds 55°C (131°F), the side of the SAVA lifting bag in contact with the object shall be protected by plywood or rubberised steel plate to protect the bag from heat damage. The minimum temperature to which SAVA lifting bags retain their lifting capacity and material properties is –20°C (–4°F).

LIGHTING THE WORK SITE
Even if positioning and inflating the SAVA lifting bag are simple, working in the dark is dangerous. Make sure there is sufficient light so that the work site is not dark or shaded. We also recommend that you use additional lights during the day when visibility is significantly reduced due to shading. Do not use open flames for lighting in the dark.

PRESENCE OF AUTHORISED PERSONS
Only qualified persons are allowed to be present at preparations for load lifting/lowering. Other persons must keep away from the area of preparations and lifting/lowering procedure. Where people and the environment could be exposed to additional hazards, e.g. fire outbreak due to fuel leakage, other measures must also be taken by competent personnel to reduce the risk.

FIRE AREAS
SAVA lifting bags may be used in fire areas only after the temperature of the bearing surface between the load and the bag, and the ground drops below 55°C (131°F).

The standard version of SAVA lifting bags **is NOT** suitable for use in potentially explosive atmospheres. Use dedicated SAVA lifting bags of special design in potentially explosive atmospheres. Consult the manufacturer for more information

SAVA lifting bags are resistant to certain types of chemicals. Chemical resistance is presented in the attached Media resistance table. Consult the manufacturer for resistance to chemicals not listed in the mentioned table.

5.4. CARRYING SAVA LIFTING BAGS

Carry SAVA lifting bags in an upright position. Make sure that the inflation connector faces up to avoid damage if the bag accidentally falls.
Larger and heavier lifting bags such as:

- VEGA 33, VEGA 41, VEGA 50, VEGA 65, VEGA 80, VEGA 100,
- NOVA 41, NOVA 51, NOVA 63, NOVA 81, NOVA 100,

or multiple SAVA lifting bags must be carried by two persons.

5.5. TRANSPORT AND STORAGE

SAVA lifting bags are packed in cardboard packaging with special protection for sensitive parts. They must be placed in a horizontal or upright position for transport. It is forbidden to twist or fold them. Lifting bags should be stored in a dark and dry place and not exposed to extreme temperatures (see chapter 4.5).

Do not use sharp objects such as knives or screwdrivers, etc., to remove packaging, as they could damage the lifting bag.

Packaging is made of fully recyclable cardboard, which is why it must not be permanently discarded but disposed of in recycled paper containers or in special cardboard packaging containers.

5.6. STORAGE AND PROTECTION OF THE PRODUCT WHEN NOT IN OPERATION

Store SAVA lifting bags in a dry and dark place.

Storage temperature: from +5 °C (+41 °F) to +25 °C (+77 °F).

We recommend that you store SAVA lifting bags placed horizontally. When storing SAVA lifting bags horizontally, the inflation connection should be at the front to be visible allowing SAVA bag to be moved safely without damage.

If you store SAVA lifting bags in an upright position, we recommend that you fasten them to a base (wall) to prevent them from twisting. The inflation connection should face up.

We recommend that you store SAVA lifting bags in PVC bags to minimise various environmental influences on the product during storage.

5.7. SAFETY INSTRUCTIONS BEFORE USE

Quick start guide and a manufacturer's test report are attached with each SAVA lifting bag. **Keep the user manual and periodic test documents throughout the lifetime of the SAVA lifting bag.**

5.8. CHOOSING THE RIGHT SAVA LIFTING BAG

The following information is required to be able to choose the right SAVA lifting bag for your application:

- shape of the load,
- weight of the load to be lifted,
- required lifting height.

Based on the weight of the load to be lifted, the required lifting height, and the diagrams from Attachment 4, the right lifting bag can be chosen.

Example:
We want to lift a load of 10 t (11 US t) to a height of 150 mm (6") using one lifting bag.

We can choose a conventional lifting bag VEGA 33, VEGA 41, VEGA 50, VEGA 65, VEGA 80 or VEGA 100. The lifting bag VEGA 25 does not provide sufficient lifting capacity for a height of 150 mm.

Conventional lifting bags NOVA 41, NOVA 51, NOVA 63, NOVA 81 and NOVA 100 can also be used for the same application.

6.0. PRODUCT IDENTIFICATION

6.1. TYPE OF PRODUCT

- VEGA conventional lifting bag
- NOVA conventional lifting bag

6.1.1. DESCRIPTION OF THE LIFTING BAG

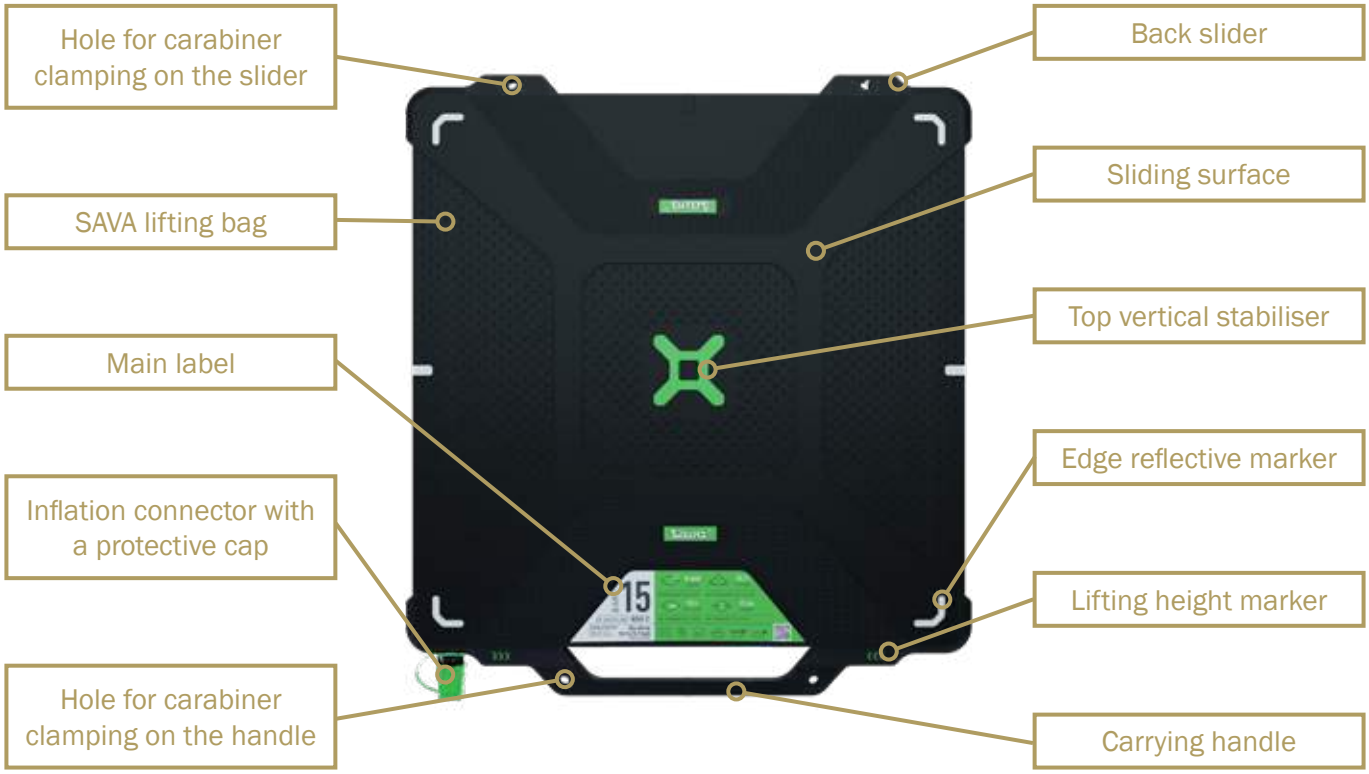


Figure 6.1: Description of SAVA lifting bag.

6.1.2. LABEL DATA

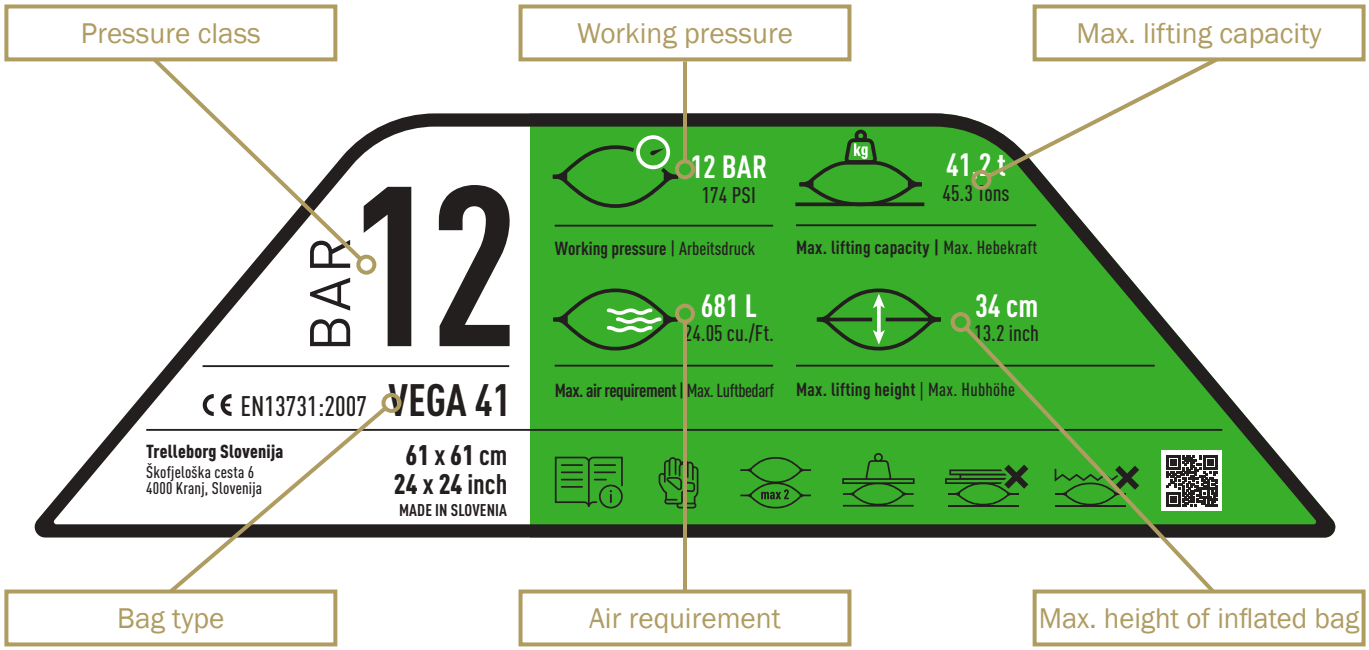


Figure 6.2: Bag label data explanation.

6.1.3. LIFTING HEIGHT DATA

The lifting height of VEGA and NOVA high-pressure lifting bags is also graphically illustrated on the main label (small size lifting bags) or next to the carrying handle (large size lifting bags), Figure 6.3.

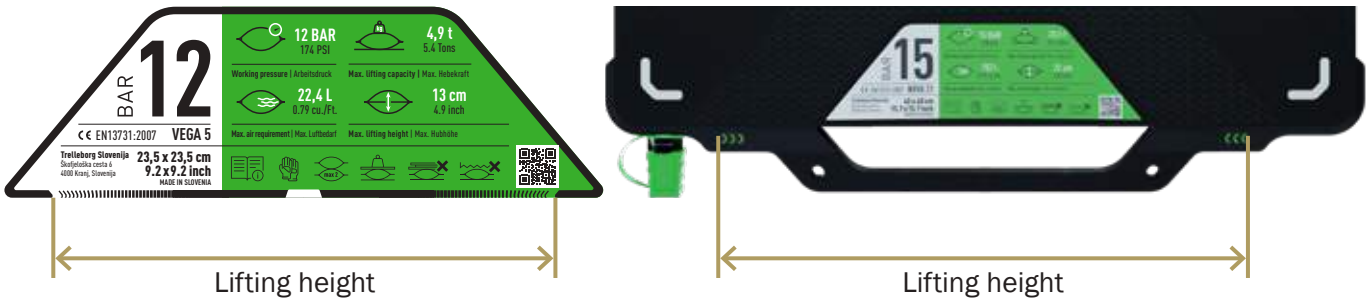


Figure 6.3: Graphically illustrated lifting height of VEGA and NOVA high-pressure lifting bags.

6.1.4. SERIAL NUMBER DATA

The serial number is affixed to:

- VEGA 2 and NOVA 2: the top surface,
- VEGA 5, VEGA 10, NOVA 6 and NOVA 13: the edge of the product,
- other sizes: the edge of the carrying handle.

It consists of a number and a QR code. The first two digits in the number are the month of manufacture, the second two digits are the year of manufacture, and the remaining digits are the serial number of the product manufactured. In the bottom line of the serial number, an uncoded data on time of manufacture is added, where m (month) stands for the month of manufacture and y (year) for the year of manufacture. The QR code is a graphic image of the serial number.

The example in Figure 6.4 shows a SAVA lifting bag manufactured in September (09) 2020 (20).

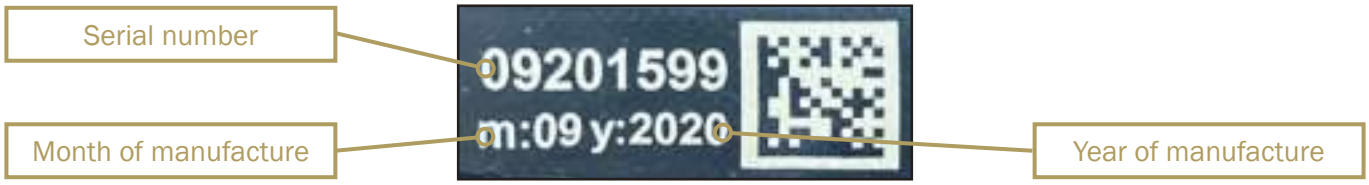


Figure 6.4: Serial number of SAVA lifting bag.

6.2. LIFETIME

The expected lifetime of the product is 15 years if it is properly used and maintained.

SAVA lifting bags are made of rubber and therefore subject to the natural ageing process. Although visual inspection shows that the lifting bags are still in good condition, they should be removed from service after 15 years, as signs of ageing, invisible to the naked eye, may already be present in the material.

Destructed or damaged products or products that have reached the end of their useful life must be removed from service. They should not be disposed of as ordinary waste – SAVA lifting bags are considered returnable waste. Classification should be carried out in accordance with locally valid regulations.

The product can be partially recycled.

7.0. OPERATING INSTRUCTIONS

7.1. DESCRIPTION OF LIFTING BAGS

SAVA lifting bags can be inflated with air or water only.
The use of other gases and liquids is not permitted.

Inflating SAVA lifting bags without using the controllers with built-in safety valves is not permitted.

Do not inflate the lifting bag to more than 1 bar (14.5 psi) without the load.
Inflate SAVA lifting bag until the required or maximum lifting height and/or maximum working pressure is reached.

To lift a load with SAVA lifting bags, have ready:

1. air source,
2. pressure reducing valve (if the air source pressure exceeds the maximum permissible inlet pressure of the controller (15 or 18 bar and/or 218 or 261 psi),
3. connecting hoses,
4. controller,
5. SAVA lifting bag.

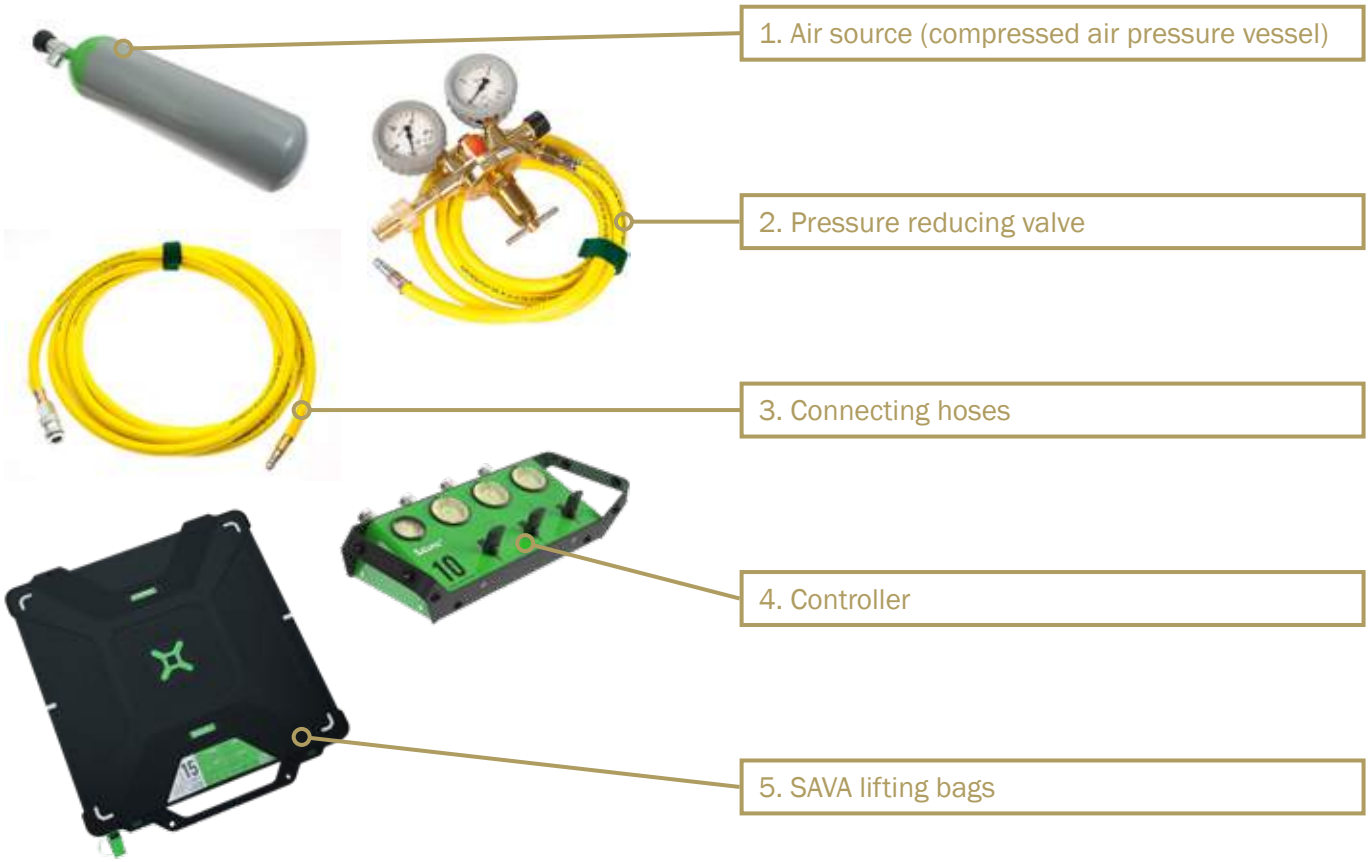


Figure 7.1: Components of the load lifting system with SAVA lifting bags.

7.1.1. PRESSURE REDUCING VALVE

The pressure reducing valve is designed to adjust the pressure of the air source to the specified inlet pressure of the controller. The pressure reducing valve consists of the components shown in Figure 7.2.

Figure 7.2: Pressure reducing valve.

The pressure reducing valve is to be screwed directly onto the pressure vessel via the pressure vessel connection, with the valve on the pressure vessel closed. When the valve on the pressure vessel is open, the inlet pressure gauge of the pressure reducing valve on the pressure vessel indicates the pressure in the pressure vessel. The outlet pressure gauge indicates the adjustable pressure of the pressure reducing valve, available only after loosening the relief valve. The outlet pressure is continuously adjustable, by rotating the adjusting valve, throughout the working area.

Specific instructions are attached with the pressure reducing valve.

7.1.2. CONNECTING HOSES

The connecting hoses are used to pneumatically connect SAVA lifting bags to the associated pneumatic controller. The connecting hoses are made up of elements shown in Figure 7.3. They are adapted to the pressure class and may only be used in that specific pressure class. The number on the coupling and the connector of the connecting hose determines the specific pressure class for of the connecting hose. The inflation hoses are fitted with double safety couplings.

Figure 7.3: Connecting hose.

The month of manufacture of the connecting hose and the serial number (Figure 7.4) are engraved next to the coupling or the connector.

Figure 7.4: Connecting hose data.

7.1.3. EXP PANEL CONTROLLER

The EXP panel controller is designed for safe control of SAVA lifting bags. The controllers are pressure class-specific with a clear indication of the pressure class on the inlet channel.

Connect the controller to the air source directly via the safety inlet coupling or indirectly via the pressure reducing valve. The maximum permissible inlet pressure is indicated above the inlet pressure gauge. The inlet pressure gauge indicates the value of the inlet pressure and indirectly displays the air source or pressure vessel indicator. The EXP controller may have two or three outlet channels.

Each outlet channel consists of:

- a control lever for filling and emptying the lifting bag. When up, the lifting bag is being inflated; when down, the lifting bag is being deflated. Once the control lever is released, it assumes its neutral-closed position, which prevents both inflating and deflating the lifting bag;
- a safety valve inside the controller, not visible; when activated, it emits a characteristic acoustic signal;
- an outlet pressure gauge to measure the pressure in the lifting bag; and
- outlet couplings with a two-stage safety opening.

Optional accessories include a neck strap, a dedicated controller case and a light for night work. The controller case is designed to allow the controller to be plugged in and conveniently used directly from the case.

Figure 7.5: EXP controller

Detailed operating instructions are attached with each controller.

7.2. PREPARING THE LIFTING BAG FOR LIFTING

Lifting with SAVA lifting bags is only permitted using the components listed above.

If the compressed air contains oil, use an oil separator.

STEP 1: Put SAVA lifting bag on a lifting site
Put the SAVA lifting bag on the previously prepared lifting site. When positioning, follow the rules described in chapter 5; use mechanical supports for load stabilisation.

Figure 7.6: Positioning SAVA lifting bag on a lifting site.

STEP 2: Connect the hose to SAVA lifting bag
The connecting hoses are of different colours for greater visibility. If you use several lifting bags, use a different colour with each lifting bag.

Connect the hose to the lifting bag. Insert the safety coupling into the connector of the lifting bag as indicated by the arrow in Figure 7.7. so that the connecting coupling engages onto the hose.

Figure 7.7: Connecting the hose to SAVA lifting bag.

STEP 3: Connect the connecting hoses to the controller
Plug the connector of the connecting hose from SAVA lifting bag into the connection coupling on the controller as indicated by the arrow in Figure 7.8. If correctly connected, the connecting coupling engages onto the controller.
Fully unroll the connecting hoses. Make sure they are not kinked or folded.

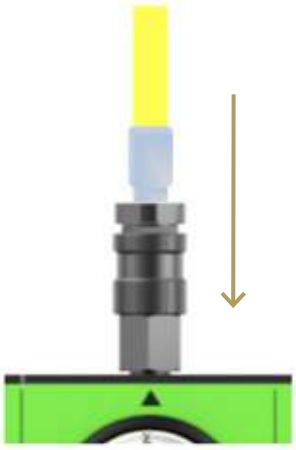


Figure 7.8: Connecting the connecting hoses to the controller.

STEP 4: Prepare the air source
The most commonly used air source, also presented in this user manual, is a compressed air pressure vessel. If using another compressed air source, please note:

- pressure limit before the inlet to the controller; the maximum inlet pressure to the controller, indicated at the inlet coupling, is limited and depends on the pressure class of the controller,
- the air inlet coupling to the controller; the inflation hose connector should correspond to the type 26 coupling.

STEP 4.1: Remove the safety plug from the pressure vessel
Before removing the safety plug, be sure to check that the valve on the pressure vessel is closed. The valve closes in a clockwise direction.

Unscrew the safety plug and store it.

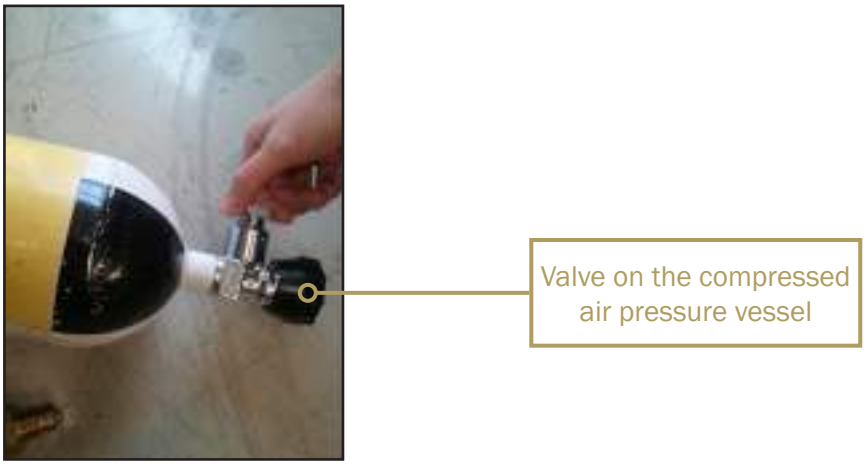


Figure 7.9: Removing the safety plug from the pressure vessel.

STEP 4.2: Instal the pressure reducing valve on the pressure vessel
Close the relief valve on the pressure reducing valve.

Insert the pressure reducing valve all the way into the connection point on the pressure vessel and tighten the fixing screw as shown in Figure 7.10.

When the pressure vessel is placed on the floor, turn the valve so as to prevent damage during use.

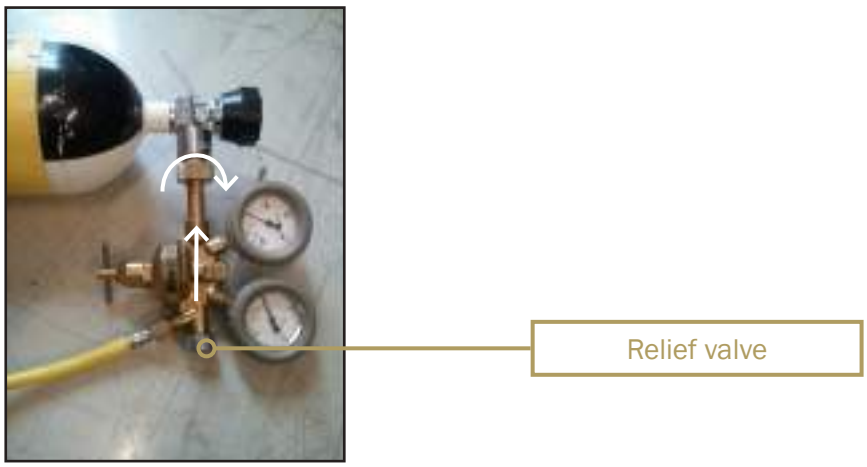


Figure 7.10: Installing the pressure reducing valve.

STEP 4.3: Set the pressure reducing valve to the required value

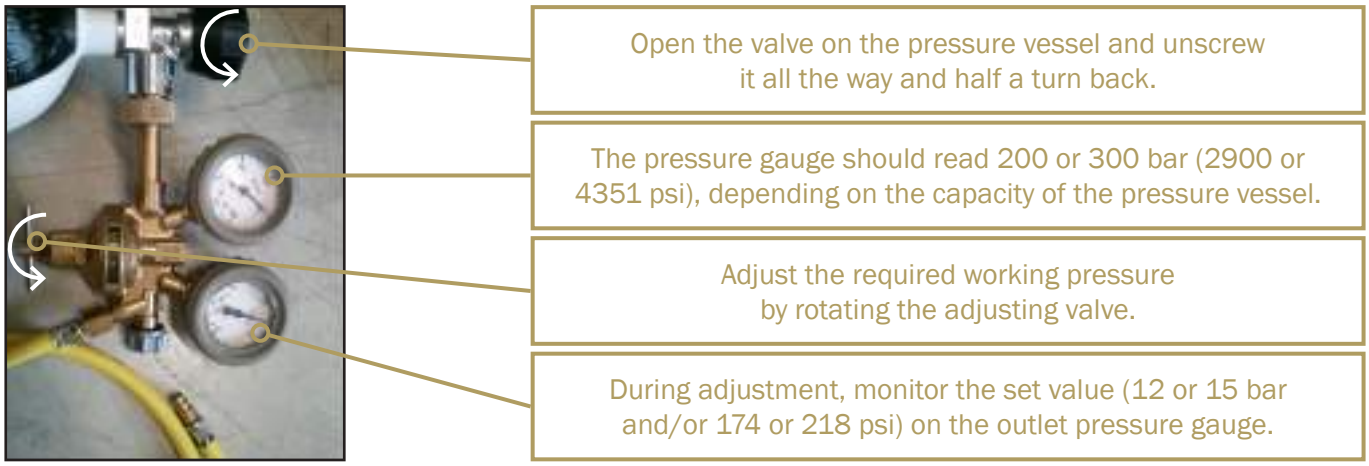


Figure 7.11: Setting the pressure reducing valve.

STEP 5: Connect the inflation hose to the controller

Connect the connector of the inflation hose to the inlet connector of the air source on the controller as indicated by the arrow in Figure 7.12. If connected correctly, the coupling engages onto the controller. Lock the coupling by rotating the coupling jacket 180° to the left or right.

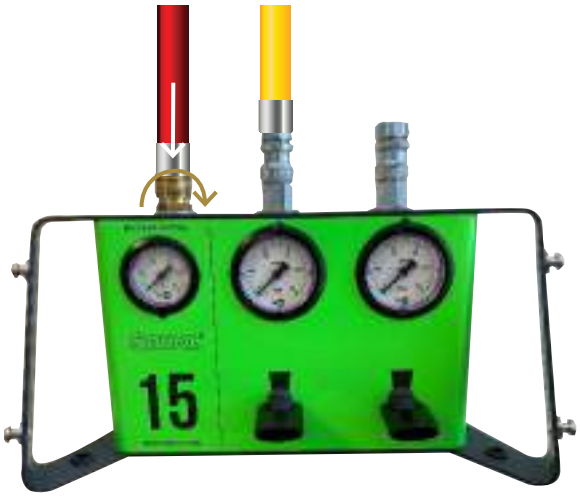


Figure 7.12: Connecting the inflation hose to the controller.

STEP 6: Release the pressure reducing valve
Release the pressure in the controller by turning the relief valve counter-clockwise.

Figure 7.13: Releasing the relief valve.

7.3. DISCONNECTING THE LIFTING BAGS

SAVA lifting bags and other necessary components are under high pressure, so extreme care must be taken during disconnection. Follow the steps described below.

STEP 1: Close the valve on the compressed air pressure vessel
Close the valve on the compressed air pressure vessel. See Figure 7.9.

STEP 2: Close the relief valve on the pressure reducing valve
Turn the relief valve on the pressure reducing valve clockwise to cut off the pressure to the controller. See Figure 7.13.

STEP 3: Release the pressure in the lifting bags
Using the controller, fully release the pressure from the connected lifting bags.

STEP 4: Depressurise the inflation hoses
Using the controller, release all the air from the inflation hose and valves into the connected lifting bags. Immediately after that, repeat emptying the lifting bags.

STEP 5: Disconnect the inflation hose from the controller
Rotate the coupling jacket until the groove on the jacket engages with the pin, as detailed in the bottom right corner of Figure 7.14. Push the coupling jacket towards the controller and pull out the connector with the inflation hose.

Figure 7.14: Disconnecting the inflation hose from the controller.

STEP 6: Disassemble the pressure reducing valve
Loosen the fixing screw on the pressure reducing valve and separate it from the compressed air pressure vessel. See Figure 7.10.

STEP 7: Fit the safety plug to the compressed air pressure vessel
Fit the safety plug to the compressed air vessel as shown in Figure 7.9.

STEP 8: Disconnect the connecting hoses from the controller
Push the hose with the connector into the connection towards the controller. Push the coupling jacket towards the controller. Release the connector with the hose so that it pops out of the coupling.
When the connecting hoses are disconnected, they get fully depressurised.

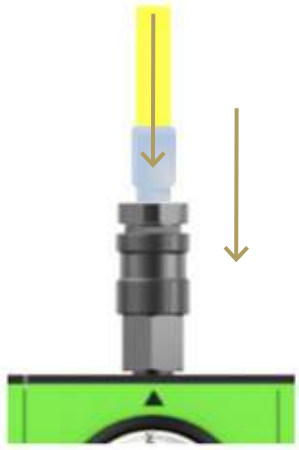


Figure 7.15: Disconnecting the connecting hoses from the controller.

STEP 9: Remove the lifting bags from the lifting site
Remove the lifting bags from the lifting site and put them in an easily accessible place.
WARNING: Do not pull the lifting bag by the connecting hoses.

STEP 10: Disconnect the inflation hose from the lifting bag
Push the hose with the coupling towards the lifting bag. Pull the coupling jacket away from the lifting bag and drop the hose so that the connector of the lifting bag pops out of the coupling.

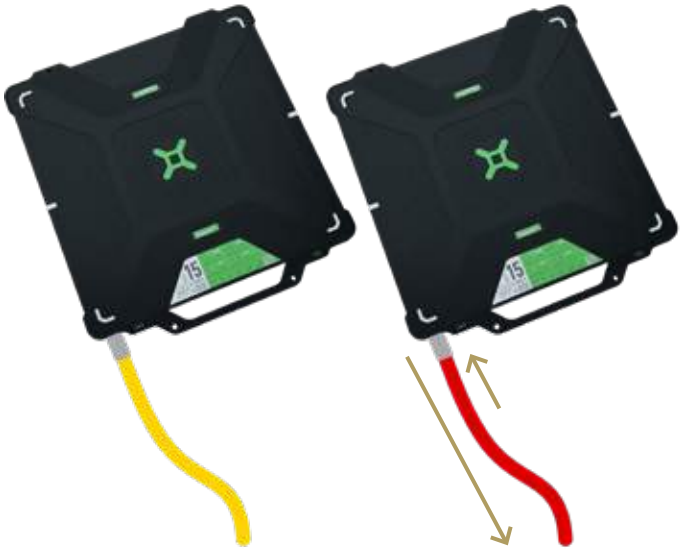


Figure 7.16: Disconnecting the connecting hoses from the lifting bag.

7.4. LIFTING METHODS

Before starting work, check the area where SAVA lifting bag will be placed.

Remove broken glass, sharp objects and other foreign particles, which could cause damage or failure of the lifting bag, from the area where the lifting bag is to be placed. Make sure that the lifting bag does not come into contact with sharp edges of sheet metal, the ends of brackets, nails, screws and similar.

When you need to place the lifting bag on a surface where a risk of sliding exists due to:

- oil stains,
- chemicals that could affect the properties of the rubber,
- ice or snow,

sprinkle the surface with sand or other granular material beforehand, or use a rubberised metal plate for protection.

If the lifting bag is used on an unpaved or soft surface, place a solid support, e.g. a rubberised metal plate or wooden plywood, under the bag to ensure stability during lifting and/or to prevent slipping of rubber or load.

WARNING: It's MANDATORY to use a mechanical safety support for all lifting operations. Working under a load supported only by an inflated SAVA lifting bag is not permitted under any circumstances.

Place SAVA lifting bag onto the prepared place or built support as shown in Figure 7.6.

WARNING: It may happen that the load to be lifted has protruding hanging parts. In such cases, the SAVA lifting bag MUST NOT be positioned so as to rest on hanging parts of the load.

The mechanical safety support must be strong enough to withstand the load it carries. It must be placed on a solid surface to minimise the possibility of its slipping in the given circumstances.

Figure 7.17: Substructure support and the bearing surfacee.

Along with the inflation of conventional lifting bags, the load-bearing surface and consequently the load capacity reduces. The load capacity of SAVA lifting bags as a function of lifting height is shown in Attachment 4.

The lifting capacity reaches its maximum at the beginning of the lift, when the lifting height is the lowest (Figure 7.18). As the lifting bag inflates, it gradually becomes spherical (Figure 7.19) while the load-bearing surface, and hence the load capacity, decrease accordingly.

Figure 7.18: Reducing the load-bearing surface with increasing the lifting height.

At the maximum lifting height, the load-bearing surface and the load capacity of the lifting bag are the smallest (Figure 7.19).

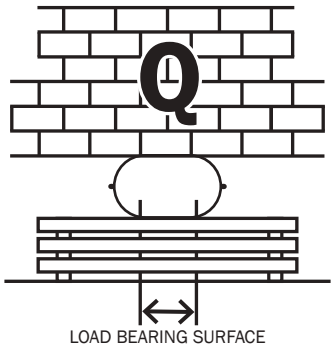


Figure 7.19: Minimum load-bearing surface at maximum lifting height.

7.4.1. LIFTING WITH ONE SAVA LIFTING BAG

Where there is more than 70 mm (2.8”) of space between the ground and the object to be lifted and only one lifting bag available, build a solid support as high as to provide just enough space for insertion of the non-inflated lifting bag. The top surface of the support should allow the non-inflated lifting bag to rest properly on it.

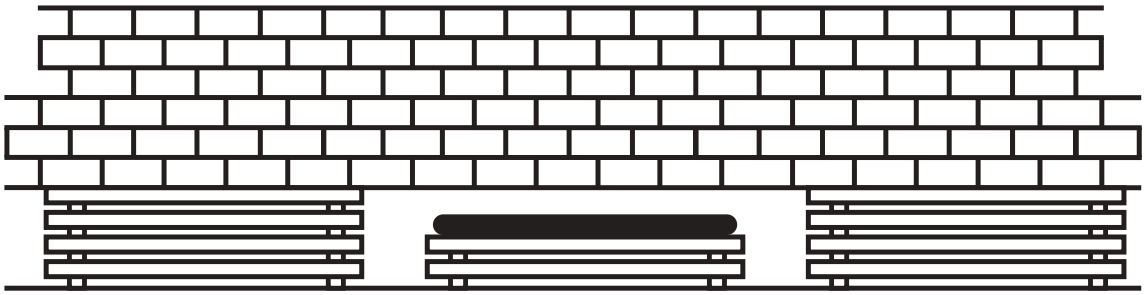


Figure 7.20: Construction of safety supports – non-inflated lifting bag.

Slowly inflate SAVA bag to reach the required height and simultaneously add lateral safety supports, see Fig. 5.24.

Build up the safety support on each side of the load to the point where another support structure cannot be inserted (Figure 7.20). In this way, the height from which the load would fall down in the event of an unexpected pressure drop in the lifting bag or bag’s collapse.

Insert the lifting bag in the middle of the support with the connector of the lifting bag at the front. Make sure that the top of the lifting bag fully contacts the bottom of the load. An insufficient load-bearing surface may cause the load to slip during inflation or the lifting bag to suddenly and uncontrollably slip out from under the load.

Slowly inflate the lifting bag to the required height and keep adding lateral safety support elements as shown in Figure 7.21.

Do not inflate the lifting bag during adding the elements of lateral safety support.

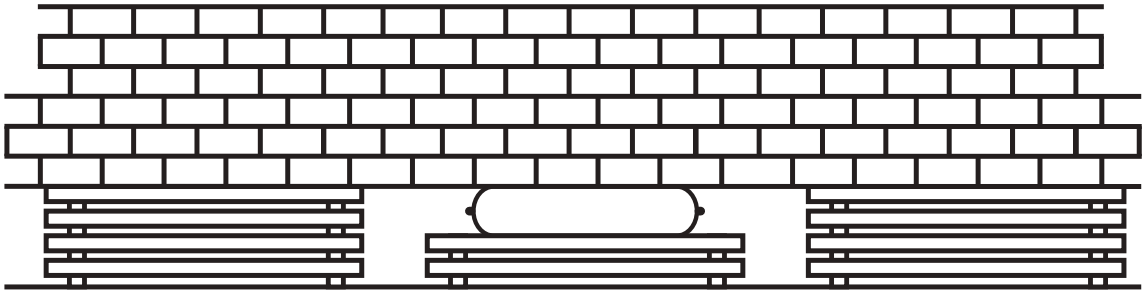


Figure 7.21: Construction of safety supports – inflated lifting bag.

Carefully let the load sit on the safety support. If more working space is needed below the lifting point, remove the lifting bag and the support under it.

When working under the load, the load must be stabilised and the lifting bag fully deflated.

7.4.2. LIFTING WITH MULTIPLE LIFTING BAGS TO INCREASE LOAD CAPACITY

The load capacity of SAVA lifting bags can be increased by combining two lifting bags placed one next to the other and inflating them simultaneously, as shown in Figure 7.22. The increased load capacity is twice the load capacity of the smaller lifting bag.

Example:
A combination of the VEGA 10 and VEGA 17 lifting bags, placed one next to the other and inflated simultaneously, has twice the capacity of the smaller bag (VEGA 10) at 19.6 t (21.6 US t), which is enough to lift a load of 15 t (16.5 US t).

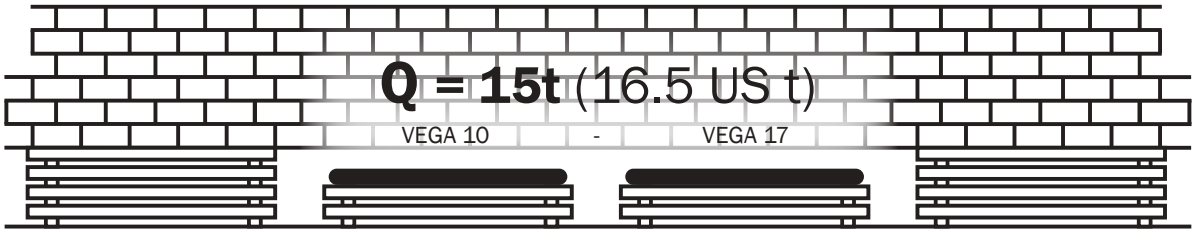


Figure 7.22: Combination of two SAVA lifting bags placed one next to the other to increase the capacity.

7.4.3. LIFTING WITH MULTIPLE LIFTING BAGS TO INCREASE LIFTING HEIGHT

The increase in lifting height is achieved by placing two SAVA lifting bags one on top of each other, as shown in Figure 7.23. The total lifting height of such a combination is equal to the sum of the lifting heights of a single lifting bag. The load capacity of the combination is equal to the load capacity of the smaller lifting bag.

WARNING: If the required lifting height cannot be determined, select the largest SAVA lifting bag available that can be inserted under the load.

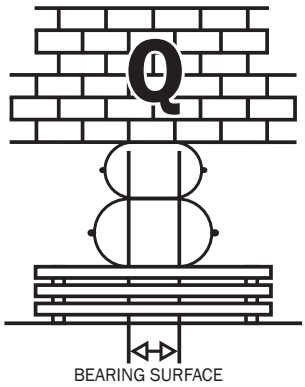


Figure 7.23: Combination of two SAVA lifting bags to increase the lifting height.

Example:
A combination of SAVA VEGA 10 (17 cm/6.9") and VEGA 17 (22/8.5") lifting bags placed on top of each other enables a total lifting height of 39 cm (15.4").

For conventional SAVA lifting bags of the VEGA and NOVA type, the combination for increasing the lifting height may consist of ONLY TWO lifting bags

When combining the lifting bags to increase the lifting height, put the smaller lifting bag in the middle of the larger one with both connectors facing to the front, as shown in Figure 7.24. The profiled surface of VEGA and NOVA bags allows interlocking and stabilising of the two bags. Make sure that the upper cross-piece of the bottom bag interlocks with the bottom cross-piece of the upper bag, as shown in Figure 7.25.

Build safety supports and a support base for the lifting bag in the same way as for lifting with one lifting bag (chapter 7.4.1). First inflate the lower, larger lifting bag until the upper, smaller lifting bag contacts the load. Then fully inflate the upper lifting bag and, if needed, the lower one to reach the required lifting height.

Figure 7.24: Combining conventional SAVA lifting bags to increase the lifting height.

Figure 7.25: Interlocking VEGA and NOVA lifting bags to increase the lifting height.

7.4.4. LIFTING OBJECT OF UNUSUAL SHAPES

7.4.4.1 Lifting pipes and profiles

Problems arise when lifting pipes and profiles, as they do not contact the entire available load-bearing surface of the lifting bag. The lifting bag may also be damaged if it is twisted or contacted by pointy or sharp parts of the object to be lifted.

Therefore, place a rubberised steel plate or plywood between the SAVA lifting bag and the object to be lifted, as shown in Figure 7.26, to distribute the lifting force evenly over the entire lifting surface of the lifting bag.

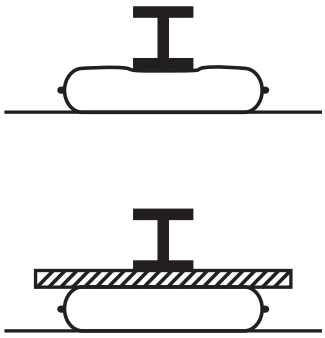


Figure 7.26: SAVA lifting bag with plywood support for lifting profiles and pipes.

7.4.4.2 Lifting cylindrical objects

It is not possible to lift cylindrical objects of larger dimensions, such as tanks, with one lifting bag. If the object is not firmly secured, it will roll to the side as soon as the SAVA lifting bag starts to inflate and becomes spherical.

Therefore, lift cylindrical objects with at least two SAVA lifting bags, one on each side of the object, as shown in Figure 7.27. Inflate both SAVA lifting bags evenly and simultaneously.

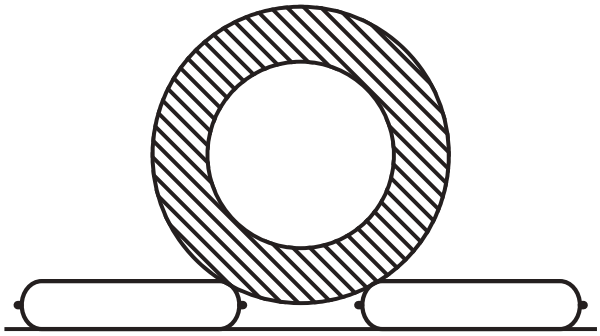


Fig. 7.27: Lifting large cylindrical loads

7.4.4.3 Separating and pushing with SAVA lifting bag

SAVA lifting bags can also be used to separate and move objects. Problems can arise if the object to be pushed has a thin wall, which SAVA lifting bag can bend or even break due to high pressure. Therefore, lean the lifting bag against a bar, pillar or other solid and rigid element. If this is not possible, place a rubberised metal plate or thick plywood between the lifting bag and the object to distribute the pushing force over a larger area, as shown in Figure 7.28.

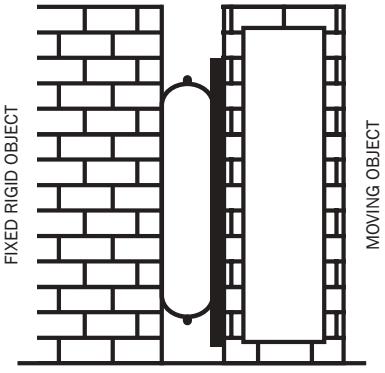


Figure 7.28: Moving and/or separating objects.

8. UNEXPECTED SITUATIONS

If, during work with SAVA lifting bags, you notice any damage to the lifting bag, inflation and connecting hoses, and other components of the lifting system that could compromise safety, stop the work immediately and replace the damaged component. The use of SAVA lifting bags and hoses with cracks, bulges, unusual deformations, etc., is NOT permitted.

If you estimate that lifting loads with SAVA lifting bags poses a danger to rescued persons or the rescue team, stop the work. Consult the rescue professionals on applying an alternative method of lifting (crane, towing, etc.).

If the bag collapses, a very loud bang is released.

Table 3: Unexpected situations.

UNEXPECTED SITUATION	CONSEQUENCE	NECESSARY ACTION
The pressure in the lifting bag suddenly drops. The lifting bag and the load lower uncontrollably.	The load lowers to the support. When the lifting bag collapses, a very loud sound is released.	If you identify a fault in one of the components, replace it. Otherwise, replace all components.
The lifting bag does not inflate even though the pressure gauge shows the correct working pressure.	The load cannot be lifted.	Check again if a suitable SAVA lifting bag has been selected for the lift.
Despite activation of the filling valve on the lifting bag, the working pressure cannot be reached.	The load cannot be lifted.	Check the lifting bag inflation system. Inspect the individual components and, if you identify a fault in one of them, replace that component or all components of the system.
Uncontrolled movement of the load or lifting bag.	The load is no longer balanced.	Lower the load to the basic or support position with extreme care, checking beforehand and re-arranging the place of use if necessary. Then recheck the lifting bags for correct position.
Uncontrolled exceeding of the working pressure.	Destruction of the lifting bag accompanied by a loud sound.	 The lifting system is protected by safety valves. If the working pressure is nevertheless exceeded, immediately stop lifting and carefully lower the load onto the prepared supports. Check the lifting bag inflation system. Inspect the individual components and, if a fault is detected in any of them, replace that component, otherwise replace all components of the system.

9.0. ACCESSORIES

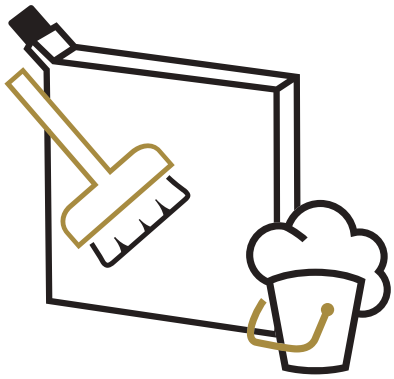
Accessories are available for purchase and use with the SAVA lifting bag system. A list of accessories is attached.

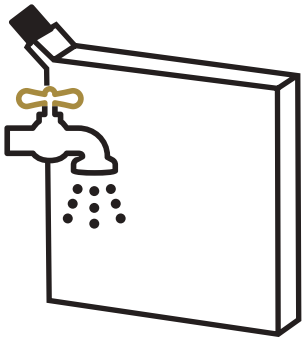
Please contact your dealer or visit their website for further information.

10.0. MAINTENANCE AND CLEANING

Clean and inspect high-pressure lifting bags and accessories after each use. Always use personal protective equipment when cleaning, which should include at least safety goggles, gloves and footwear.

10.1. MAINTENANCE AND CLEANING OF SAVA LIFTING BAGS AFTER USE





Clean and inspect SAVA lifting bag after each use. Oil and grease stains cause the lifting bag to slip, while pieces of dirt in the connector prevent it from connecting to the hose and obstruct the flow of air or water.

Roughly clean the lifting bag by holding it upright with the connector at the top and shaking and tapping it on the floor.

Check the opening of the connector. If it is filled with dirt, remove it with a thin wire. Pull the dirt out of the connector, do not push it into the lifting bag.

Use a stiff-bristle brush to remove adhering dirt from the surface of SAVA lifting bag. Move the brush in different directions. The use of sharp objects to remove dirt is not permitted.

Once all adhering dirt is removed, splash a mild solution of dishwashing detergent and warm water on the stains on the lifting bag and brush off any remaining dirt from the surface with a stiff-bristle brush. Do not use petrol, thinner, alcohol or aggressive cleaners.

Rinse the lifting bag with clean cold water. A strong jet of water will remove any remaining dirt and soap scum from the bag's surface.

The use of a high-pressure cleaner is NOT allowed.
Do not dry SAVA lifting bags in a dryer or with heating devices.

Hold the lifting bag upright and wipe the connector with a clean cloth. Leave the lifting bag to air dry.

Carefully inspect the clean and dry SAVA lifting bags, following the preventive maintenance instructions and Table 4.

10.2. MAINTENANCE OF INFLATION AND CONNECTING HOSES AFTER USE

After each use, clean the inflation and connecting hoses with a mild solution of dishwashing detergent and warm water. Rinse the hoses with clean cold water.

Check the opening in the connector and coupling. If they are filled with dirt, remove it with a thin wire. Pull the dirt out of the connector or coupling. Do not push dirt into the hose.

Wipe the hoses with a dry cloth.

The use of a high-pressure cleaner is NOT allowed.
Do not dry the inflation and connecting hoses in a dryer or with heating devices.

Carefully inspect the cleaned and dry hoses.

10.3. MAINTENANCE OF THE CONTROLLERS AFTER USE

After use, clean and maintain the controllers in accordance with the operating instructions for the controller.

11. PREVENTIVE MAINTENANCE

Preventive maintenance includes a mandatory inspection of SAVA lifting bags and the accessories, as well as testing and replacing damaged components.

Please also observe local regulations on carrying out preventive maintenance.

Use personal protective equipment when inspecting and testing. Firefighters and rescue team members should use a complete set of protective equipment required for their work. Other users should wear a safety helmet, safety glasses and gloves, and protective footwear.

We recommend that you keep written records of inspection and test results and also retain them for the lifetime of the product.

Follow the instructions for safe working.

If in doubt about the safety of the test, discontinue the test immediately and consult the manufacturer or their authorised representative on the next steps.

Functional tests carried out under pressure may only be performed after visual inspection has confirmed the fault-free status.

If the last periodic test has not been carried out within the prescribed interval, or if the lifting bag or its accessories have failed to pass thie test, or if there is any doubt as to the safe and reliable use of the lifting bag and its accessories, the use of the lifting bag and its accessories may be dangerous and is therefore not permitted. In this case, the prescribed periodic test must be carried out prior to conducting the functional test.

If, during a visual inspection or functional test, damage or leaks are detected in SAVA lifting bags or damage to or malfunctions of the equipment, the faulty lifting bags or equipment MUST NOT be used.

In addition to the inspection intervals specified by the manufacturer, please also observe the requirements of valid local legislation.

11.1. INSPECTION INTERVALS

SAVA lifting bag

Table 4: SAVA lifting bags – inspection intervals.

INSPECTION	INSPECTION INTERVAL	OPERATOR	PROCEDURE
Visual inspection	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.1.*
Functional test	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.2.*
Periodic test	5th, 10th, 13th year after manufacture, or when in doubt about the safety and reliability of the product	Manufacturer or a person authorised by the manufacturer	

Pressure reducing valve

Table 5: Pressure reducing valve – inspection intervals.

INSPECTION	INSPECTION INTERVAL	OPERATOR	PROCEDURE
Visual inspection	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.3.*
Functional test	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.4.*
Periodic test	5th, 10th, 13th year after manufacture, or when in doubt about the safety and reliability of the product	Manufacturer or a person authorised by the manufacturer	

Connecting hoses

Table 6: Inflation and connecting hoses – inspection intervals.

INSPECTION	INSPECTION INTERVAL	OPERATOR	PROCEDURE
Visual inspection	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.5.*
Functional test	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.6.*
Periodic test	5th, 10th, 13th year after manufacture, or when in doubt about the safety and reliability of the product	Manufacturer or a person authorised by the manufacturer	

EXP controller

Table 7: EXP controller – inspection intervals.

INSPECTION	INSPECTION INTERVAL	OPERATOR	PROCEDURE
Visual inspection	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.7.*
Functional test	• After each use • Annually	Person qualified to work with SAVA lifting bags	*Chapter 11.2.8.*
Periodic test	5th, 10th, 13th year after manufacture, or when in doubt about the safety and reliability of the product	Manufacturer or a person authorised by the manufacturer	

11.2. TEST PROCEDURES

11.2.1. VISUAL INSPECTION OF SAVA LIFTING BAG

Clean and dry SAVA lifting bags before visual inspection.

Visually check the bags and pay special attention to:
- abnormal bulges,
- air pockets,
- punctures,
- cuts,
- worn parts,
- other mechanical damage.
-

Inspect the connector and:
- check for any wear or damage,
- test the connecting hose for connectivity,
- check if the protective cap is in place and damage-free to ensure its functionality.

Check the data on the label of SAVA lifting bag for legibility.

Connect the unloaded SAVA lifting bag in accordance with chapter 7.2. and fill it with a pressure of 0.2 times the working pressure.

Visually check the lifting bag again, following the second paragraph of this chapter.

Apply soapy water with a brush over the entire surface of the lifting bag, including the connector. Visually check the lifting bag and the connector for leaks.

If any damage or defect is detected, mark it with chalk. Consult the manufacturer or their authorised representative about the severity of the damage and further use of SAVA lifting bag.

If SAVA lifting bag fails to pass the visual inspection, remove it from service. The use of a lifting bag that has failed the visual inspection is NOT allowed. In case of doubt about the severity of the damage, consult the manufacturer or their official representative.

11.2.2. FUNCTIONAL TEST OF SAVA LIFTING BAG

If SAVA lifting bag fails to pass the visual inspection, it is NOT permitted to carry out the functional test.

If in any doubt as to whether a functional test is safe to carry out, consult the manufacturer or their authorised representative prior to carrying out the functional test.

Connect the unloaded SAVA lifting bag in accordance with chapter 7.2. Fill SAVA lifting bag to a pressure of 0.5 times the working pressure.

After one minute, refill the pressure up to 0.5 times the working pressure if necessary.

Read the pressure on the pressure gauge. After 10 minutes, repeat the reading. The lifting bag has passed the leak test if the pressure difference does not exceed 10% of the initial value.

If SAVA lifting bag fails to pass the functional test, remove it from service. The use of a lifting bag that has failed the functional test is NOT permitted. In case of doubt as to the severity of the damage, consult the manufacturer or their official representative.

11.2.3.VISUAL INSPECTION OF THE PRESSURE REDUCING VALVE

Visually check the following components for damage:
- the threaded part of the pressure vessel connector,
- rubber gasket in the pressure vessel connector,
- pressure gauges and the maximum working pressure marking,
- protective caps on the gauges to ensure their functionality,
- relief valve,
- inflation hose, e.g. tears, punctures or other damage such as slightly hardened areas and effects of contact with acids.

11.2.4.FUNCTIONAL TEST OF THE PRESSURE REDUCING VALVE

Connect the pressure reducing valve to a standard pressure vessel with a capacity of 6 l and a pressure of 300 bar. The pressure vessel should be full. Close the pressure relief valve.

Open the valve on the pressure vessel. The left-hand pressure gauge should read 300 bar.

Apply soapy water with a brush to the connection area of the pressure reducing valve with the pressure vessel and check for leaks.

Move the adjusting valve to gradually reduce the outlet pressure indicated on the right-hand gauge to 0 bar and gradually release the pressure in the pressure reducing valve. Rotate the adjusting valve in the opposite direction until the maximum value indicated on the right-hand gauge (12 or 15 bar depending on design) is reached. The adjusting valve enables value setting throughout the working range. The adjusting valve should move smoothly throughout the operating range.

Apply soapy water to the connector with a brush and check the relief valve for leaks.

Connect the inflation hose to the controller. Slowly open the relief valve until it is fully open. The relief valve must be moving smoothly at all times. The pressure gauge on the controller must show the same value as the right-hand pressure gauge of the pressure reducing valve. Apply soapy water with a brush to the inflation hose and to the connection areas of the hose with the pressure reducing valve and the hose with the controller. Check the hoses and the connection areas for leaks.

11.2.5. VISUAL TEST OF THE CONNECTING HOSES

Visually check for damage:
- connection couplings,
- connector,
- hoses, e.g. tears, punctures or any other damage such as slightly stiffened areas and the effects of contact with acids.

11.2.6. FUNCTIONAL TEST OF THE CONNECTING HOSES

Connect the controller and the lifting bag with the connecting hose as described in chapter 7.2. Inflate the lifting bag to a pressure of 0.2 times the working pressure. Apply soapy water with a brush to the connection areas and the connecting hose, and check for leaks.

11.2.7. VISUAL INSPECTION OF THE EXP CONTROLLER

Visually check for damage:
- connecting inlet couplings,
- connecting outlet couplings,
- inlet pressure gauge,
- outlet pressure gauges,
- housing,
- neck strap and its attachment to the controller (optional),
- lamps to illuminate the controller (optional).

11.2.8. FUNCTIONAL TEST OF THE EXP CONTROLLER

Connect the inflation hose of the pressure reducing valve as described in chapter 7.2, and check the operation of the inlet coupling.

Connect the controller and the lifting bag with the connecting hose as described in chapter 7.2 and check the operation of the outlet couplings.

Set the control levers to the lifting position and then move them to the lowering position. The levers should move smoothly. If the control lever is in the lifting position, the connected SAVA lifting bag must be lifting.
WARNING: Do not exceed a pressure value of 0.2 times the working pressure in the lifting bag.

11.2.8.1 Functional test of the controller pressure gauges

Using reference pressure gauges, test the performance of the controller's pressure gauges.
Check the function of:

- the inlet pressure gauge, where the outlet pressure gauge of the connected pressure reducing gauge can be used as a reference gauge,
- the outlet pressure gauges, for which a dedicated reference pressure gauge is required.

11.2.8.2 Functional test of the safety valve

Connect the pressure reducing valve as described in chapter 7.2.

Push the control lever to the lifting position and gradually increase the pressure in the controller until the safety valve opens or the value 1.1 times the working pressure of the controller is exceeded. **WARNING: The outlet pressure of the pressure reducing valve must be set to the maximum inlet pressure supplied to the controller.** The safety valve is free from defect if it is activated within a range of -0 to +10 % of the working pressure of the controller. The activated safety valve emits a characteristic sound.

11.2.8.3 Functional test of the controller lighting lamp

Put the lamp on the controller and switch it on. The light shines.

12. FAULT IDENTIFICATION AND TROUBLESHOOTING

Table 8: Fault indentification and troubleshooting

UNEXPECTED SITUATION	CONSEQUENCE	NECESSARY ACTION
Inlet pressure gauge of the pressure reducing valve does not indicate sufficient pressure	The pressure vessel is empty. The valve on the pressure vessel is closed.	Replace the pressure vessel. Open the valve on the pressure vessel.
The required pressure cannot be set on the outlet pressure gauge of the pressure reducing valve.	The pressure in the pressure vessel has blocked the adjusting valve. Failure of the adjusting valve. Failure of the outlet pressure gauge.	Open the relief valve for a short time (1 s) and try to set the pressure again. Replace the pressure reducing valve. Replace the pressure reducing valve.
The inflation hose of the pressure reducing valve does not allow proper insertion into the controller's connection coupling	There is dirt in the connector or coupling. The connector or coupling is damaged.	Clean the connector and coupling. Replace the pressure reducing valve or controller.
The connecting hose does not allow proper insertion into the controller's connection couplings.	There is dirt in the connectors or couplings. The connectors or couplings are damaged	Clean the connectors and couplings. Replace the hose or controller.
The lifting bag does not inflate despite the activated lever for lifting.	Failure of the safety valve. The connector or coupling is blocked with dirt. The inflation hose or connecting hoses are not properly connected.	Replace the controller. Clean the connector or coupling. Check and re-connect the inflation or connecting hoses.

UNEXPECTED SITUATION	CONSEQUENCE	NECESSARY ACTION
The lifting bag does not deflate despite the activated lever for lowering.	The coupling's connectors are blocked with dirt.	**WARNING!** **The following procedure requires extreme caution!** 1. Check again if the load is properly and securely supported. 2. Close the valve on the pressure vessel. 3. Deflate all lifting bags connected to the controller. 4. Disconnect the connecting hose on the lifting bag which is not deflating very carefully 5. If the lifting bag is still not deflating, use a metal needle, from a safe distance, to clean and/or release the connector of the lifting bag.
The last periodic test as specified by the manufacturer has not been carried out.	Failure to follow the instructions for use.	**WARNING!** **The use of the lifting bag system that has not been properly tested is strictly forbidden.** Before using the lifting bag system, ensure that a periodic test is carried out in accordance with the manufacturer's requirements.

NOTES

Trelleborg is a leading global provider of solutions and engineered products made from polymer materials that provide sealing, damping and protection at critical points in demanding environments. Its innovative solutions sustainably improve business performance of customers.

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November 2022

TRELLEBORG INDUSTRIAL SOLUTIONS
TRELLEBORG SLOVENIJA

Attachments to the user manual

LIST OF ATTACHMENTS

ATTACHMENT 1: WARRANTY STATEMENT

1. GENERAL TERMS AND CONDITIONS

1.1. These warranty terms and conditions apply as for Environmental protection and rescue products, manufactured by TBSLO, Product Area Environmental protection and rescue products (hereinafter Products). If any provision of this warranty would be contrary to any mandatory legal provisions in any particular jurisdiction, such provision shall apply to a maximum extent as provided for by such mandatory legal provisions.

1.2. The Products which may be sold by TBSLO Product Area Environmental protection and rescue products but are not manufactured by it are not covered by this warranty and are sold exclusively with warranties, if any, by their original manufacturer.

2. MANAGEMENT OF THE PRODUCTS

2.1. In order to claim a remedy pursuant to this warranty, purchaser must conform to the instructions for management of the Products, available at https://www.trelleborgslovenija.com/en/products-and-solutions/environmental-protection-and-rescue-products/downloads/manuals.

3. WARRANTY

3.1. TBSLO warrants to the purchaser that for a period of twelve (12) months as of delivery of the Products, such Products shall be free from defects in material and workmanship, subject to normal use and management of the Products, including, among others, proper storage. For high-pressure lifting bags, the warranty period amounts to thirty-six (36) months as of delivery.

3.2. This warranty shall be in lieu of any other warranties, express or implied, including, but not limited to, any warranty of merchantability or fitness for a particular purpose.

4. EXCLUSION OF WARRANTY

4.1. Warranty shall be excluded in cases where the Products have not been used for the ordinary purpose or have been exposed to abnormal conditions such as, but not limited to misuse, mishandling (such as, but not limited to, cuts, tears, vandalism, fire, wilful destruction, improper installation and/or improper maintenance, misapplication), use of unauthorized components or attachments or if adjustments or repairs have been performed by anyone other than TBSLO or its authorized agents.

4.2. Warranty shall also be excluded and TBSLO shall not be held liable in case of force majeure, such as, but not limited to:

- war or threat of war, sabotage, insurrection, riots or requisition;
- all laws, restrictions, regulations, by-laws, prohibitions or any other measures by the governmental, parliamentary or local bodies;
- import and export regulations or embargo;
- strikes, lock-outs or other industrial measures or trade disputes (if including Manufacturer's employees or third party);
- difficulties with supply of raw materials, work force, fuel, parts or machinery;
- power blackout, break of machinery.

4.3. TBSLO shall not be held liable for any deficiencies in Products manufactured according to drawings, designs, project drafts and/or specifications provided by the purchaser.

4.4. Normal wear and tear are not covered by this warranty.

5. MAKING A WARRANTY CLAIM

5.1. Purchaser is obliged to take delivery of the Products and perform a careful inspection of the Product upon delivery.

5.2. Any claim by the purchaser with reference to the Products shall be deemed waived unless submitted in writing to TBSLO within the earlier of (I) eight days as of the discovery of the defect, or (II) twelve months as of the date of delivery of the Products or thirty-six (36) months as of delivery of high-pressure lifting bags. Identifying the defect is deemed to have occurred when a defect could have reasonably been detected by the purchaser.

5.3. Claim must contain at least the following information:
- part number,
- serial number,
- description of defect,

and must be substantiated by adequate evidence, such as pictures etc. Upon request, TBSLO must be allowed to inspect the Product.

5.4. To obtain performance under this warranty, any products suspected of having a manufacturing defect in materials or workmanship shall be returned freight prepaid for inspection to TBSLO, Product Area Environmental protection and rescue products, Škofjeloška c. 6, 4000 Kranj, Slovenia.

6. REMEDIES

6.1. TBSLO shall decide on a claim within forty–five days of receipt of the complete documentation and Product pursuant to art 5.

6.2. Providing TBSLO acknowledges the claim as justified, it shall, at its discretion, either:
- repair the Product,
- replace those components of the Product which are defective,
- replace the Product, if repair is not possible or reasonable,
- reimburse the consideration for the Product or its components which are defective.

6.3. Whenever TBSLO repairs or replaces the Product at its expense or reimburses the purchase price, it shall reimburse the purchaser, with a credit note, the same surface freight amount the purchaser had when returned the Product to TBSLO.

6.4. Remedies pursuant to this article 6 shall constitute the sole and exclusive remedy in the event of a breach of warranty. For the avoidance of doubt, TBSLO shall not be liable for any incidental, consequential and/ or non-pecuniary damages or damages having a comparable effect. TBSLO's aggregate liability in respect of any and all losses arising under or in connection to the contract/ purchase order/any similar document that is the basis for sale of Products, shall be limited to an amount equal to the invoiced price for the Products supplied. Any exclusions or limitations of liability are agreed to be extended for the benefit of all entities within TBSLO''s group.

7. CLOSING PROVISIONS

7.1. No statement or action by Trelleborg Slovenija, whether express or implied, other than set forth herein, shall constitute a warranty.

7.2. Any applicability of general terms and conditions used by the purchaser, wherever stated, is hereby explicitly excluded, notwithstanding any provisions of such general terms and conditions to the contrary.

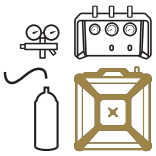
7.3. This warranty statement is subject to the laws of the Republic of Slovenia, with the exclusion of its conflict of law principles.

Kranj, 8 January 2019
Trelleborg Slovenija, d.o.o
PRODUCT AREA ENVIRONMENTAL
PROTECTION AND RESCUE PRODUCTS

ATTACHMENT 2: QUICK START GUIDE

Attachment 2 includes brief instructions for use of high-pressure lifting bags.

1.1. BRIEF INSTRUCTIONS FOR USE OF VEGA AND NOVA HIGH-PRESSURE LIFTING BAGS



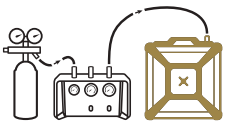
STEP 1

PROCEDURE

Prepare the Sava lifting bag, air source, controller, supply and connecting hoses where required.

WARNING

At the time of lifting/lowering loads and during the preparation for the procedure, only qualified persons may be present at the site. Other persons should keep away from the site of lifting.
Check the chosen Sava lifting bag for technical suitability.



STEP 2

PROCEDURE

Connect all the components.

WARNING

Pay attention to the pressure class of components. The 8 bar (116 psi), 10 bar (145 psi), 12 bar (174 psi) and 15 bar (218 psi) systems are not compatible.
In the case of an air source with more than 12 bar (174 psi) of pressure, the use of a pressure reducing valve is mandatory.

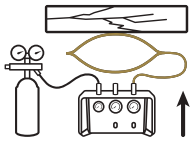
STEP 3

PROCEDURE

Insert the chosen Sava lifting bag under the load.

WARNING

Do not exceed the maximum number of lifting bags stacked on top of each other: with Sava lifting bags of SLK, SLK-L, SLK-H, Vega and Nova types, a maximum of two is allowed, and with Sava FLAT lifting bags of SFB-K and SFB-H types, a maximum of three. Always secure the stacked Sava FLAT lifting bags with connecting straps.



STEP 4

PROCEDURE

Lifting the load.

WARNING

Use control levers or valves on the controller and the associated pressure gauges for controlling the lifting/lowering procedure. Never exceed the maximum inflation pressure. Never inflate the Sava lifting bags without a load to more than 1 bar (14.5 psi). Interrupt lifting upon reaching the required lifting height or the maximum inflation pressure.

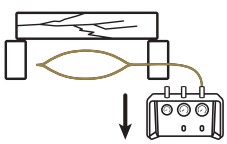
STEP 5

PROCEDURE

Place safety supports under the load.

WARNING

Never work under the load that is not secured with mechanical safety supports.



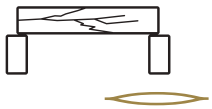
STEP 6

PROCEDURE

When the work is finished, deflate the Sava lifting bag completely.

WARNING

Keep the Sava lifting bags connected to the controller during deflation. Always use discharge levers on the controller for deflating the Sava lifting bag.



STEP 7

PROCEDURE

Remove the Sava lifting bag from the place of use, disconnect air supply and connecting hoses, weigh them down to squeeze the remaining air out, clean and check them.

Non-compliance with the instructions can result in various injuries. Carefully read the instructions for operation before using the lifting bag.

www.trelleborgslovenija.com/en/products-and-solutions/environmental-protection-and-rescue-products/downloads/manuals

PERSONAL PROTECTIVE EQUIPMENT
Always wear personal protective equipment when working with Sava lifting bags. Fire fighters and rescue team members shall wear a complete protective gear specified for their work. Other users shall wear protective helmet, protective goggles and gloves, as well as protective footwear.

TEMPERATURE RANGE OF USE:
Lifting bags should be used within the temperature range from -20 °C (-4 °F) to +80 °C (176 °F). The product may be used at lower temperatures down to -40 °C (-40 °F) for a maximum of 1 hour.

The standard version of Sava lifting bags is NOT intended for use in potentially explosive atmospheres.

CHOOSING THE RIGHT SAVA LIFTING BAG:
When choosing the right Sava lifting bag, refer to the technical data tables, the lifting characteristics and the labels on the lifting bags.

ATTACHMENT 3: MEDIA RESISTANCE TABLE

Attachment 3 contains the Media Resistance Table.

1.1. MEDIA RESISTANCE TABLE

The Media resistance table has been produced in accordance with ISO/TR 7620.

The table below summarises the most commonly used media in connection with high-pressure lifting bags. If the medium you are using is not listed in the table, please to ISO/TR 7620 or consult the manufacturer about the use of high-pressure lifting bag.

In the table, the impact of the medium on the product is indicated as in the figure below and serves as a guide for the selection of a high-pressure lifting bag according to the rubber it is composed of.

Figure 1:Impact of the medium on the rubber

Table 1:

MEDIA	CONCENTRATION [%]	TEMPERATURE [°C]	RUBBER TYPE
			NR/BR
Acetone		23	1
Acetylene			1
Ammonium hydroxide	10	23	1
	Conc.	23	1
Aniline		23	2
		100	4
Benzene		23	4
Boric acid	10	100	1
Brake fluid (vegetable)		50	1
Butanol		50	1
		100	4
Butyric acid			
Calcium hydroxide		100	1
Calcium hypochlorite	15		4
Hydrochloric acid	20	23	
Ethanol		50	1
Ether		23	4

MEDIA	CONCENTRATION [%]	TEMPERATURE [°C]	RUBBER TYPE
			NR/BR
Formaldehyde	40	23	1
	40	70	
Glycerol		100	1
Hexanol		23	1
Formaldehyde	30	23	1
	90		4
Kerosene		70	4
Methanol		50	1
Methyl chloride			4
Milk		23	1
Mineral oils No. 1		100	4
Mineral oils No. 2		100	4
Mineral oils No. 3		100	4
Petroleum		23	4
Natural gas			3
Dilute nitric acid	10	50	2
Ozone (conc. 50 pphm)		40	4
Phenol		100	4
Phosphoric acid	60	50	2
Propanol		50	1
Sodium hydroxide	10	100	1
	25	100	1
Sodium hypochlorite	10	50	2
Sulphur hexafluoride			
Sulphuric acid (VI)	10	100	1
	20	23	1
	25	100	1
	50	100	1
	60	100	3
	75	100	4
	96	23	4
Toluene		23	4

ATTACHMENT 4 : TECHNICAL CHARACTERISTICS OF PRODUCTS

Attachment 4 includes technical data about high-pressure lifting bags VEGA and NOVA.

1.1. VEGA HIGH-PRESSURE LIFTING BAGS

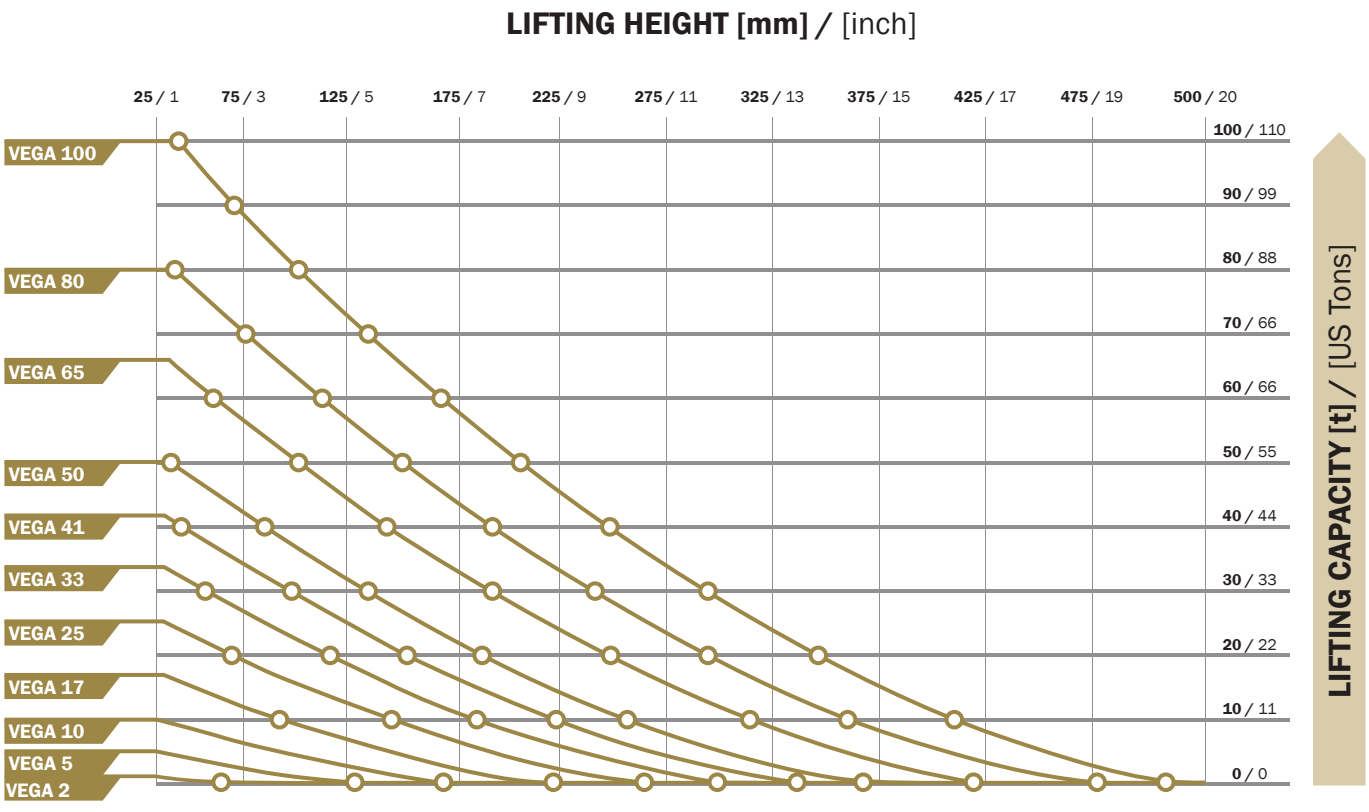
Technical data table

Table 1: Technical data table for VEGA high-pressure lifting bags

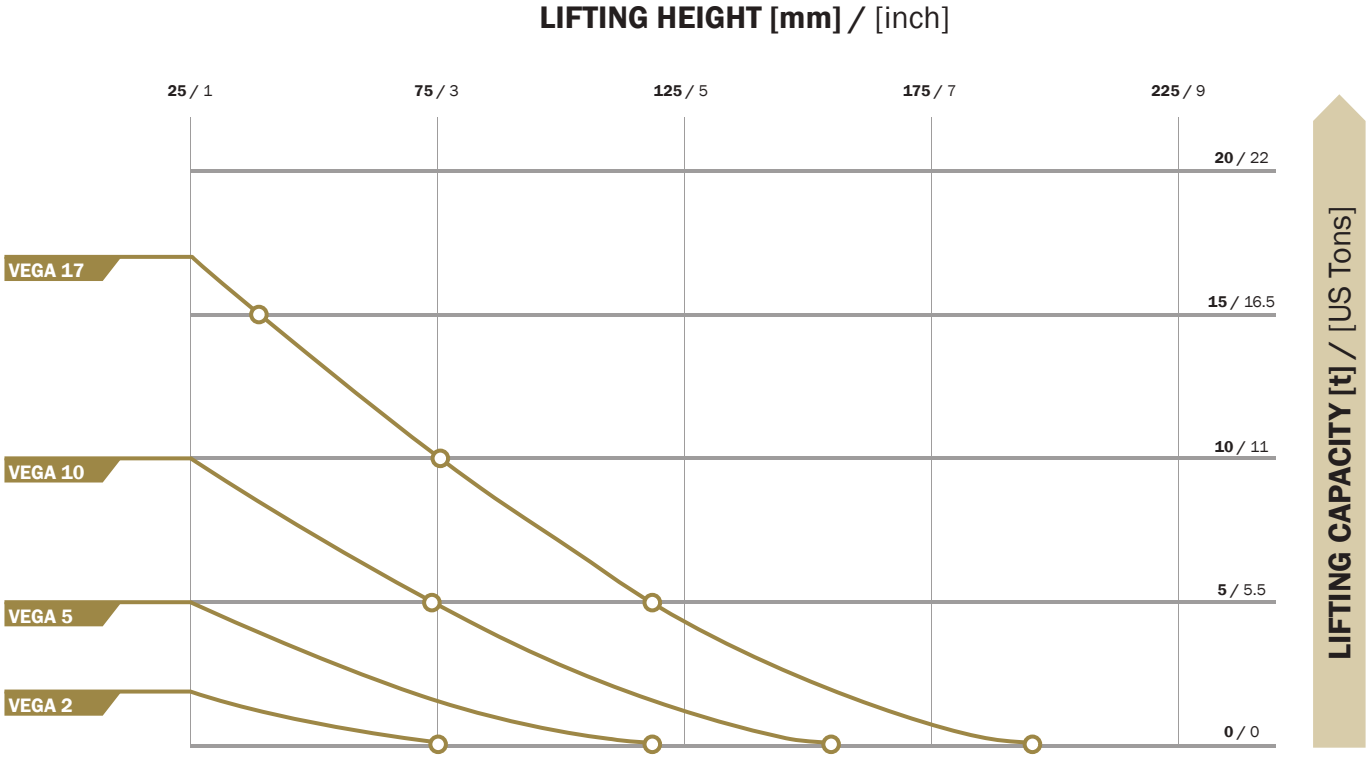
TYPE	PART NUMBER	DIMENSIONS			WEIGHT	WORKING PRESSURE	AIR REQUIREMENT	MAX. LIFTING CAPACITY	MAX. LIFTING HEIGHT
		LENGTH	WIDTH	HEIGHT					
		[cm] / [inch]	**[cm]** / [inch]	**[cm]** / [inch]	**[kg]** / [lbs]	**[bar]** / [psi]	**[l]** / [cu./Ft.]	**[t]** / [US Tons]	**[cm]** / [inch]
VEGA 2	608046	**15** / 6″	**15** / 6″	**2.2** / 0.9″	**0.5** / 1.2	**12** / 174	**4.5** / 0.16	**1.4** / 1.5	**8** / 3″
VEGA 5	608047	**23.5** / 9.2″	**23.5** / 9.2″	**2.2** / 0.9″	**1.2** / 3	**12** / 174	**22.4** / 0.79	**4.9** / 5.4	**13** / 4.9″
VEGA 10	608049	**32** / 12.6″	**32** / 12.6″	**2.5** / 1″	**2.5** / 5.5	**12** / 174	**63.4** / 2.24	**9.8** / 10.8	**17** / 6.9″
VEGA 17	608050	**40** / 15.7″	**40** / 15.7″	**2.5** / 1″	**4** / 8.8	**12** / 174	**131.7** / 4.65	**16.7** / 18.4	**22** / 8.5″
VEGA 25	608051	**48** / 18.9″	**48** / 18.9″	**2.5** / 1″	**5.7** / 12.6	**12** / 174	**236** / 8.33	**25.1** / 27.6	**26** / 10.4″
VEGA 33	608052	**55** / 22″	**55** / 22″	**2.5** / 1″	**7.5** / 16.5	**12** / 174	**365** / 12.89	**33.2** / 36.5	**30** / 11.9″
VEGA 41	608053	**61** / 24″	**61** / 24″	**2.5** / 1″	**9.3** / 20.5	**12** / 174	**681** / 24.05	**41.2** / 45.3	**34** / 13.2″
VEGA 50	608054	**67** / 26.4″	**67** / 26.4″	**2.5** / 1″	**11.2** / 24.7	**12** / 174	**897** / 31.68	**50.2** / 55.2	**37** / 14.4″
VEGA 65	608055	**76** / 30″	**76** / 30″	**2.7** / 1.1″	**15.5** / 34.2	**12** / 174	**1010** / 35.67	**65.2** / 71.7	**41** / 16.3″
VEGA 80	608056	**84** / 33″	**84** / 33″	**2.7** / 1.1″	**19** / 41.9	**12** / 174	**1381** / 48.77	**80.2** / 88.2	**46** / 17.9″
VEGA 100	608057	**93** / 36.5″	**93** / 36.5″	**2.7** / 1.1″	**23.3** / 51.4	**12** / 174	**1895** / 66.92	**100.2** / 110.2	**51** / 20.1″

Lifting characteristics

Graph 1: Lifting characteristics of VEGA high-pressure lifting bags



Graph 2: Lifting characteristics of VEGA 2, VEGA 5, VEGA 10 and VEGA 17 high-pressure lifting bags



1.2. NOVA HIGH-PRESSURE LIFTING BAGS

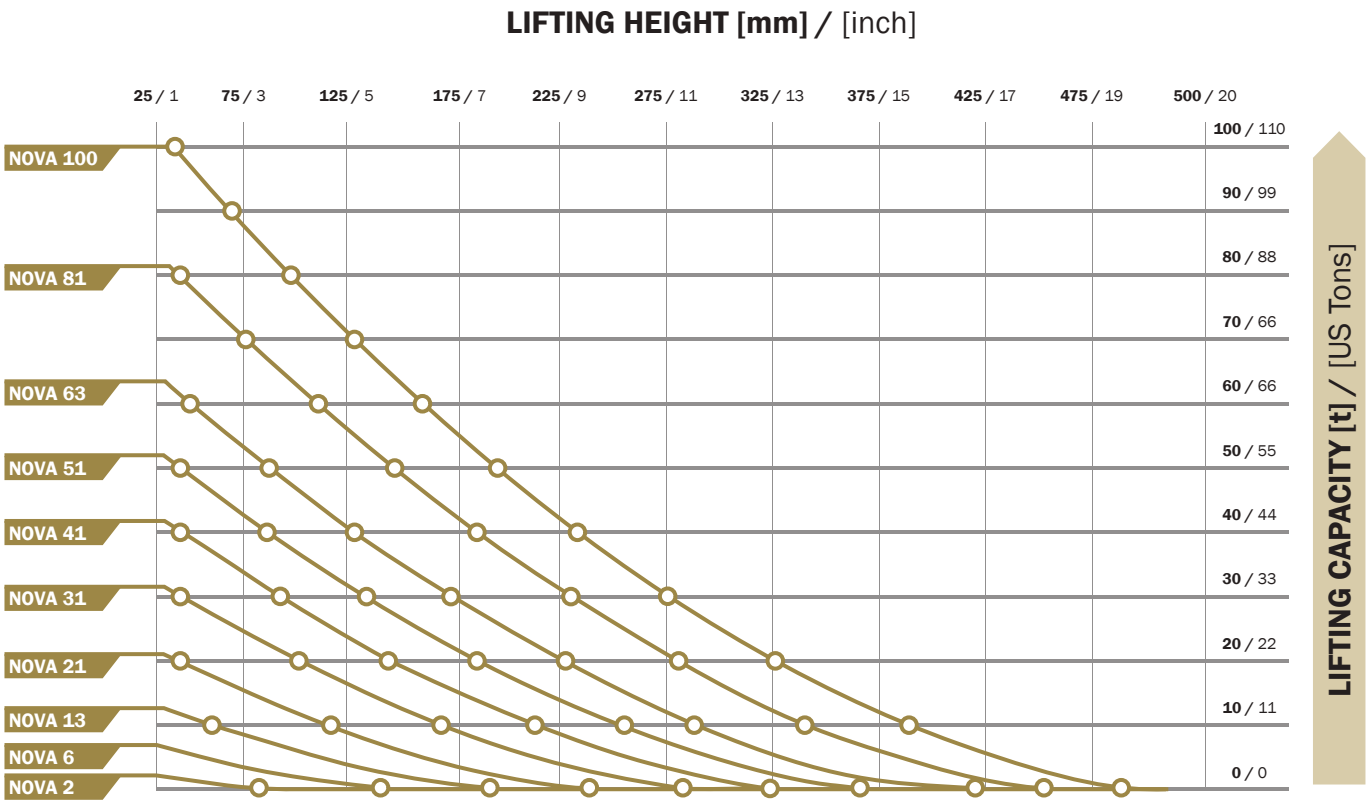
Technical data table

Table 2: Technical data table for NOVA high-pressure lifting bags

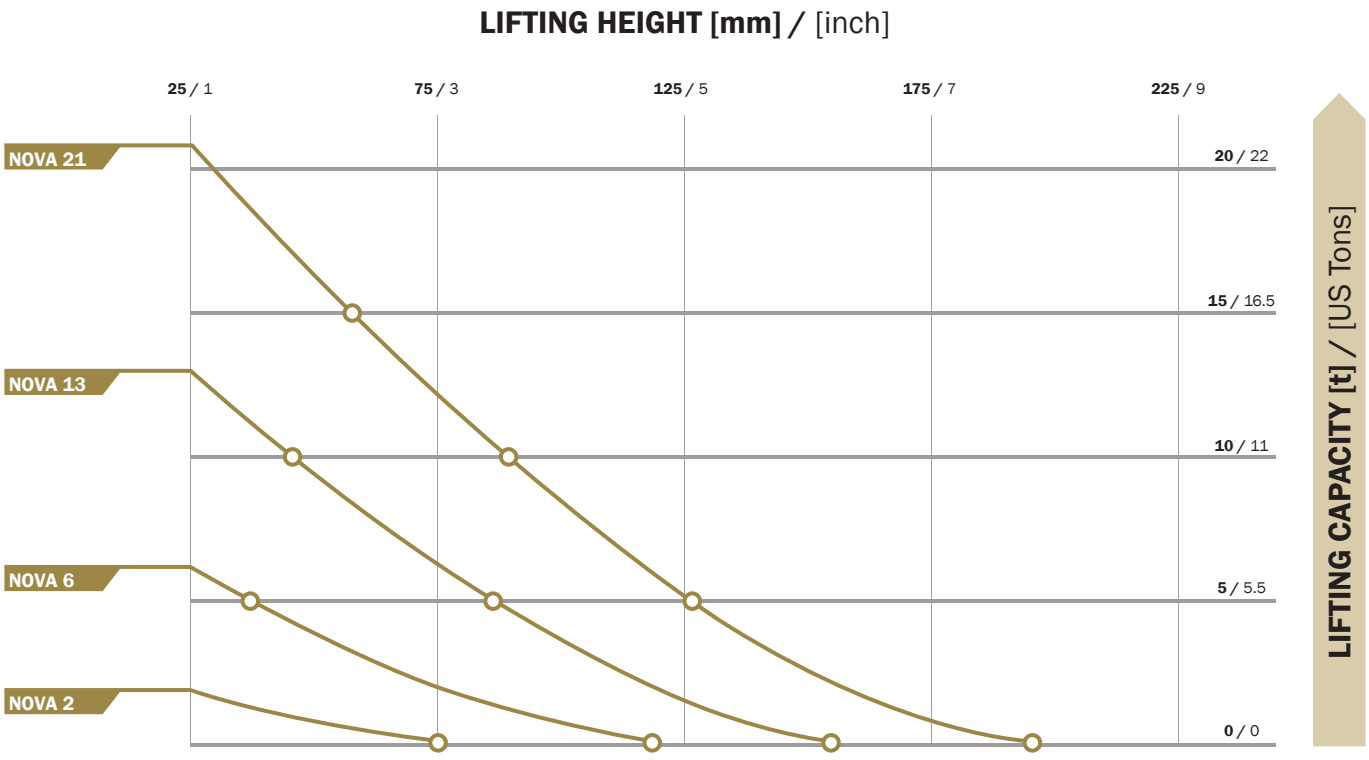
TYPE	PART NUMBER	DIMENSIONS			WEIGHT	WORKING PRESSURE	AIR REQUIREMENT	MAX. LIFTING CAPACITY	MAX. LIFTING HEIGHT
		LENGTH	WIDTH	HEIGHT					
		[cm] / [inch]	[cm] / [inch]	[cm] / [inch]	[kg] / [lbs]	[bar] / [psi]	[l] / [cu./Ft.]	[t] / [US Tons]	[cm] / [inch]
NOVA 2	608061	**15** / 6″	**15** / 6″	**2.2** / 0.9″	**0.5** / 1.2	**15** / 218	**5.2** / 0.18	**1.7** / 1.9	**8** / 3″
NOVA 6	608062	**23.5** / 9.2″	**23.5** / 9.2″	**2.2** / 0.9″	**1.2** / 3	**15** / 218	**25.8** / 0.91	**6.2** / 6.8	**13** / 4.9″
NOVA 13	608063	**32** / 12.6″	**32** / 12.6″	**2.5** / 1″	**2.5** / 5.5	**15** / 218	**73.2** / 2.59	**12.3** / 13.5	**17** / 6.9″
NOVA 21	608064	**40** / 15.7″	**40** / 15.7″	**2.5** / 1″	**4** / 8.8	**15** / 218	**152** / 5.37	**20.5** / 22.6	**22** / 8.5″
NOVA 31	608065	**48** / 18.9″	**48** / 18.9″	**2.5** / 1″	**5.7** / 12.6	**15** / 218	**273.4** / 9.66	**31.2** / 34.3	**26** / 10.4″
NOVA 41	608066	**55** / 22″	**55** / 22″	**2.5** / 1″	**7.5** / 16.5	**15** / 218	**422** / 14.9	**41.3** / 45.4	**30** / 11.9″
NOVA 51	608067	**61** / 24″	**61** / 24″	**2.5** / 1″	**9.3** / 20.5	**15** / 218	**585** / 20.66	**51.4** / 56.5	**34** / 13.2″
NOVA 63	608068	**67** / 26.4″	**67** / 26.4″	**2.5** / 1″	**11.2** / 24.7	**15** / 218	**786** / 27.76	**63.2** / 69.5	**37** / 14.4″
NOVA 81	608069	**76** / 30″	**76** / 30″	**2.7** / 1.1″	**15.5** / 34.2	**15** / 218	**1167** / 41.21	**81.5** / 89.7	**41** / 16.3″
NOVA 100	608070	**84** / 33″	**84** / 33″	**2.7** / 1.1″	**19** / 41.9	**15** / 218	**1595** / 56.33	**100.3** / 110.3	**46** / 17.9″

Lifting characteristics

Graph 3: Lifting characteristics of NOVA high-pressure lifting bags



Graph 4: Lifting characteristics of NOVA 2,NOVA6, NOVA 13 and NOVA 21 high-pressure lifting bags



ATTACHMENT 5: LIST OF ACCESSORIES

Attachment 5 includes a list of accessories to be used with high-pressure lifting bags.

Use high-pressure lifting bags with the original accessories available from the manufacturer.

Table 1: List of accessories

CODE	NAME
609798	Controller 2 EXP 12
609802	Controller 3 EXP 12
609799	Controller 2 EXP 15
609803	Controller 3 EXP 15
613218	EXP controller case
616092	EXP lamp
609794	Pressure reducing valve 300-12 bar
609795	Pressure reducing valve 300-15 bar
611200	Hose for pressure reducing valve
611187	Inflation hose, 12 bar, 5 m, red
611188	Inflation hose, 12 bar, 10 m, red
611183	Inflation hose, 12 bar, 5 m, yellow
611184	Inflation hose, 12 bar, 10 m, yellow
611185	Inflation hose, 12 bar, 5 m, blue
611186	Inflation hose, 12 bar, 10 m, blue
611189	Inflation hose, 12 bar, 5 m, grey
611190	Inflation hose, 12 bar, 10 m, grey
611195	Inflation hose, 15 bar, 5 m, red
611197	Inflation hose, 15 bar, 10 m, red
611191	Inflation hose, 15 bar, 5 m, yellow
611192	Inflation hose, 15 bar, 10 m, yellow
611193	Inflation hose, 15 bar, 5 m, blue
611194	Inflation hose, 15 bar, 10 m, blue
611198	Inflation hose, 15 bar, 5 m, grey
611199	Inflation hose, 15 bar, 10 m, grey

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