TRELLEBORG

User manual

Low and medium pressure lifting bags

Sava

The system of Sava low- and medium pressure lifting bags of the 0.5 and 1.0 bar series is used particularly for rescuing persons captured in various circumstances where classical rescue methods are not applicable or would be too time-consuming. The system is excellently suitable for use on soft surface, uneven and gravel, as well as snowy and icebound surfaces.

The combination of built-in materials assures high level of safety during use. The bottom and the top of the bag are made from a relatively thick multi-layer fabric-reinforced rubber plate, which is well resistant to punctures. The lateral wall is made from a polyamide fabric, which assures a safety factor of 2.6 (working pressure / burst pressure).

- Always read instructions before use.
- To assure safe work always carefully supervise the lifting procedure and prior to it choose a position that will provide the maximum stability.
- Choose a proper bag size.
- Always use accurately calibrated pressure gauges.
- Never exceed the inflation pressure of 0.5 bar or 1.0 bar (7.4 psi or 14.7 psi).
- Always use an inflation hose long enough to inflate the bag from a safe distance.
- Never work under a load without safety supports.
- Never place bag on top of each other, but only parallel.
- Never use aggressive cleaning agents or solvents or sharp objects for dirt removal.

Non-observing the instructions could result in injuries to people and damages to bags.

This brochure includes technical information about lifting bags and basic instructions for their use. The selection and use of lifting bags depend on different factors such as lifting requirements, capacity, lifting height, object shape. The manufacturer is not held responsible for injuries to people and damages to objects resulting from the incorrect or unsuitable use of lifting bags and accessories.

Illustrations next to the text are solely informative. Actual conditions for lifting techniques and characteristics depend on a particular application and differ from case to case.

RECOMMENDATIONS FOR SAFE AND EFFICIENT WORK

When using lifting bags, always wear protective clothing and equipment. Firemen and rescue-team members must be equipped to suit the requirements of their work, other users should wear safety helmets, safety glasses and gloves or other equipment, if required. Only qualified personnel may manipulate lifting bags.

Proper transportation and storing of bags are of great importance. Lifting bags are stored in special sacks, two bags are placed horizontally in one sack so that the inflation nozzles always face the user and the opening of the bag, respectively (Fig. 1). When transporting the sack the inflation nozzle should always be turned upwards to prevent any possible damages in case of a fall. Larger and heavier bags should be carried by two persons.

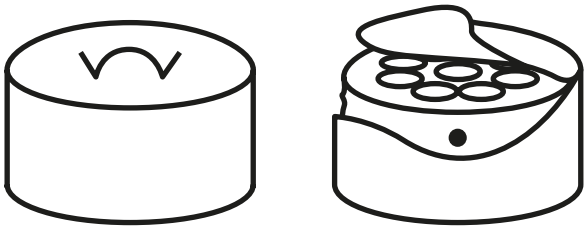

Fig. 1

When the surface temperature of the object to be lifted exceeds 55 °C, the part of the air bag in contact with the object is to be protected with a fibre board or heat-resistant coating. Heat and temperatures exceeding the permitted level can damage the bag.

Even though it is simple to place and inflate the air bag, the operation in dark is dangerous. The work area is to be well illuminated. Sometimes, when due to shading the visibility is poor, even during the day, it is reasonable to use additional sources of light.

HOW DOES THE INFLATION SYSTEM OPERATE?

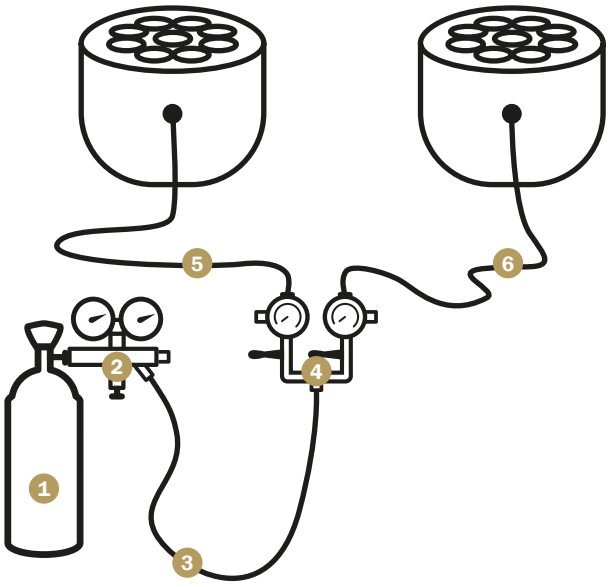

Fig. 2

With a pressure reducing valve set the pressure to 1.6 bar (23 psi) maximum prior to using the air bag. The inflation valves on the double controller (4) are to be closed. Connect the air bag to the distribution hoses (5 and 6) and place it correctly in the lifting area. Open left or right inflation valve on the double controller. During inflation check the working pressure on a pressure gauge and the air bag operation. After concluding lifting or separating, close the inflation valve on the controller (Fig. 2). To let off the air open the safety valve on the double controller (4). Remove the air bags from the site of use, inflate them to a pressure of 0.1 bar and clean them.

WORK WITH LOW AND MEDIUM PRESSURE BAGS

Fig. 3

1. The place where the air bag will be positioned should assure the maximum safety level and lifting stability. Clean the area of glass fragments and other foreign particles that might damage the air bag. Prevent the contact of the bag, especially the bag wall with sharp objects. Prevent contact of the bag, especially its sidewalls, with sharp object (Fig.3).

   When the air bag is to be put on a surface, from which it could slip due to oily spots or ice, cover that surface with sand or any other granulated material.

2. Insert the bag in a pre-arranged area or safety support (Fig. 4) to assure the maximum stability level and turn the inflation nozzle away from the object to be lifted and towards the user, respectively. Prior to inflation make sure that the bag contacts the bottom side of the object and that the bag walls lie between the upper and the lower contact surface, as well as that the upper and the lower contact surface lie centrically on top of each other. The undersized contact surface can cause the object to slip during the inflation, for the bag could considerably and with force shift from under the object to be lifted.

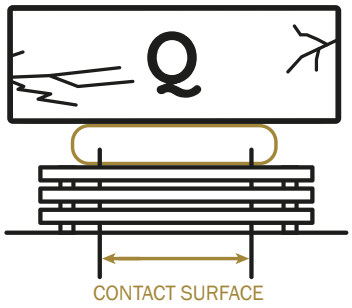

Fig. 4

3. During the process of air bag inflation, the air column, and, consequently, the lifting height, increase (Figure 5). The maximum height and force are accurately defined for each individual air bag and given in the technical data sheet. Due to the limiters installed inside the bag, the bag does not get the characteristic spherical shape during the inflation but remains cylinder-shaped. Prior to use the user should be familiar with the maximum lifting force and height in order to be able to choose the proper bag and to use it correctly.

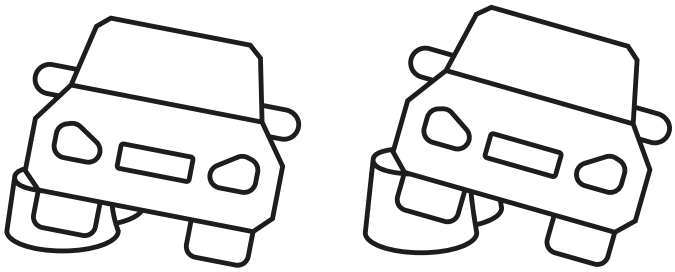

Fig. 5

4. Build and complete the safety support on each side of the bag to the point where it is impossible to insert another safety level (Fig. 6). In this way the distance is decreased from which the object could fall in case of a sudden air loss in the bag or a collapse of the inflation system.

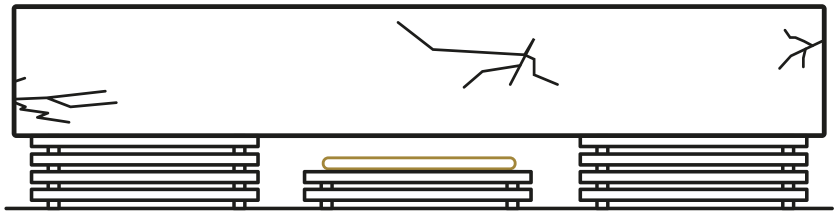

Fig. 6

5. Inflate the bag until it reaches the required height then insert safety supports up to the maximum possible height. (Fig. 7). If additional staff is available, it should insert the safety supports simultaneously with the inflation procedure.

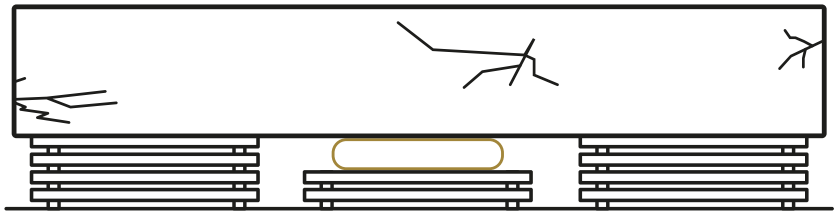

Fig. 7

6. Slowly deflate the bag until the object safely contacts the safety supports. Afterwards remove the bag and the support, if the required working space is under the lifting point.

During any lifting operation, the safety supports are of vital importance. Any work under a load supported only by the inflated air bag is strongly forbidden.

INCREASING THE LIFTING CAPACITY AND HEIGHT

It is wrong to believe that lifting capacity and height can be increased through placing air bags on top of each other. It is forbidden to stack one bag on top of each other, since the stability of the lifted load considerably decreases (Fig. 8).

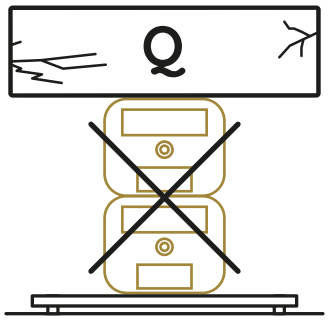

Fig. 8

The lifting capacity depends on the bag surface size, which is in contact with the lower side of the object to be lifted. It can be increased by:

- Combining two or more bags of the same dimensions placed parallel; all bags should be inflated simultaneously (Fig. 9);
- By replacing the bag with a larger bag (Fig. 10).

As shown in Fig. 9 four bags are placed next to the each other on a foundation. Each bag can lift approximately 4 tons, or four bags 16 tons in total. The load of 15 tons cannot be lifted with two bags, since their capacity is only 8 tons, therefore two additional bags should be used. With four equal bags a load of 16 tons can be lifted.

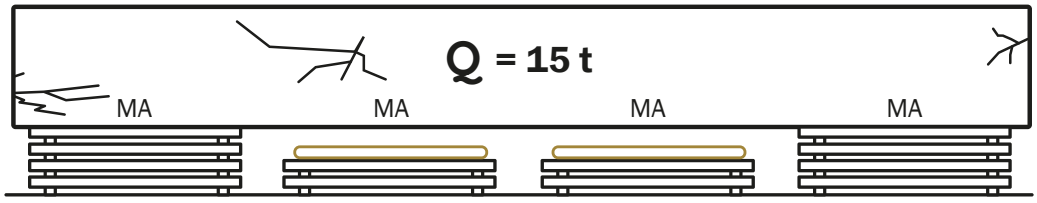

Fig. 9

Lifting height and capacity can be increased by using a larger bag with a higher lifting height and capacity (Fig. 10).

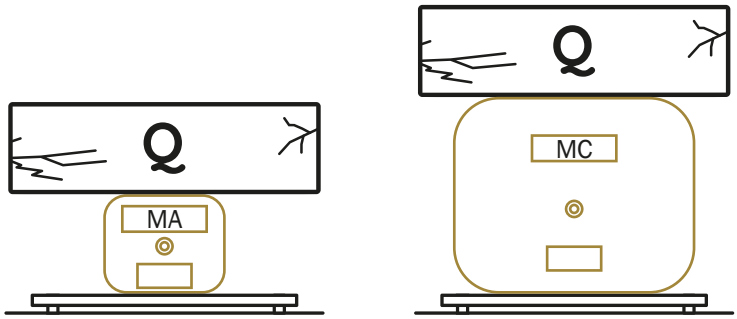

Fig. 10

Never place two bags on top of each other. By providing safety supports maximum lifting heights and lifting capacities can be achieved.

LIFTING OBJECTS OF UNUSUAL SHAPES

LIFTING PROFILES AND PIPES

When lifting a profile or a pipe with an air bag, problems occur as the object does not contact the entire surface of the bag. Moreover, steel or kevlar cord can be damaged, if twisted. For that reason a fibre-board is to be inserted between the air bag and the object to be lifted, in order to equally distribute the lifting force over the entire lifting surface of the air bag (Fig. 11).

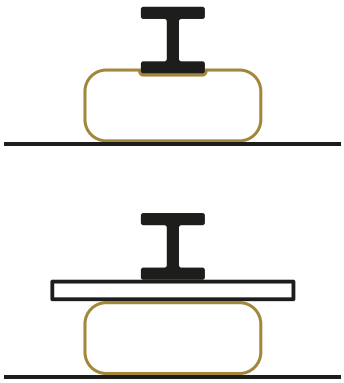

Fig. 11

LIFTING CYLINDRICAL OBJECTS

Lifting cylindrical and larger objects such as tanks is only possible when the tank is clamped so that it cannot turn aside. (Fig. 12).

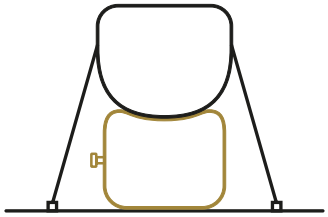

Fig. 12

SEPARATING AND PUSHING WITH A BAG

Air bags can also be used to separate and move objects, usually without any special difficulties. Problems arise with a thin-walled object, which could be bent or broken by the pressure of the air bag. For that reason, lean the bag against a rib, pillar or any other stiff element. If that is not possible, insert a thick fibreboard between the air bag and the object to distribute the pushing force on the larger surface (Figure 13).

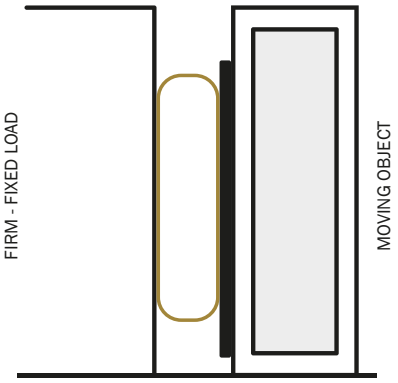

Fig. 13

CLEANING AFTER USE

Air bags are to be cleaned after each use. Oil or grease spots can cause air bags to slide, the presence of dirt in the nozzle disables the connection of hose. Before cleaning inflate the bag outdoor to approximately 0.1 bar internal pressure. In the upright position with the nozzle at the top, the air bag is to be knocked against the floor to shake off the dirt. Check the opening in the nozzle. If it is full of dirt, remove it using a thin piece of wire. Do not push the dirt inside the bag but draw it out.

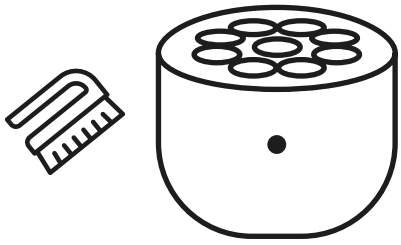

Fig. 14

To remove agglutinated dirt from the air bag surface, use a brush with soft bristles. Move the brush in all directions. Do not use sharp objects to remove dirt from the air bag surface.

After cleaning all the agglutinated dirt, soak the spots with a light solution of warm water and a detergent for washing the dishes, and remove the remaining dirt by using the brush. (Fig.14).

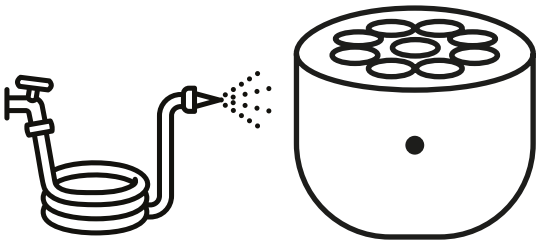

Fig. 15

Rinse the surface with warm, fresh water (Fig.15). Strong water jet shall remove all the dirt and detergent, which might have remained on the air bag surface.

With the air bag in the upright position, wipe the nozzle using a clean cloth. Let the air bag dry. Don’t speed up drying by putting the air bag in a drier or close to a source of heat.

CHECKING, STORING AND PREVENTIVE MEASURES

Adequate maintenance and care for air bags require more than cleaning after use. Air bags call for inspection, and preventive maintenance throughout the storage period.

CHECK-UP AFTER CLEANING

When dry, check the air bag for eventual air blisters, cuts or worn out segments that might be hidden under the dirt. If you observe any damage or defect, mark it with a chalk, and consult the manufacturer or an authorised service.

Check the nozzle for any damage, which could disable the connection. Replace the nozzle, if necessary.

STORING

Store the air bags in sacks, two bags horizontally in one sack. Insert the bags in the sack so that the inflation nozzle faces the user and the sack opening, respectively, in order to be able to handle the sack carefully. When transporting sacks with bags turn the inflation nozzles upwards to prevent any damages in case of a fall. Larger and heavier bags are to be carried by two persons.

PREVENTIVE MAINTENANCE

Provided that adequate care is taken of the air bags and they are properly stored, there is practically impossible for the air bags and the inflation system to fail in a critical moment. Periodically check all the segments essential for operation, and clean them; wipe metal parts using a soft cloth. During the check-up the entire set should be prepared for operation and inflated to a working pressure. Afterwards coat bag splices, connections and hoses with soap water to discover possible leakages. If you observe any damages of vital importance for the air bag's functioning, chalk it and consult the manufacturer or the nearest authorised service.

It is recommendable that an authorised person (manufacturer) tests the set.

TECHNICAL DATA

Low pressure bags 0.5 bar

TYPE	PART NUMBER	DIMENSIONS		WEIGHT	WORKING PRESSURE	NOMINAL CONTENT	AIR REQUIREMENT	MAX LIFTING CAPACITY	MAX. LIFTING HEIGHT	INFLATION VALVE
		DIAMETER	HEIGHT							
		[cm] / [inch]	[cm] / [inch]	[kg] / [lbs]	[bar] / [psi]	[l] / [cu./Ft.]	[l] / [cu./Ft.]	[t] / [US Tons]	[cm] / [inch]	Thread size
MS 45	527296	**102** / 40″	**10** / 4″	**16** / 35	**0.5** / 7.3	**368** / 13	**551** / 20	**4** / 4.4	**45** / 18″	R 1/2″-female
MS 122	527297	**135** / 53″	**10** / 4″	**30** / 66	**0.5** / 7.3	**1745** / 62	**2618** / 93	**7** / 7.7	**122** / 48″	R 3/4″-male
MS 210	527298	**145** / 57″	**10** / 4″	**43** / 95	**0.5** / 7.3	**3466** / 122	**5199** / 184	**9** / 9.9	**210** / 83″	R 3/4″-male

Medium pressure bags 1.0 bar

TYPE	PART NUMBER	DIMENSIONS		WEIGHT	WORKING PRESSURE	NOMINAL CONTENT	AIR REQUIREMENT	MAX LIFTING CAPACITY	MAX. LIFTING HEIGHT	INFLATION VALVE
		DIAMETER	HEIGHT							
		[cm] / [inch]	[cm] / [inch]	[kg] / [lbs]	[bar] / [psi]	[l] / [cu./Ft.]	[l] / [cu./Ft.]	[t] / [US Tons]	[cm] / [inch]	Thread size
MA	521478	**61** / 24″	**5** / 2″	**7.5** / 17	**1.0** / 14.5	**126** / 4	**251** / 9	**3** / 3.3	**43** / 17″	R 3/8″ - male
MB	521479	**76** / 30″	**5** / 2″	**12** / 27	**1.0** / 14.5	**268** / 9	**535** / 19	**4.7** / 5.2	**59** / 23″	R 3/8″ - male
MC	521481	**91** / 36″	**5** / 2″	**15** / 33	**1.0** / 14.5	**397** / 14	**793** / 28	**6.7** / 7.4	**61** / 24″	R 3/8″ - male
MD	521482	**122** / 48″	**8** / 3″	**35** / 77	**1.0** / 14.5	**1168** / 41	**2337** / 83	**12** / 13.2	**100** / 39″	R 3/8″ - male

NOTES

NOTES

Trelleborg is a world leader in engineered polymer solutions that seal, damp and protect critical applications in demanding environments. Its innovative solutions accelerate performance for customers in a sustainable way.

Trelleborg Industrial Solutions is a leading supplier of polymer-based critical solutions in selected industrial application areas and infrastructure projects.

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Trelleborg Slovenija d.o.o.
PG Environmental protection products

Škofjeloška cesta 6, 4000 Kranj, Slovenija

phone: +386 (0)4 206 6388
e-mail: tis.kra.info.eko@trelleborg.com
fax: +386 (0)4 206 6390

www.trelleborg.com/en/seals-and-profiles
www.trelleborg.com

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