



Instructions for use: Large sealing bags

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1.0. IDENTIFICATION

1.1. PRODUCT TYPE

Product types:

- Bags M1:
 - M1 – 1.5 bar
 - M1/6 - 6 bar
 - M1/10 - 10 bar
- Bags M2 – 1.5 bar



Figure 1: Identification of SAVA sealing bags, M type

1.2. MANUFACTURER



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2.0. PRODUCT DESCRIPTION

2.1. BASIC FUNCTIONS AND AREAS OF APPLICATION

SAVA sealing bags of M type can seal cracks on pipelines, gas lines, containers, barrels and various oval tanks of diameters larger than 480 mm. SAVA sealing bags should never be used for the objects, the carrying capacity of which is below 8 kg/cm².



Figure 2: Sealing bags of M1 type (left) and M2 (right)

SAVA sealing bags are rectangular, manufactured from a combination of soft natural and synthetic rubber, resistant to oil, oil products, acids, lyes and other atmospheric influences. A suitable cord structure provides for proper flexibility and strength of the bags. All sealing bags are equipped with a quick coupling for inflation and deflation and have ratchet straps integrated.

Various compressed air sources are available for inflation of SAVA sealing bags outdoors, such as compressors, compressed air bottles, foot pumps and others.

2.2. BASIC DATA

Table 1: Technical data about SAVA sealing bags, M type

TYPE	PART NUMBER	DIMENSIONS			WEIGHT	WORKING PRESSURE	SEALING SURFACE DIMENSIONS		SEALING PRESSURE	AIR REQUIREMENT
		LENGTH	WIDTH	HEIGHT			LENGTH	WIDTH		
		[cm] / [inch]	[cm] / [inch]	[cm] / [inch]			[cm] / [inch]	[cm] / [inch]		
M1- 1.5 bar / 22 psi	60043	62 / 24"	30 / 12"	2 / 0.8"	4.5 / 10	1.5 / 22	50 / 20"	30 / 12"	1.4 / 20	20 / 0.7
M1/6- 6 bar / 87 psi	291293	62 / 24"	30 / 12"	2 / 0.8"	4.6 / 10	6 / 87	50 / 20"	30 / 12"	5 / 73	50 / 1.8
M1/10-10 bar /145 psi	282293	62 / 24"	30 / 12"	2 / 0.8"	4.6 / 10	10 / 145	50 / 20"	30 / 12"	9 / 131	70 / 2.5
M2-1.5 bar / 22 psi	60350	62 / 24"	30 / 12"	2 / 0.8"	6.2 / 14	1.5 / 22	50 / 20"	30 / 12"	1.4 / 20	20 / 0.7

3.0. DEFINITIONS

Work area: A pipe diameter for which SAVA sealing bag is suitable for use.

Hook: A piece of metal curved at an angle at the end of the straps, for combining with other straps or attaching to SAVA sealing bag of M2 type.

Maximum working pressure: The maximum permissible pressure for inflation of SAVA sealing bags.

Pressure gauge: A device that indicates the pressure.

Damaged area: A damaged area on the object to be sealed.

Foot pump: A device for inflation of sealing bags, operated by using one's foot.

Ratchet strap: A strap for attaching and tightening SAVA sealing bag onto the damaged area

Inflation hose: A hose that conveys compressed air from the controller or foot pump to SAVA sealing bag.

Base plate: A rubber plate for protection of SAVA sealing bag against sharp particles and oil products.

Sealing bag: An inflatable rubber bag attached to a damaged object to seal leaks (usually on tanks or pipelines) utilising the compressed air.

Test pressure gauge: A pressure gauge with an integrated coupling for testing of the accessories.

Safety valve: A device that protects the system against excessive pressure.

Protective bag: A bag that protects SAVA sealing bag against chemicals.

4.0. TRANSPORT, STORING, WORK SAFETY AND RESTRICTIONS OF USE

4.1. TRANSPORT AND STORING

Products are packed in cardboard boxes with special protection of sensitive parts. When transported, they should be placed horizontally or vertically, make sure they are not twisted or folded. They should be stored in a dark and dry space, protected against extreme temperatures (see chapter 4.5).

4.2. SAFETY INSTRUCTIONS BEFORE USE



Please ensure you read and understand the instructions before using the product.



Rescue teams should be trained in accordance with the internal regulations applicable to training programmes for professional rescue teams. Other users should participate in training organised by the manufacturer or an authorised training provider.

4.3. REMOVAL OF PACKAGING

Do not use any sharp objects, such as knives, screwdrivers and similar, for removal of packaging as the product could get damaged.

4.4. DISPOSAL OF PACKAGING



Packaging is made of recyclable cardboard, which is why it should not be disposed but landfilled in waste bins for recycled paper or special containers for cardboard packaging.

4.5. STORING AND PROTECTION OF THE PRODUCT WHEN NOT IN USE

The products should be stored in a dry and dark place.



Storage temperature: +5 °C to +25 °C (+14 °F to +77 °F).

If carrying cases were also purchased, we recommend storing the products, which are not in operation, in these cases.

Make sure the products are not bent, inflation connections loaded or inflation hoses twisted during storing.

4.6. INSTRUCTIONS AND PERIODIC TEST REPORTS



Brief instructions and manufacturer's test report are enclosed with every product. Brief instructions for all types of product are enclosed with this document. SAVA recommends that they are laminated and a copy is kept next to the product.



The instruction manual should be retained throughout the service life of a product.

4.7. ENVIRONMENTAL CONDITIONS AND USAGE RESTRICTIONS



The temperature range of application is from -20 to +60 °C. The use of the product at temperatures below -20 °C, but not below -30 °C, is limited to 1 hour at the most, and at temperatures exceeding +60 °C to 30 minutes, yet the temperature may not exceed 70 °C.



The standard version of products is NOT suitable for use in potentially explosive environments.



Open flame and smoking are forbidden when using these product.

4.8. SAFETY AND PERSONAL PROTECTIVE EQUIPMENT

When working with SAVA sealing bags of M type, always wear personal protective equipment. Fire fighters and rescue team members should wear all of the specified protective equipment.

Other users should wear protective clothing, helmet, goggles gloves and protective footwear.





When working with SAVA sealing bags of M type in the area near hazardous substances, comply with applicable local guidelines, regulations and the legislation on the use of suitable protective equipment for a specific hazardous substance.

4.9. RECOMMENDATIONS FOR SAFE AND EFFICIENT WORK



Non-compliance with the instructions may lead to a risk to users and third persons, and may cause various injuries, which is why the instructions must be read and understood prior to using the product.



- Choose a suitable product type of proper size for intervening in a specific situation.
- Always use calibrated controllers or foot pumps, designated for work at the specified pressure.
- Inflate the product until it reaches the specified working pressure.
- Never inflate the product to the pressure that exceeds the maximum working pressure defined for the product.
- Monitor the pressure in the product throughout its use; if required, refill the product to correct the pressure.
- Always use the ratchet straps.
- The length of the inflation hose should enable inflation of the product from a safe distance.
- Always use all the safety equipment as specified.
- If hazardous substances are involved, use the protective equipment in accordance with the local regulations and standards on emergency response plans for accidents involving a specific hazardous substance.
- When the product is used in accidents involving hazardous substances, always act in accordance with the local regulations and standards on emergency response plans for accidents involving a specific hazardous substance.
- The product should not be used in any other way than as described in this instruction manual.

4.9.1. WORKING ENVIRONMENT



TEMPERATURE OF THE OBJECT TO BE SEALED

If the temperature of the object to be sealed or the liquid that is leaking exceeds 55 °C, protect the product with rubber plates to prevent damages due to the heat. The lowest temperature at which the product retains its performance and material properties is -20 °C.



LIGHTING IN THE PLACE OF WORK

It is dangerous to work in the dark, even though SAVA sealing bags of M type are simple to handle. Make sure that the place of work is properly illuminated and not in the shade. SAVA recommends the use additional lights when visibility is significantly poorer due to shade, even during the day. Do not use open flame for lighting in the dark.



RESTRICTED AREA - AUTHORISED PERSONNEL ONLY

Only qualified personnel are allowed to be present at work with SAVA sealing bags of M type. Other persons should keep out of the area where preparations for sealing and the actual sealing procedure take place. If an accident occurs that involves hazardous substances, the personnel using the products for interventions in accidents involving hazardous substances should be qualified for rescue operations in such accidents in accordance with the local regulations and standards. If additional risks are a threat to people and the environment (e.g. outbreak of fire due to a fuel leakage, moving of a container etc.), professional personnel must carry out all the required precautionary actions to minimise such risks.

4.9.2. RESISTANCE TO SUBSTANCES

Standard SAVA large sealing bags of M type are made from the Nr/Br material. Special SAVA large sealing bags of M type can be made from the CR material as well. The CR bags are marked with an orange dot. Sealing plates are made from CR. The resistance values of particular rubber material are shown in Table 2.

The resistance classification table is in compliance with the standard ISO/TR 7620. The effect of the media on the product is classified as:

1 NEGLIGIBLE	2 LOW	3 MEDIUM	4 SIGNIFICANT
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Table 2: Table of resistance of rubber materials to various substances

MEDIA	CONCENTRATION (%)	TEMPERATURE [°C] / [°F]	NR/BR	CR	NBR
Acetone		23 / 73.4	1	2	4
Acetylene			1	2	1
Ammonium hydroxide	10	23 / 73.4	1	1	1
	Conc.	23 / 73.4	1	1	2
Aniline		23 / 73.4	2	3	4
		100 / 212	4	4	4
Benzene		23 / 73.4	4	4	4
Boric acid	10	100 / 212	1	1	1
Brake fluid (vegetable)		50 / 122	1	1	4
		50 / 122	1	1	1
Butanol		100 / 212	4	3	1
				2	4
Butyric acid				2	4
Calcium hydroxide		100 / 212	1	1	2
Calcium hypochlorite	15		4	2	3
Chloric acid	20	23 / 73.4		4	4
Ethanol		50 / 122	1	1	1
Ether		23 / 73.4	4	4	2
Formaldehyde	40	23 / 73.4	1	1	1
	40	70 / 158			4
Glycerine		100 / 212	1	1	1
Hexanol		23 / 73.4	1	2	2
Hydrogen peroxide	30	23 / 73.4	1	1	1
	90		4	4	4
Kerosene		70 / 158	4	3	1
Methanol		50 / 122	1	1	1
Methyl chloride			4	4	4
Milk		23 / 73.4	1	1	1
Oil 1 (ASTM No.1, ISO 1817)		100 / 212	4	1	1
Oil 2 (IRM 902, ISO 1817)		100 / 212	4	2	1
Oil 3 (IRM 903, ISO 1817)		100 / 212	4	4	1
Naphtha		23 / 73.4	4	4	1
Natural gas			3	1	1
Nitric acid (diluted)	10	50 / 122	2	3	2
Ozone (conc. 50 ppm)		40 / 104	4	2	4
Phenol		100 / 212	4	4	4
Phosphoric acid	60	50 / 122	2	2	3
Propanol		50 / 122	1	1	2
Sodium hydroxide	10	100 / 212	1	1	1
	25	100 / 212	1	1	4
Sodium hypochlorite	10	50 / 122	2	3	3
Sulphur hexafluoride				1	1
Sulphuric acid (VI)	10	100 / 212	1	1	3
	20	23 / 73.4	1	1	3
	25	100 / 212	1	1	4
	50	100 / 212	1	1	4
	60	100 / 212	3	4	4
	75	100 / 212	4	4	4
96	23 / 73.4	4	4	4	
Toluene		23 / 73.4	4	4	4

5.0. WORK PROCEDURES

Prior to using SAVA sealing bags of M type, carefully read chapter 4, which describes the procedures for safe work and restrictions of use!

5.1. ASSEMBLY AND USE OF RATCHET STRAPS

Ratchet straps form part of the accessories of large SAVA sealing bags of M type and are already included in the following sets:

- M 1 set
- M 1/6 set
- M 1/10 set
- M 2 set

As part of the accessories, three types of straps are available (of various colours and lengths):

- Ratchet strap
- Hook strap
- Ratchet with a hook

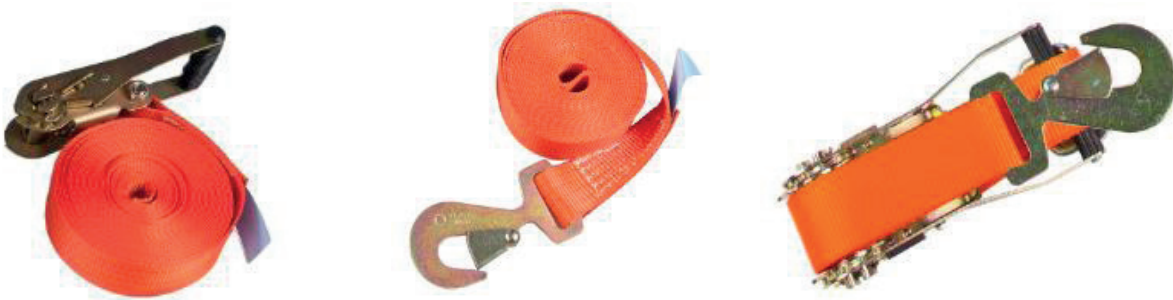


Figure 3: Ratchet strap (left), hook strap (middle) and ratchet with a hook (right)

5.1.1. SEALING BAG SAVA M 1 – 1.5 BAR

At least two ratchet straps are required with SAVA M 1 – 1.5 bar. It is recommended to use the straps of different colours but the same length.

Insert the straps through the openings in the bag, provided for inserting and feeding the straps.



Figure 4: The opening for strap insertion

Feed one strap through both openings on the side of SAVA sealing bag with the inflation connector, and the other strap through both openings on the opposite side. When feeding the straps through the openings, make sure the ratchets of both straps are correctly positioned on one side of SAVA sealing bag (see the picture below). The straps should not be twisted. The straps should be set on the side of the SAVA sealing bag with the label containing manufacturer's logotype and technical data.

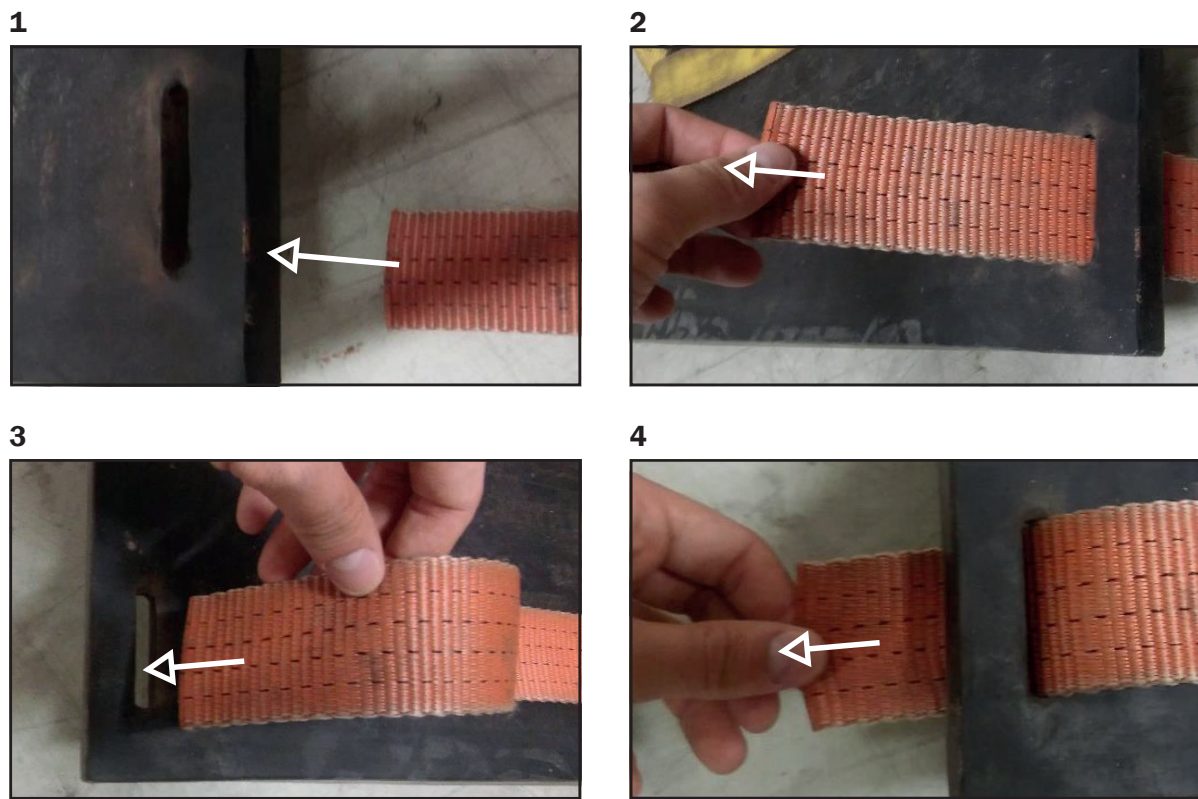


Figure 5: Feeding the strap through the holes of SAVA sealing bag



Figure 6: Incorrectly fed orange strap (left) and correctly fed strap (right)



Figure 7: Correctly positioned ratchets

5.1.2. DISMANTLING THE PRESSURE REDUCING VALVE

In addition to the two ratchet straps that are fed through the openings in the bags, an additional ratchet strap should be wrapped around the middle part of SAVA sealing bag 1/6 - 6 bar and M 1/10 - 10 bar.

For feeding ratchet straps through the openings, refer to the procedure for SAVA sealing bag M 1 – 1.5 bar.

The additional ratchet strap is wrapped around the middle part of SAVA sealing bag when the bag is already fastened onto the place to be sealed and before inflation.

To simplify positioning of the additional strap, SAVA sealing bag is marked. Position the strap between these marks. Make sure that the ratchet is positioned correctly and the strap is not twisted.



Figure 8: The mark for positioning the middle strap



Figure 9: The fastened SAVA sealing bag M 1/6 or M 1/10 with three straps

Before tightening the strap, make sure the ratchet does not touch SAVA sealing bag, if possible.

5.1.3. SAVA SEALING BAG M 2 – 1.5 BAR

Two hook straps and two ratchets with a hook are required for fastening SAVA sealing bag M 2 – 1.5 bar. SAVA recommends preparing two sets of a hook strap and a ratchet with a hook, each set of a different colour.

Attach both ratchets with hooks in the eyelet on one side of SAVA sealing bag and the hook straps on the other side. Make sure the hook strap and the ratchet of the same colour are attached and positioned correctly on one side.



Figure 10: The straps attached to the bag

Attach the hook across the eyelet of SAVA sealing bag.

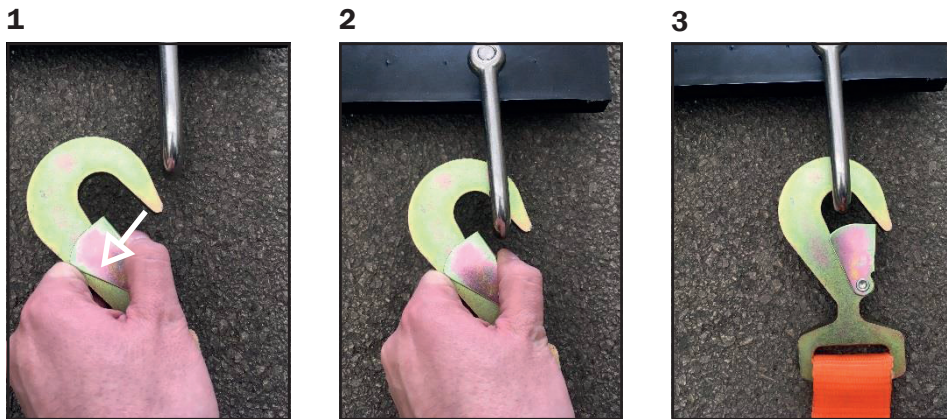


Figure 11: Attaching the hook

Remove the hook by pressing the lock on the hook and pull it out of the eyelet on SAVA sealing bag.

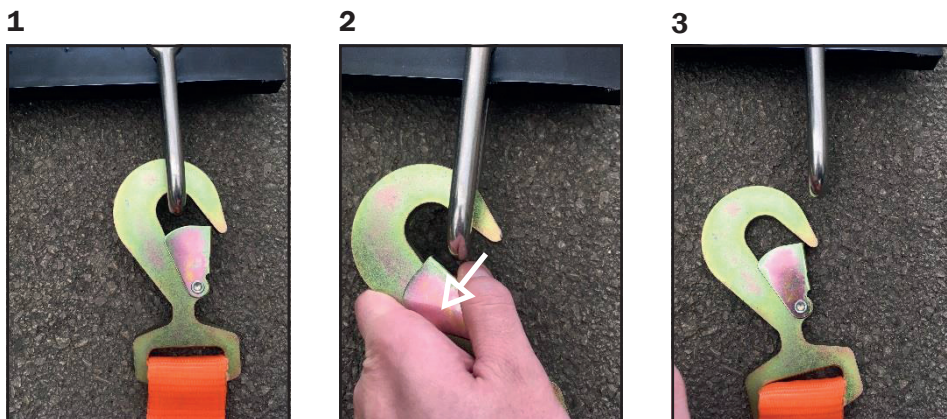


Figure 12: Removing the hook

5.2. OPERATING THE RATCHET

A ratchet is used for tightening the ratchet straps by means of which SAVA sealing bags of M type are attached on the place to be sealed.

5.2.1. TIGHTEN THE RATCHET

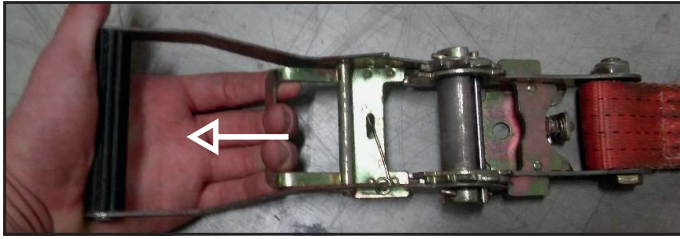
When not used, the ratchet is usually in its extended position. Before use, it should be moved in its medium working position



Figure 13: The ratchet in extended position

Use the release catch under the handle to extend the ratchet as shown in the picture below.

1



2



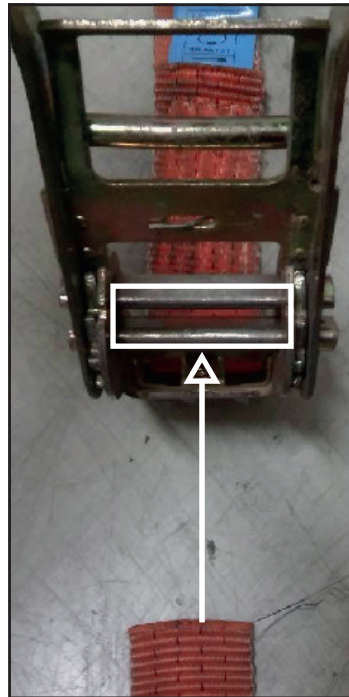
Figure 14: Move the ratchet in its medium working position

Attach the hook across the eyelet of SAVA sealing bag.

1



2



3

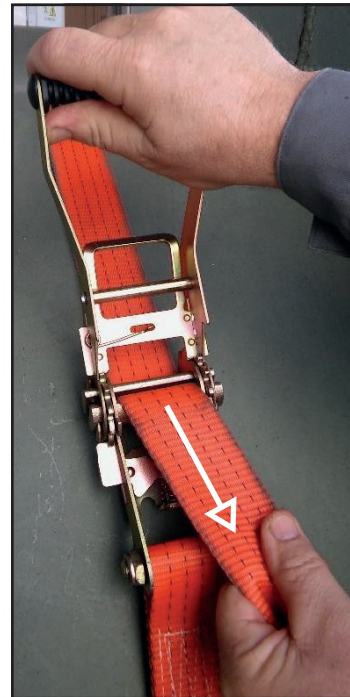


Figure 15: Feed the strap through the ratchet

Pull the strap tight by hand and then begin to tighten it using the ratchet. Crank the ratchet from its one to its other extreme position. The strap should be at least double-wound in the ratchet to ensure it is safely locked to prevent it from slipping. Only then release the ratchet strap.



Figure 16: Tighten using the ratchet

When the strap is fully tightened, move the ratchet into its extreme lock position: pull the handle under the ratchet and move it to the fully closed position.

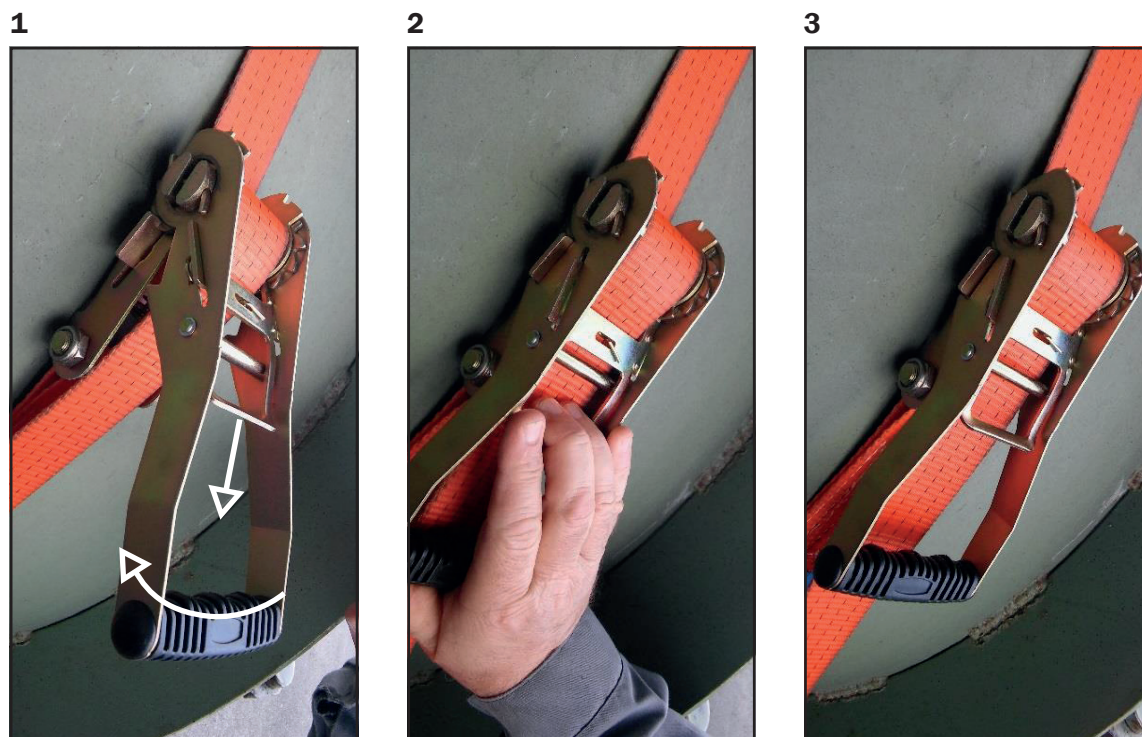


Figure 17: Lock the ratchet

5.2.2. RELEASE THE RATCHET

To release the ratchet, it should be moved from its closed to its working position. Pull the handle under the ratchet and move it away from the ratchet strap.

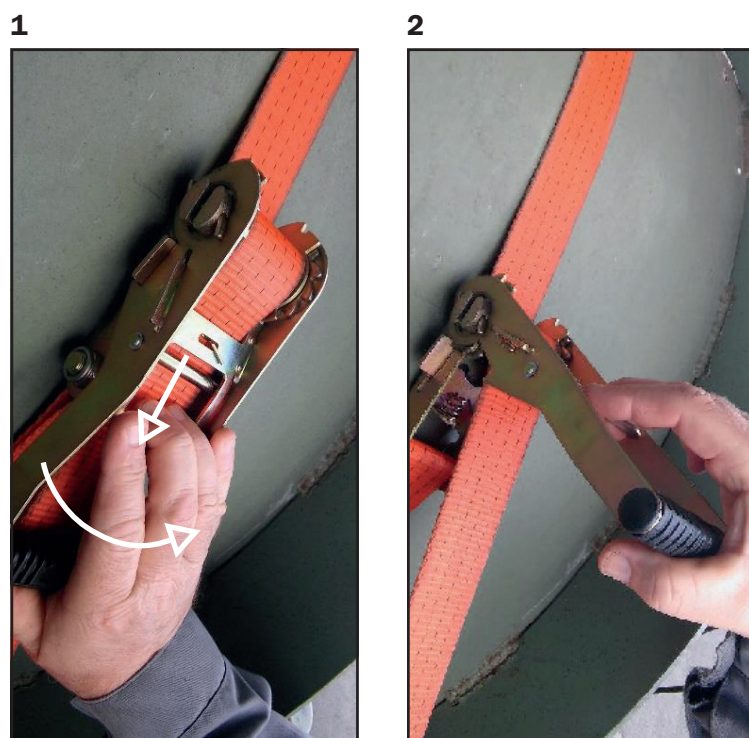


Figure 18: Move the ratchet from its closed to its working position

Afterwards fully extend the ratchet by moving it to its extreme open position, pulling the handle under the ratchet and spreading the ratchet.

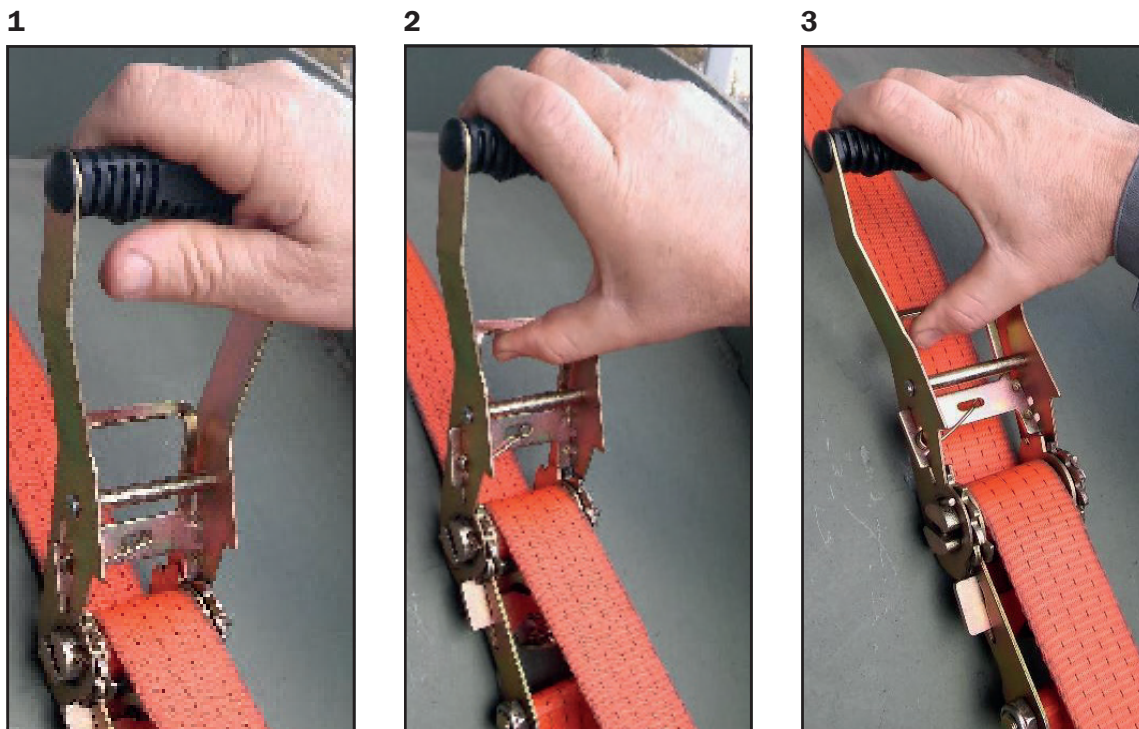


Figure 19: Fully extend the ratchet

When the ratchet is fully opened, pull the loose end of the strap and release it. Remove the entire strap from the ratchet.

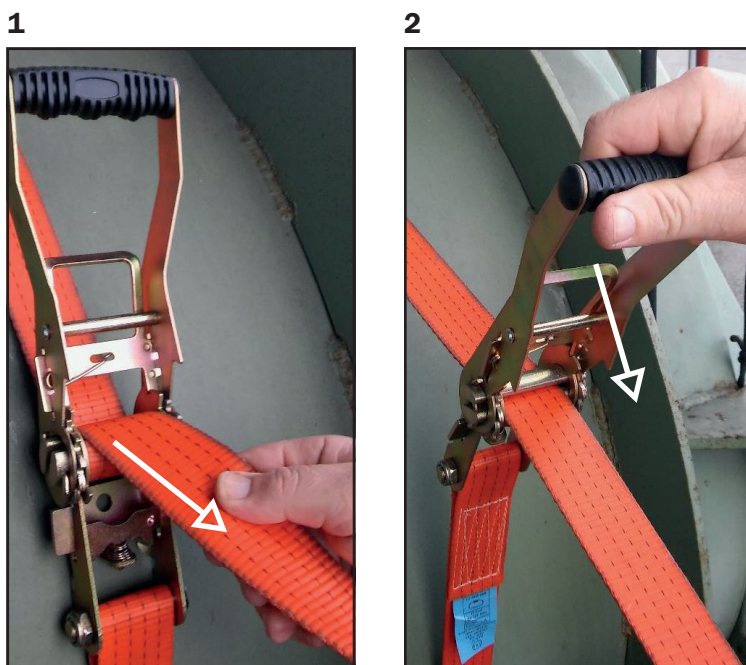


Figure 20: Release the ratchet strap

5.2.3. EXTENSION OF RATCHET STRAPS

If the straps, integrated in SAVA sealing bags, are too short, they can be extended by adding another ratchet strap.

Attach the loose end of the strap, integrated in SAVA sealing bag, to the ratchet of the additional ratchet strap, and connect the loose end of the additional ratchet strap to the ratchet fixed on SAVA sealing bag.

5.3. USE OF THE FOOT PUMP

SAVA sealing bags of M type are commonly inflated with a foot pump. Foot pumps form part of standard sets of SAVA sealing bags.

Three different types of foot pumps are available, operating at working pressure 1.5 bar, 6 bar or 10 bar. They differ in size, coupling typ, pressure gauge and safety valve; however, all three types are operated in the same way.

5.3.1. PREPARATION FOR USE

First release the special pin that locks the pedal of the foot pump. Press the foot pedal towards the ground and unpin the metal pin, after which the foot pedal is released.

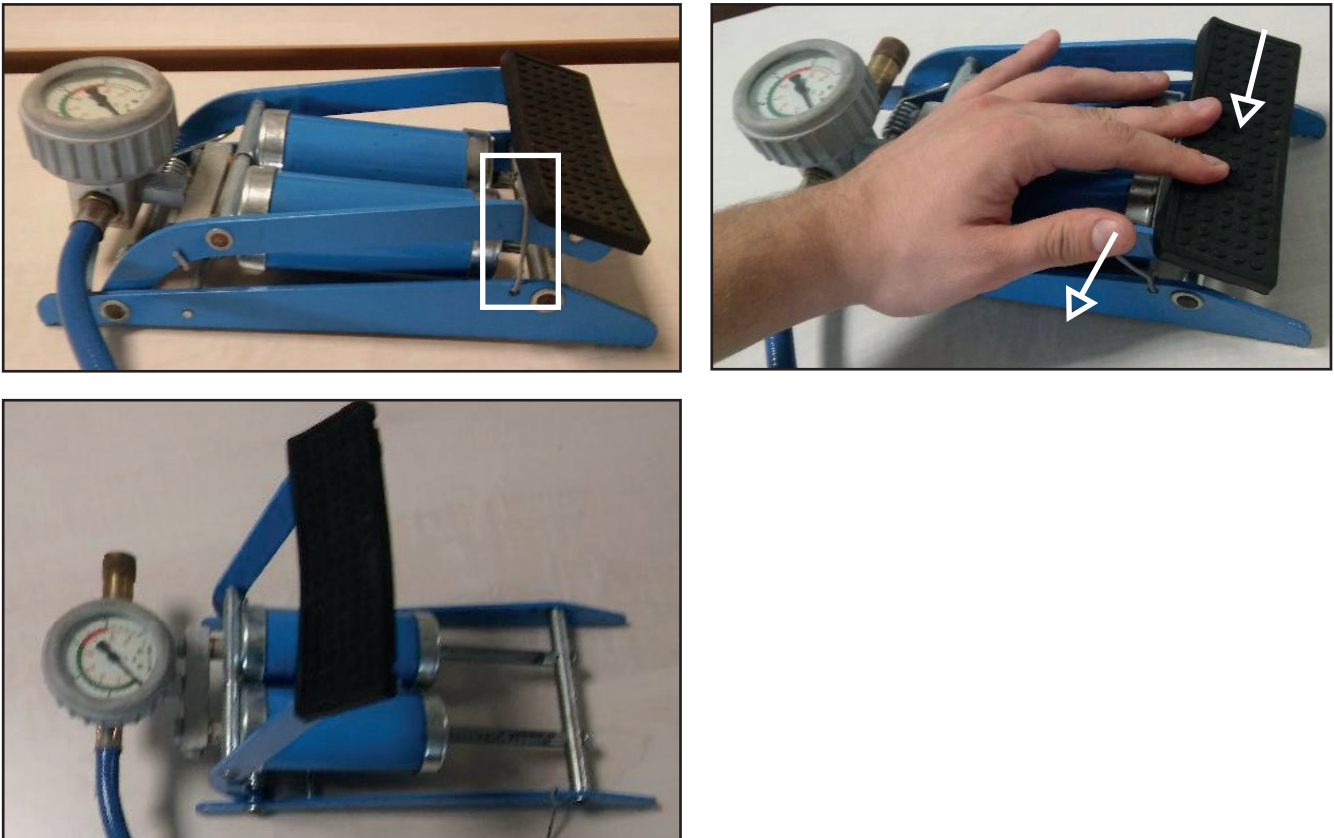


Figure 21: The marked pin of the foot pedal (top left), releasing the pin (top right), the released pedal of the foot pump (bottom)

Prior to using the foot pump, make sure that the lock screw on the safety valve end is in its closed position. To close the screw, turn it clockwise.

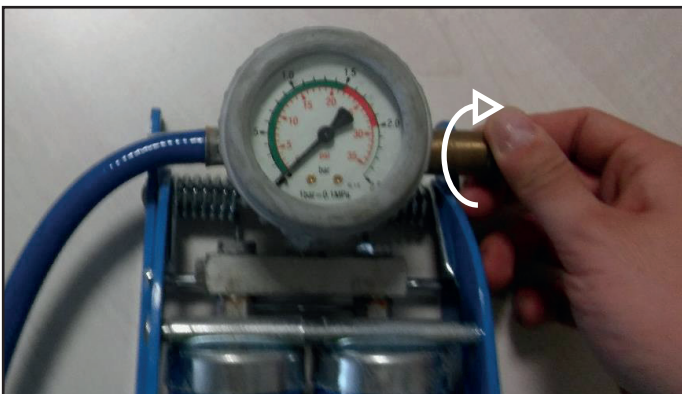


Figure 22: Check if lock screw is closed

5.3.2. CONNECTION AND INFLATION

First connect the foot pump and SAVA sealing bag. The foot pump can be connected directly to the sealing bag or, if required, an additional inflation hose can be added.



Figure 23: Inflation hose connected to SAVA sealing bag

Inflate the sealing bag by pushing – either by foot or hand – the pedal of the foot pump towards the ground and releasing it to its upper position. When released, the pedal automatically returns to its upper position.

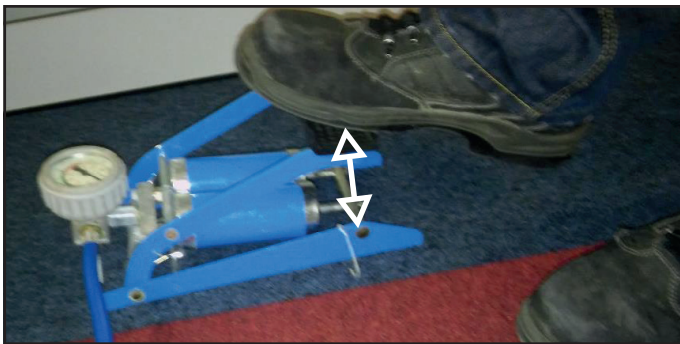


Figure 24: Inflate the sealing bag by pushing and releasing the foot pedal

Repeat the procedure until the required working pressure is reached. The working pressure is indicated on the pressure gauge.

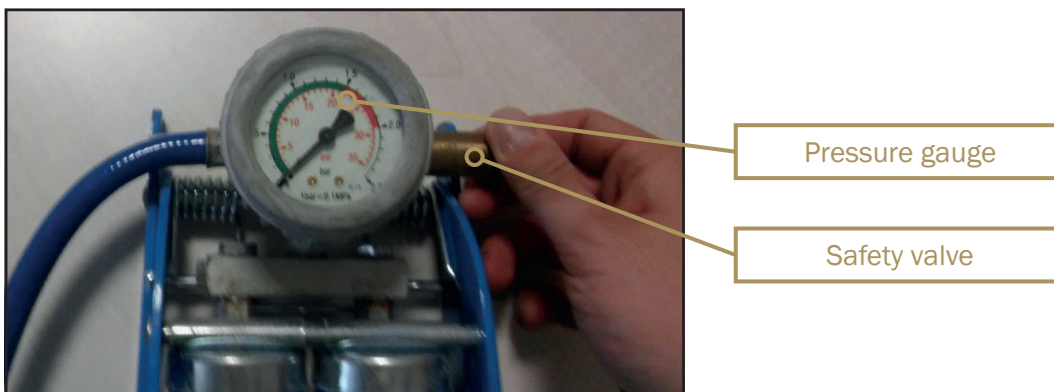


Figure 25: Pressure gauge and safety valve on the foot pump

If the pressure in the SAVA sealing bag is exceeded, the safety valve of the foot pump opens automatically to relieve excessive pressure.

5.3.3. EMPTYING, DISCONNECTION AND TIDYING UP

To deflate SAVA sealing bag connected to the foot pump, unscrew the lock screw on the safety valve end. To unscrew the lock screw, turn it anti-clockwise.

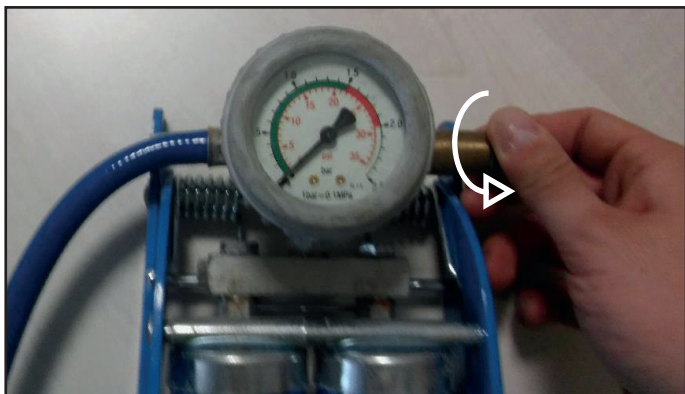


Figure 26: Open lock screw on the foot pump

When the emptying is finished, screw the stop valve on the foot pump by turning clockwise.

Afterwards disconnect the inflation hose from the coupling on SAVA sealing bag and lock the foot pedal in the lower position by pushing the pedal towards the ground and inserting the pin of the pedal in the pedal side.

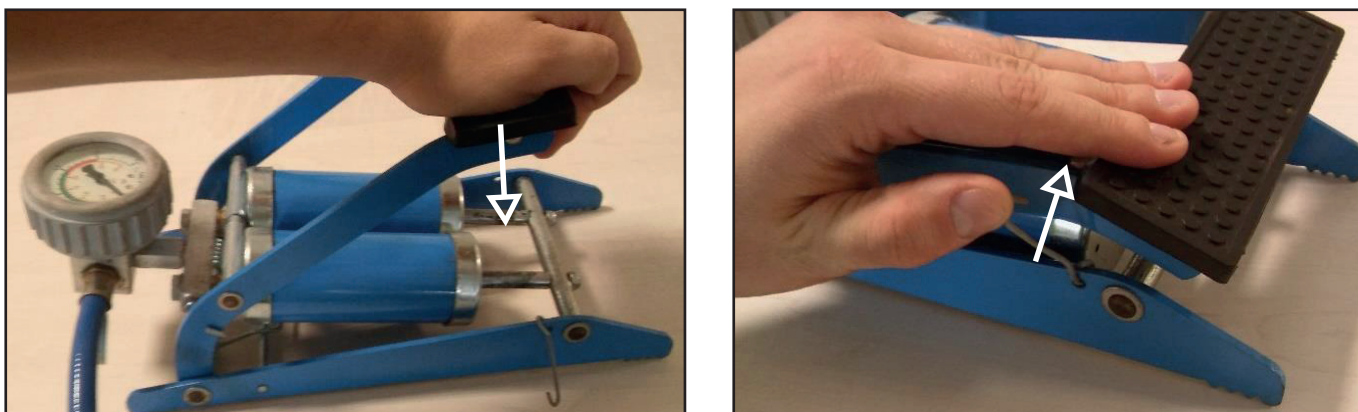


Figure 27: Lock the pedal in the lower position

5.4. USE OF SAVA SEALING BAGS OF M1 AND M2 TYPES

Before using the products, the user should read and understand:



Safety instructions before use , see chapter 4.2;
Environmental conditions and restrictions of use, see chapter 4.7;
Safety and personal protective equipment, see chapter 4.8;
Recommendations for safe and efficient work, see chapter 4.9.

5.4.1. POSITIONING OF SAVA SEALING BAGS

First attach the ratchet straps on SAVA sealing bags as described in chapter 5.1. Since fixing the ratchet straps on SAVA sealing bags of M1 type is rather time-consuming, we suggest equipping the bag with ratchet straps in advance.



Figure 28: SAVA sealing bags of M 1 (left) and M 2 (right) types with the attached ratchet straps

In the sealing procedure, a sealing plate, a protective bag or only SAVA sealing bag can be used.

If a leak is sealed with a sealing plate, first place the sealing plate on the damaged area and then SAVA sealing bag on the sealing plate. Make sure that the smooth surface of SAVA sealing bag faces the damaged area.



Figure 29: Sealing with using the sealing plate

If a leak is sealed with a protective bag, first insert SAVA sealing bag in the protective bag and then place both on the damaged area. Make sure that the protective bag's label is closed on the side with technical data on SAVA sealing bag.



Figure 30: Sealing with using the preprotective bag

If a leak is sealed with SAVA sealing bag only, place it with its smooth surface facing the damaged area.



Figure 31: Sealing with only the SAVA sealing bag

Wrap the ratchet straps around the pipe, container etc. and connected them with the ratchets on the other side, please refer to chapter 5.2. Make sure straps are not twisted or crossed. The ratchet strap on one side of SAVA sealing bag should be connected to the ratchet on the same side of the bag. If ratchet straps are too short, they can be extended by adding a ratchet strap as described in chapter 5.2.3.

Using the ratchets tighten the ratchet straps on both sides of the bag, refer to chapter 5.2. for instructions. Make sure the straps are evenly tightened on both sides.

In addition to the two ratchet straps, fed through the openings in the bags, another ratchet strap, wrapped across the middle parts of SAVA sealing bag, is needed with SAVA sealing bags 1/6 - 6 bar and M 1/10 - 10 bar as described in chapter 5.1.2.



Figure 32: SAVA sealing bag of M 1/6 or M 1/10 type with all three ratchet straps attached

5.4.2. INFLATION OF SAVA SEALING BAGS

When all ratchet straps are attached and tightened, fill SAVA sealing bag with air, usually by means of foot pumps, which form part of the sets of SAVA sealing bags of M1 and M2 types. A controller with a pressure reducer and air cylinder or a controller with an alternate air source may also be used.



Figure 33: Foot pump (left) and inflation hose (right)

First connect the supply hose of the foot pump to SAVA sealing bag; if required, add another inflation hose between the pump's hose and SAVA sealing bag.

Fill SAVA sealing bag to the working pressure with the foot pump. Monitor the pressure in the sealing bag throughout the inflation procedure. Refer to chapter 5.3.1 for preparation of the pump for use and chapter 5.3.2 for the inflation procedure.



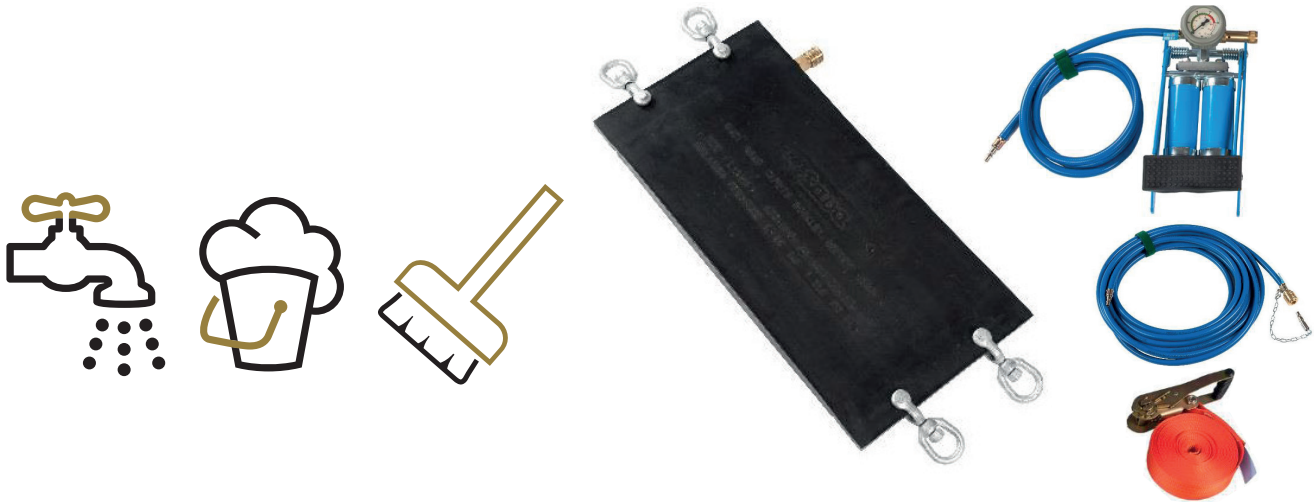
Figure 34: Inflated SAVA sealing bag M2

5.4.3. REMOVAL OF SAVA SEALING BAGS

When the work is finished, SAVA sealing bag should be emptied. Open the lock screw on the safety valve of the foot pump as described in chapter 5.3.3.

When SAVA sealing bag is entirely emptied, remove the inflation hose, then loosen and remove the ratchet straps as described in chapter 5.2.

When SAVA sealing bags and the accessories are removed, they should be cleaned and inspected as described in chapter 6.



5.5. LIST OF THE ACCESSORIES

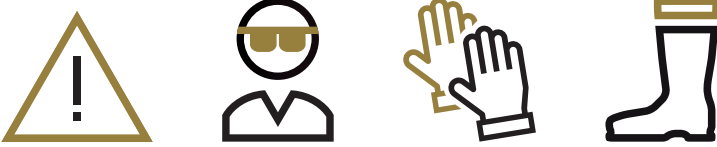
In the table below the accessories are listed to be used with SAVA sealing bags. All listed items can be combined with SAVA sealing bags of M1 and M2 types. The compatibility between the individual accessories and a particular SAVA sealing bag is indicated.

Table 3: Table of accessories and compatibility with a particular SAVA sealing bag of M type

CODE	NAME	COMPATIBILITY			
		M 1 1.5 BAR	M 1/6 6 BAR	M 1/10 10 BAR	M 2 1.5 BAR
528873	Foot pump 1.5 bar	x			x
594273	Foot pump 6 bar		x		
588334	Foot pump 10 bar			x	
529663	Single fitting controller 1.5 bar	x			x
531542	Single fitting controller 6 bar		x		
531543	Single fitting controller 10 bar			x	
529094	Inflation hose 10 m -blue	x			x
577351	Inflation hose 10 m - blue, 6, 10 bar		x	x	
60166	Ratchet strap - 10 m, yellow	x			x
60165	Ratchet strap - 10 m, orange	x			x
531465	Ratchet strap - 10 m, red		x	x	
576563	Ratchet strap - 10 m, blue		x	x	
60353	Hook strap - 2 m, orange				x
60357	Hook strap - 2 m, yellow				x
60354	Hook strap - 5 m, orange				x
60365	Hook strap - 5 m, yellow				x
524551	Sealing plate 600 × 300 × 30 mm, CR	x	x	x	x
524552	Sealing plate 1000 × 300 × 30 mm, CR	x	x	x	x
528304	Protective bag, against chemicals - M 1	x	x	x	
525564	Protective bag, against chemicals - M 2				x
587296	Plastic box 80 × 60 × 23.5 mm	x	x	x	x

6.0. MAINTENANCE AND CLEANING

6.1. SAFETY WARNINGS



Always wear protective goggles, gloves and footwear when cleaning SAVA products for interventions in accidents involving hazardous substances.



If the product is contaminated by hazardous substances, protective equipment should be used in accordance with the relevant regulations for a specific hazardous substance. Comply with applicable local regulations and guidelines.

6.2. CLEANING AFTER USE

Clean and inspect SAVA sealing bags after every use. Long-term exposure to stains caused by certain hazardous substances, can damage SAVA sealing bags. Dirt in the inflation coupling prevents proper connection with the inflation hose and obstructs the air flow.

Check the opening in the coupling; if it's filled with dirt, remove it with a thin wire. Always pull the dirt out of the coupling, do not push it inside a SAVA sealing bag.

Use a hard-bristle brush to remove any agglutinated dirt from the surface of SAVA sealing bags. Move the brush in various directions. Use of sharp objects for dirt removal is forbidden.

After removing all the agglutinate dirt, soak any marks or stains on SAVA sealing bags with a light solution of washing-up detergent and warm water, and remove the remaining dirt from the surface with a hard-bristle brush. Do not use petrol, diluters, alcohol or aggressive cleaning agents.

Rinse SAVA sealing bags with clean, cold water. The jet of water will remove any remaining dirt and detergent from the surface of SAVA sealing bags



High-pressure cleaners should NOT be used.

Hold SAVA sealing bag upright, wipe its coupling with a clean cloth then allow to air dry.



Dryers or heat devices should NOT be used.

Carefully check the cleaned and dry SAVA sealing bags:

- Check for air bubbles, cuts, worn-out parts that can be hidden by the dirt. Mark the damage or defect with a chalk. Consult the manufacturer or an authorised agent about the seriousness of the damage or possibility for further use of SAVA sealing bag.
- Check the coupling; in the cases of damages that prevent connection to the plug on the hose, replace it.

6.3. REPLACEMENT OF INFLATION COUPLING

6.3.1. M1 - 1.5 BAR, M2

Unscrew the coupling from the sealing bag by turning it to the left; use a spanner 22.



Figure 35: Unscrewing the coupling

Clean the threaded section of the coupling and wrap it with Teflon tape or coat it with sealing adhesive.



Figure 36: Threads wrapped with teflon tape

Screw a new coupling on the threaded connection by turning it to the right; use a spanner 22.



Figure 37: Screwing the new coupling

6.3.2. M1/6 - 6 BAR, M1/10 - 10 BAR

Unscrew the coupling together with the hose from the sealing bag by turning it to the left; use a spanner 17.

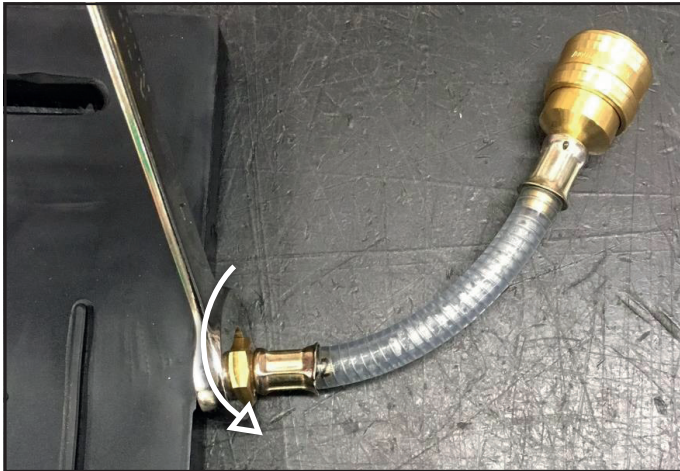


Figure 38: Unscrewing the coupling

Clean the threaded section of the coupling and wrap it with Teflon tape or coat it with sealing adhesive.



Figure 39: Threads wrapped with teflon tape

Screw a new coupling on the threaded connection by turning it to the right; use a spanner 17.



Figure 40: Screwing the new coupling

6.4. PREVENTIVE MAINTENANCE

Visual and performance tests are obligatory and can be conducted by a person qualified for work with sealing bags. We recommend that periodic tests are performed. They can be performed either by the manufacturer or a person authorised by the manufacturer.

6.5. INSPECTION INTERVALS

6.5.1. SAVA SEALING BAG

Table 4: Inspection intervals for SAVA sealing bags of M type

TEST	INSPECTION INTERVAL	TEST OPERATOR	PROCEDURE
Visual test	<ul style="list-style-type: none">• After every use• Annually	A person qualified for work with sealing bags	Chapter 6.6.1.1.
Performance test	<ul style="list-style-type: none">• After every use• Annually	A person qualified for work with sealing bags	Chapter 6.6.1.2.
Periodic test	Recommended in the 5 th , 8 th , 10 th , 11 th , 12 th , 13 th and 14 th year after the manufacture.	Manufacturer or a person authorised by the manufacturer	

6.5.2. FOOT PUMP AND CONTROLLERS

Table 5: Inspection intervals for foot pumps and controllers

TEST	INSPECTION INTERVAL	TEST OPERATOR	PROCEDURE
Visual test	<ul style="list-style-type: none">• After every use• Annually	A person qualified for work with sealing bags	Chapter 6.6.2.1.
Performance test	<ul style="list-style-type: none">• After every use• Annually	A person qualified for work with sealing bags	Chapter 6.6.2.2.
Periodic test	Recommended in the 5 th , 8 th , 10 th , 11 th , 12 th , 13 th and 14 th year after the manufacture.	Manufacturer or a person authorised by the manufacturer	

6.5.3. INFLATION HOSE

Table 6: Inspection intervals for inflation hoses

TEST	INSPECTION INTERVAL	TEST OPERATOR	PROCEDURE
Visual test	<ul style="list-style-type: none">• After every use• Annually	A person qualified for work with sealing bags	Chapter 6.6.3.1.
Performance test	<ul style="list-style-type: none">• After every use• Annually	A person qualified for work with sealing bags	Chapter 6.6.3.2.
Periodic test	Recommended in the 5 th , 8 th , 10 th , 11 th , 12 th , 13 th and 14 th year after the manufacture.	Manufacturer or a person authorised by the manufacturer	

6.6. TEST PROCEDURES

6.6.1. SEALING BAG

6.6.1.1. Visual test



The following tests should be carried out outdoors.



If SAVA sealing bag fails to pass the visual test, it should be removed from further use. If in doubt about the seriousness of the damage, the product should be inspected by the manufacturer.

Connect SAVA sealing bag as instructed in chapter 0. and inflate it to 0.2-times working pressure. Visually check for unusual bulges, punctures, cuts or similar mechanical damages. Using a brush, apply soap water on the entire surface of SAVA sealing bag, also on the connection. Visually check if SAVA sealing bag and the connector are airtight.

6.6.1.2. Performance test



The following test should be carried out outdoors. Provide for a proper safety distance between people and the test object, as well as buildings and the test object.



If SAVA sealing bag fails to pass the performance test, it should be removed from further use. If in doubt about the seriousness of the damage, the product should be inspected by the manufacturer.



To qualify for the performance testing, SAVA sealing bag should first pass the visual test.



If SAVA sealing bag is suspected unsafe to work with or be tested, consult the manufacturer.

Connect SAVA sealing bag as instructed in chapter 0. and inflate it to 0.5-times working pressure. If the pressure in SAVA sealing bag does not drop by more than 10%, within an hour, the bag passed the performance test.

6.6.2. FOOT PUMP AND CONTROLLER

6.6.2.1. Visual test

Visually check the foot pump/controller for defects. Check the pressure gauge for damages. Check if the protective valve on the safety valve can be smoothly unscrewed and screwed. Check if the controller's stop valve opens and closes smoothly.

6.6.2.2. Performance test

FOOT PUMP

A performance test for the foot pump includes checking for correct functioning.

Connect test pressure gauge to the outlet hose coupling of the foot pump. Check if the hose connector of the foot pump and the connector of test pressure gauge lock properly.

Repeatedly step on the pump's pedal to build up the working pressure in the system. Check if the pointer on the pressure gauge moves across the entire indication area. If you release the pedal, the pressure in the system should not drop. Check the pressure on the pressure gauge and test pressure gauge. A permissible deviation is $\pm 10\%$ of maximum working pressure. Apply soap water on the inflation hose, the connection of the inflation hose with the foot pump and the connection between the hose connector and the coupling of test pressure gauge. Check visually for any leak on the coated areas.

Check the function of the safety valve by pressing the foot pump lever and monitor, at which pressure the safety valve opens; it should open in the range between the maximum working pressure and 1.1-times maximum working pressure

When testing is finished, relieve the pressure by opening the protective valve on the safety valve. Check if the pointer of the pressure gauge is smoothly dropping across the entire working area during pressure release.

CONTROLLER

A performance test for the controller includes checking for correct functioning.

Connect the air source to the inlet coupling of the controller; the air source should provide the pressure that is at least 10 % higher than the maximum working pressure.

Connect the inflation hose to the outlet coupling of the controller and test pressure gauge to the inflation hose end. Check if the controller's connector and the coupling of the inflation hose lock properly.

Open the stop valve to build up the pressure in the system up to the working pressure. Check if the pointer on the pressure gauge moves across the entire indication area. Check the pressure on the pressure gauge and test pressure gauge. A permissible deviation is $\pm 10\%$ of maximum working pressure. Apply soap water on the connection between the controller's connector and the coupling of the inflation hose as well as between the air source and the controller's connector. Check visually for any leaks on the coated areas.

Check the function of the safety valve by opening the stop valve and monitor, at which pressure the safety valve opens; it should open in the range between the maximum working pressure and 1.1-times maximum working pressure

When testing is finished, relieve the pressure by opening the protective valve on the safety valve. Check if the pointer of the pressure gauge is smoothly dropping across the entire working area during pressure release.

6.6.3. INFLATION HOSE

6.6.3.1. Visual test

Visually check the inflation hose. Check its coupling and connector for damages and other defects. Check if the coupling and the connector lock properly. Check the hose for ruptures, punctures and other damages such as stiff areas due to exposure to acids etc.

6.6.3.2. Performance test

A performance test for the inflation hose includes checking for correct functioning.

Connect the inflation hose to the controller (the controller should be connected to the air source) or the foot pump. When connecting the coupling of the inflation hose to the connector of the controller or foot pump, check if both parts lock and unlock properly. Connect test pressure gauge to the connector of the inflation hose. Check if the connectors of the inflation hose and test pressure gauge lock and unlock properly. Fill the inflation hose to the maximum working pressure. Apply soap water on the entire surface, the connection between the hose coupling and the connector of the controller or foot pump, and the connection between the hose coupling and test pressure gauge coupling. Visually check for any leaks on the coated areas.

6.7. SERVICE LIFE

The age of SAVA sealing bag is clear from the serial number; the first two digits refer to the month and the second two to the year of manufacture.

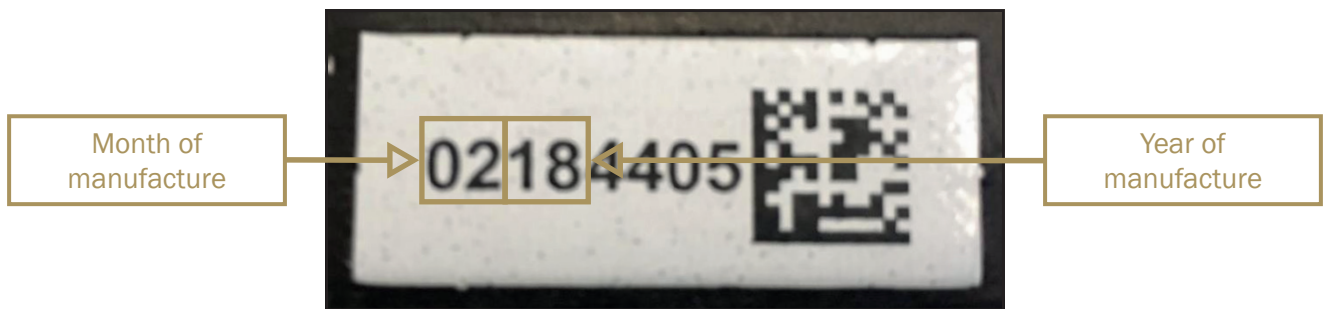



Figure 41: Serial number of SAVA sealing bag

The picture shows SAVA sealing bag that was manufactured in February (02) in 2018 (18).

SAVA sealing bags are made from rubber and thus exposed to the process of natural ageing. Even though no defects were detected during a visual inspection, products should be taken out of service after 15 years because the material structure could hide invisible signs of ageing.

6.8. FAULT IDENTIFICATION AND REMEDY

FAULT	CAUSE	REMEDY
The hose connector of the air source cannot be correctly inserted in the connection coupling of the controller.	<ul style="list-style-type: none"> • Dirt in the connector or coupling. • The connector or coupling is damaged. • The hose coupling of the air source is not of correct type. 	<ul style="list-style-type: none"> • Clean the connector and the coupling. • Replace the air source or the controller. • Replace it with a hose coupling of correct type.
Inflation hose cannot be correctly connected to the connector of the controller or foot pump's hose.	<ul style="list-style-type: none"> • Dirt in connectors or couplings. • Connectors or couplings are damaged. 	<ul style="list-style-type: none"> • Clean the connector and the coupling. • Replace the hose or controller/foot pump.
Even though the stop valve on the controller is opened or the foot pump pedal is pressed, SAVA sealing bag fails to be filled.	<ul style="list-style-type: none"> • Safety valve failure. • Protective screw on safety valve is unscrewed. • The connection or the coupling is blocked. • The hose of the air source or connecting hoses are not correctly connected. • The hose of the air source or foot pump or connecting hoses are damaged and not airtight. 	<ul style="list-style-type: none"> • Replace the controller/foot pump. • Tighten the protective screw on the safety valve. • Clean the connector or the coupling. • Check and reconnect the hose of the air source hose or connecting hoses. • Replace the hose of the air source hose or foot pump or connecting hoses.
Even though the stop valve on the safety valve of the controller or foot pump is opened, SAVA sealing bag fails to be emptied.	<ul style="list-style-type: none"> • Connectors or couplings are blocked. 	<p> WARNING!</p> <ul style="list-style-type: none"> • Extreme care is required during the following procedure. • If the SAVA sealing bag is to seal hazardous substances, use all the protective equipment required in handling with a specific substance. Comply with applicable local regulations and guidelines. <ol style="list-style-type: none"> 1. Depressurise the controller or foot pump and inflation hoses by opening the lock screw on the safety valve. 2. Be extremely careful when disconnecting the connecting hose from SAVA sealing bag that fails to be deflated. 3. Push a suitably big needle in the hole of the filling coupling on SAVA sealing bag to relieve the pressure. Be careful as during this procedure the sealed hazardous substance could begin to leak again or SAVA sealing bag could move.

7.0 WARRANTY CONDITIONS

7.1. GENERAL CONDITIONS

- 7.1.1. These warranty conditions apply as for Environmental protection and rescue products, manufactured by Trelleborg Slovenija, d.o.o. (hereinafter referred to as TBSLO), Product Area Environmental protection and rescue products (Products). If any provision of this warranty conditions 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.
- 7.1.2. 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.

7.2. MANAGEMENT OF THE PRODUCTS

- 7.2.1. In order to claim a remedy pursuant to this warranty, purchaser must conform to instructions for management of the Products, available at www.savatech.eu/environmental-protection-and-rescue/manuals

7.3. WARRANTY

- 7.3.1. TBSLO warrants to the purchaser that for the 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 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.
- 7.3.2. 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.

7.4. EXCLUSION OF WARRANTY

- 7.4.1. Warranty shall be excluded in cases where the Products have not been used for the ordinary purpose or have been subject 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.
- 7.4.2. Warranty shall also be excluded and TBSLO shall not be held liable in case of force majeure circumstances, 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.

- 7.4.3. 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.
- 7.4.4. Ordinary wear and tear are not covered by this warranty.

7.5. MAKING A WARRANTY CLAIM

- 7.5.1. Purchaser is obliged to take delivery of the Products and perform an ordinary inspection of the Product upon delivery.
- 7.5.2. 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. Discovery of the defect is deemed to have occurred when a defect could have reasonably been detected by the purchaser.
- 7.5.3. Claim must at least contain the following data:
- part number,
 - serial number,
 - description of defect,
- and must be substantiated by adequate evidence, such as pictures... Upon request, TBSLO must be allowed to inspect the Product.
- 7.5.4. 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..

7.6. REMEDIES

- 7.6.1. TBSLO shall decide on a claim within forty -five days after receiving a complete documentation and Product pursuant to art 5.
- 7.6.2. 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.
- 7.6.3. 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 returning the Product to TBSLO.
- 7.6.4. 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.

7.7. CLOSING PROVISIONS

- 7.7.1. No statement or action by Trelleborg Slovenija, whether express or implied, other than set forth herein, shall constitute a warranty.
- 7.7.2. 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.
- 7.7.3. This warranty statement is subject to the laws of the Republic of Slovenia, with the exclusion of its conflict of law principles.

Kranj, January 2019



Trelleborg Slovenija, d.o.o.
PA Environmental protection products (PA EKO)

We are a division of Trelleborg Slovenija d.o.o..
We manufacture and sell rubber products for environmental protection and rescue operations and industrial use. Our growing division was established more than thirty years ago and is constantly striving to meet our customer's current and future needs and expectations.

WWW.SAVATECH.EU
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Instructions for Use: Large sealing bags

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