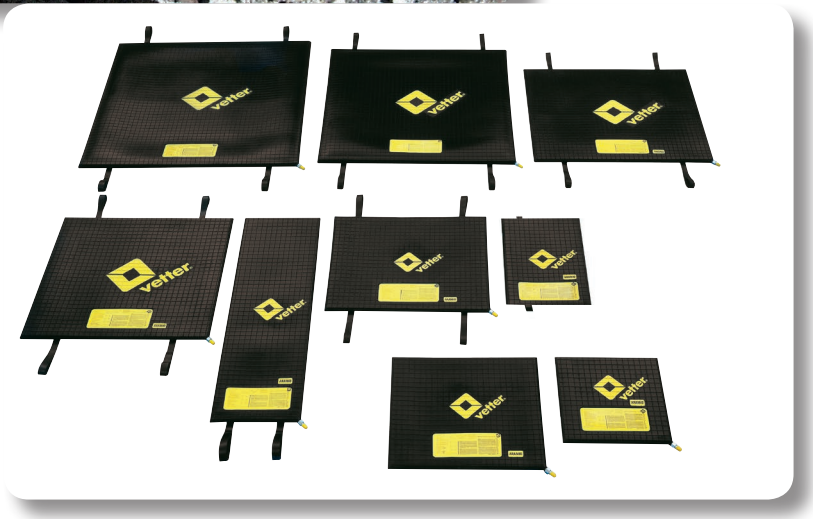
Emergency Pneumatics.

# Operating Instructions

## VETTER Mini-Lifting Bags 8.0 bar



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## Contents

## 1. Important preliminary remarks

Only knowledge and the exact observance of this operating manual guarantee correct and reliable operation, achieve the best possible usage and ensure any claims made within the framework of the Vetter guarantee.

Only staff are to use Vetter mini-lifting bags who have been instructed in their use by the manufacturer's operating manual and operating instructions.

In addition to the operating instructions, all national, generally applicable, statutory and other binding accident prevention regulations must be observed and instructed.

The disposal of discarded lifting bags is to be carried out according to disposal regulations valid for the region.

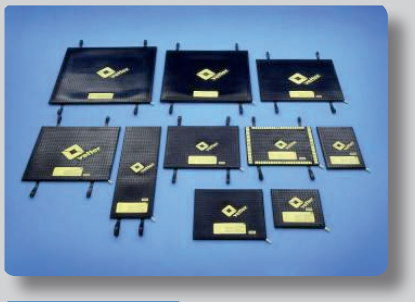
The operating instructions given here are to be regarded as part of the product and are to be kept for the complete life duration of the product. In case the product should be passed on to a successive user then the operating instructions must also be included.

## 2. Description of the product

### 2.1 Description of the set

#### a. Mini-Lifting Bags

Bag size selection is made according to the task. There are 16 different sizes from 1.0 t to 67.7 tons.



#### b. Inflation hoses

There are inflation hoses available (5 m and 10 m in length) which enable the user to control the Mini-Lifting Bags from a safe position. The colours of the hoses, RED and YELLOW, avoid any confusion during control of the different sides (inlets and outlets) of Mini-Lifting Bags.

#### c. Controller 8 bar

**When filling and deflating of the bags, the manometer and the load must be observed.**

#### Air CU (Control Unit) 8 bar deadman

Connect the inflation hoses to the outlet coupling on the rear side of the controller. Connect the air supply to the inlet coupling on the side. Move the control lever towards you in order to inflate the Mini-Lifting Bag. In doing this, observe the corresponding manometer and the movement of the load. Release the control lever, thus ending the inflation process, when the required operating pressure for the lift power or lift height is reached. Latest when the safety valve blows off or the red marking is reached! The control lever automatically returns to the center position (zero) when released (deadman switched).



Different couplings!


The built-in safety valve automatically activates when the bag is over-inflated above the maximum operating pressure of 8 bar or when there is an unforeseen additional burden of the bag.

**The activation tolerance for opening and closing of the safety valve can be +/- 10 %.**

Press the control lever in the opposite direction in order to deflate the bag or to reduce the load.

The lighting of the control element illuminates all couplings, switch levers and manometers. It is switched on and off with switch (1) on the side.

The control element is supplied by a 9 V block battery. Since the entire lifting bag system is designed for a temperature range of -20 °C to +55 °C, only batteries with this temperature range are allowed to be used. Based on the current state of the art, only lithium batteries meet this requirement.

To insert the battery, unscrew the battery compartment, replace the old battery with a new one and screw the battery compartment back together.

Control elements with lighting come under the German Law on electrical and electronic devices (ElektroG) of 24 March 2005 for implementation of the EC Directive 2002/96/EC on electrical and electronic waste – WEEE Directive.

The label attached to the battery compartment cover points out that the electronic components in this product must not be handled as domestic waste; they have to be returned to the manufacturer (return freight paid) for recycling.

### Dual deadman controller 8 bar / 116 psi, aluminium style, connectable

Connect the filling hose to the outlet couplings (4) on the rear of the control element. Connect the air supply to the lateral inlet coupling (1). To fill the Mini-Lifting Bags press the lower "+" push-button (2). When the desired operating pressure has been reached for the lift force or lift height, discontinue the filling process by releasing the push-button. Release latest when the safety valve blows off or the red marking has been reached! During this process, the push-button independently returns to the zero setting (deadman switch). If you overfill the bags past the maximum operating pressure of 8 bar or if there is an unexpected additional load on the bag, the integrated safety valve automatically blows off.

**The activation tolerance for opening and closing of the safety valve must only be a maximum of +/- 10 %.**

To drain the bag or lower the load, press the upper "-" push-button (3).

To prevent long-term damage of the membranes in the interior, vent the control element after use. To vent, first press all push-buttons (+ / -) one time.

**Connecting and disconnecting two double control elements**

To link, connect the nipple (5) of the left control element with the inlet coupling (1) of the next control element. Swivel the transom (7) on the rear of the right control element to the side of the left control element and screw it tight with the star screws (6).

The control elements are now connected and will be supplied with compressed air through the inlet coupling of the left control element.

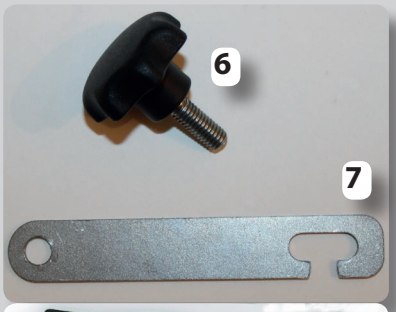
Before separating, disconnect the air supply connection and depressurise the control element by pressing the push-buttons.

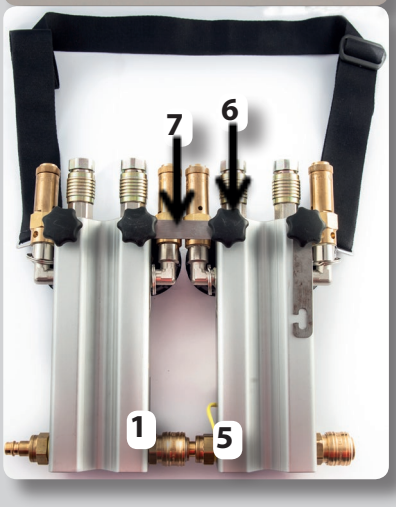
Note:

Do not separate the control elements as long as the bags are connected.

Loosen the star screws on the rear and swivel the transom back into place. Press both control elements together, pull back the union nut of the inlet coupling of the right control element and then let go of both control elements. The control elements are now disconnected.

If the transom and the star screws are not going to remain on the control element, keep them together in a bag.

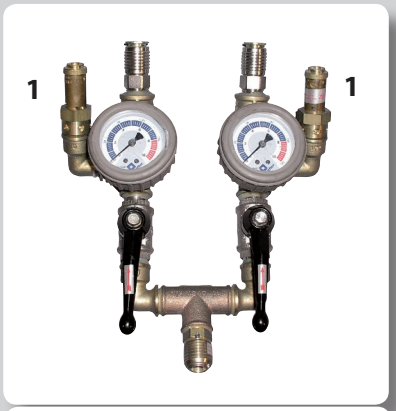



**The single and dual controllers in the 8 bar fitting version do not correspond to the requirements of the Fire Service standard DIN EN 13 731!**

### Dual controller 8 bar, fitting

Controller with inflation regulator using a ball valve without deadman switching. Close the ball valve, thus ending the inflation process, when the required operating pressure for the lift power or lift height is reached. Latest when the safety valve blows off or the red marking is reached! To empty the bag, open the head of the safety valve (1) by turning to the left. Close the safety valve by turning to the right after deflation.



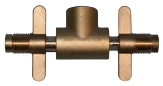

### Single controller 8 bar, fitting

The same version as described in dual contoller 8 bar, fitting, but used for the control of only one Mini-Lifting Bag.

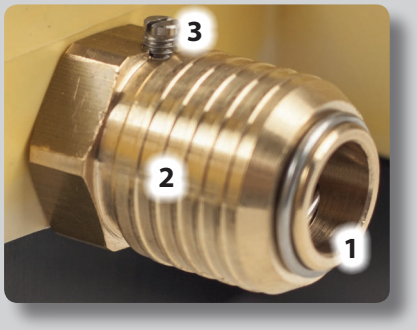
### Inventory of items

An inventory and check of all items in the delivery package is to be made according to the delivery documentation when acceptance of the Mini-Lifting Bag equipment is carried out. A visual check and function check is also to be made as specified in the operating manual.

## 2.2 Additional accessories

| Pos. | Article No. | Description | |
|---|---|---|---|
| 1 | 1600 0319 00<br>or<br>1600 0320 00 | **Pressure regulator 200/300 bar**<br>**US Version 4500 psi (not compatible with below mentioned compressed air bottles)** |  |
| 2 | 1600 0108 00 | **Comp. air bottle 6 l / 300 bar** |  |
| 3 | 1600 0199 00 | **Comp. air bottle 9 l / 300 bar** | |
| 4 | 1600 0091 00 | **Dual connector 300 bar** |  |
| 5 | 1600 0145 00 | **Pressure regulator** |  |
| 6 | 1600 0120 00 | **Adapter for construction site compressor** |  |
| 7 | 1600 0087 00 | **Hand pump (7)** |  |
| 8 | 1600 0094 00 | **Foot pump (8)** |  |

## 2.3 The Vetter safety coupling system




### a. Inlet coupling controller

Connect the air supply hose, resp. connection hose of the pressure reducer, to the plug nipple of the inlet coupling (1) on the controller. In doing this, firmly press the nipple into the coupling until it latches in. Turn the brass sleeve (2) of the coupling opposite to the safety pin (3) for additional safety.

### b. 8 bar inflation coupling

Firmly press the hose, resp. bag nipple, into the coupling until it latches in order to connect the inflation hose with the corresponding controller, resp. with the Mini-Lifting Bag. The coupling sleeve must lay on the support ring without any gap (1).


The nipple must be firmly pressed against the spring pressure in the coupling in order to release the connection (only in pressure-free condition). At the same time, the coupling sleeve must be pulled back. The connection is then released.

## 2.4 Description of the product

Vetter Mini-Lifting Bags are made by hand from high quality raw materials so that after completion, a seamless bag is produced. The semi-finished product is vulcanized under the influence of pressure and temperature and by doing this the individual layers bond to form an elastomer body. After production has been finalized, each Mini-Lifting Bag is subjected to a plant acceptance test within the scope of quality assurance.

Material of the Mini-Lifting Bags: CR/Aramide, hot vulcanized

Temperature resistance of Mini-Lifting Bags:

| | |
|---|---|
| Cold resistance | -40 °C |
| Cold flexible | -20 °C |
| Heat resistance long-term | +90 °C |
| Heat resistance short-term | +115 °C |

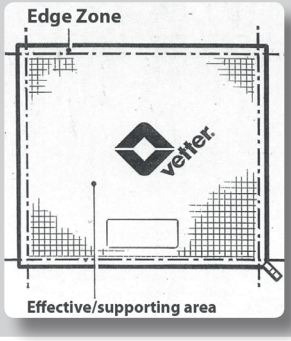
**The aramide layer on the Mini-Lifting Bag can be damaged by damage made to the bag surface, e.g. cuts, cracks, punctures or by the effects of ozone.**

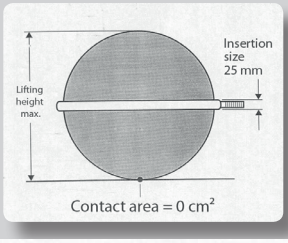
Therefore with a visual check after every operation, special attention is to be made to the following types of damage:

- ✓ Damage by separation
- ✓ Damage by cuts
- ✓ Damage by punctures
- ✓ Damage by heat and chemicals

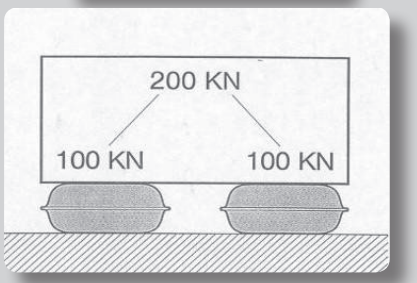
**Danger of bursting! If, when carrying out the check, this type of damage is determined then the bag is to be immediately taken out of service. Repair is not possible.**

In order to use the maximum lifting power, the total effective area, i.e. the total area minus the edge area, must be completely under the load to be lifted and that the bag must be taken to the maximum permitted operating pressure.

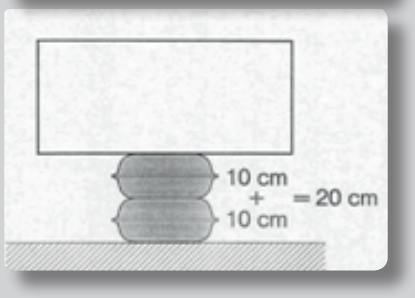





The bag develops a spherical shape (with rectangular or square base) as the lift height increases. This is the reason why the contact area with the load decreases until at a max. bag curvature this will be almost zero. The largest lift height of the Mini-Lifting Bag will only be reached in the unloaded state.



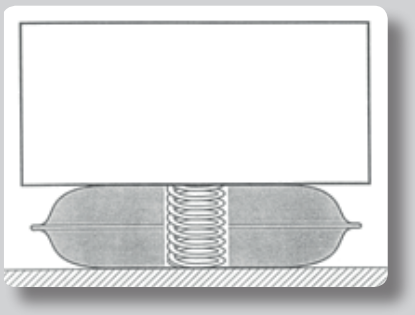

In case the lifting power produced by the Mini-Lifting Bag is not sufficient, depending on the lift height, then a number of Mini-Lifting Bags can be placed next to each other.




In case the lifting height of an Mini-Lifting Bag is not sufficient then a **maximum** of 2 bags can be placed over each other. In this mode, the lifting height is additive for both Mini-Lifting Bags.

However the lifting power only corresponds to that of the smaller bag. Basically, the lower bag should always be inflated first.

**Sequence: large bag below, small bag on top!**
**Never place 3 or more bags over each other!**



A Mini-Lifting Bag under load can be compared to a spring under tension with respect to its behavour. As soon as the Mini-Lifting Bag is suddenly released, e.g. by slipping, load break or anything similar then there will be spontaneous catapulting outwards of the Mini-Lifting Bag.

**Never stand in front of the Mini-Lifting Bag!**
**This is an area of danger!**

## 2.5 Correct handling and usage

The Mini-Lifting Bag is primarily a pneumatic rescue device used by the rescue services (e.g. fire services) with which trapped people can be freed, access gained for rescue and many other tasks. The Mini-Lifting Bag can also be used as a working device in order to lift or move loads.

Mini-Lifting Bags are subject to national requirements of the fire service sector. Further instruction information can be obtained from the operating instructions of the user. The complete Mini-Lifting Bags system is cold-resistant to -20 °C and heat-resistant up to +55 °C.

## 2.6 Safety instructions

Pre-specified personal protective clothing is to be worn during operation! For example: protective clothing, helmet, protective gloves, protection for eyes and face, noise protection etc.

The national regulations in connection with lifting bag systems and their use are to be observed. For example: DIN EN 13731, national regulations. The Mini-Lifting Bags are only to be used with compressed air, under no circumstances are they to be used with inflammable gases or aggressively acting gases. Vetter Mini-Lifting Bags are only to be inflated with original Vetter inflation fittings because these were subjected to an acceptance test by the manufacturer. The lifting bag system is to be tested for perfect condition before and after use (specifications from the manufacturer, national regulations).

The national safety guidelines must be observed and adhered to worldwide.

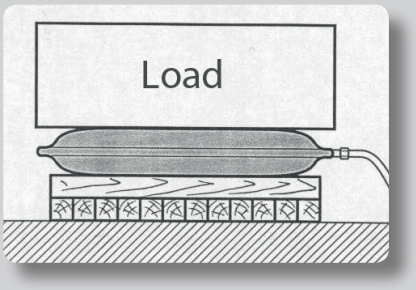
In the Federal Republic of Germany, for example, regular safety inspections are prescribed by DGUV Principle 305-002.

The lifted load is to be continually supported during the progessive lifting sequence. The stable condition of foundation support material must always be observed during construction of the foundation support.

**Never position 3 or more bags on top of each other!**

Ensure load against slippage.

In order to fully use the strengths of the Mini-Lifting Bag, the distance between load and bag should be at a minimum.




**The foundation support must brace at least the complete area of the bag and the smallest edge length of the foundation support must be larger than the height of the foundation support. Metal must never be place on metal! Attention: danger of slipping!**

With slippery ground (ice, snow, mud etc.) place anti-slip materials under the bag in order to increase adhesion. Point-shaped loads are to be avoided, e.g. construction claws or screws. Never place the bags on sharp edges, hot or red hot components. Use suitable temporary storages and cover the complete contact area of the bag. Protect the bag against flying sparks during welding or separation work. Do not additionally load bags with such things as hydraulic lifting devices, winches or falling loads.

**Never remain beneath a lifted load, never hold the load from below!**
**Remain at a distance!**

Avoid shearing effects by squeezing of the bag when lowering the load!

**During operation never stand in front of the bag but always to one side, because the bag could catapult outwards under unfavourable conditions!**
**The lifting sequence is to be stopped immediately if there is a function failure!**

A Mini-Lifting Bag can burst under adverse conditions with incorrect operation, incorrect handling or by manipulation on the controller and/or inflation hose (problems concerning pressure waves and sound waves, uncontrolled movement)!

**Vetter Mini-Lifting Bags are not suited for use in explosion endangered zones!**
**Special versions are possible on request!**

## 3. Preparing the product for use

### 3.1 Preparations for operation

Remove a set of lifting bags from the vehicle. Ensure sufficient air supply.

**Only perfectly operating and inspected Mini-Lifting Bag systems are to be used.**

The method and type of application is to be decided from case to case by the operation leader with his own area of responsibility as well as the operating instructions of the user.

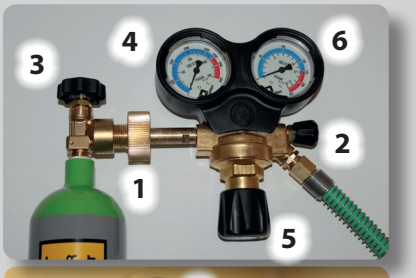
### 3.2 Application instructions

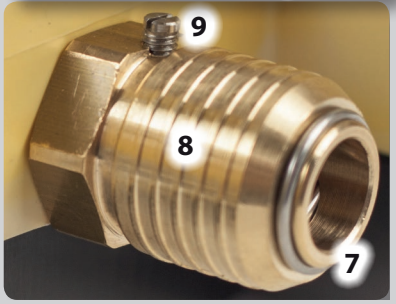
Move the lifting bag to a suitable position so that at least 75 % of the supporting bag area is under the load. Continually built up the under-support for maintaining contact when the load is lifted during the lifting procedure.

Never stand in front of the bag during operation but to the side of the Mini-Lifting Bag because it could be catapulted outwards under unfavourable conditions.

## 4. Operating instructions

### 4.1 Operation with compressed air bottles




Connect the pressure reducer to the compressed air bottle 200 bar or 300 bar using the tommy screw (1). Close the hand wheel of the pressure reducer (2). Open the valve on the bottle (3) slowly. The pre-pressure manometer (4) indicates the pressure in the bottle.

Adjust the back pressure to approximately 10 bar with the regulation bar (5) (indication of the reduced pressure on the back pressure manometer (6)).

Connect the air hose of the pressure reducer via the nipple to the input coupling (7) of the controller. In doing this, press the nipple into the coupling until you feel it lock in. For additional safety: turn the brass sleeve (8) so that it is opposite the safety pin (9).

Open the hand wheel (2) of the pressure reducer.

The lifting bag system is ready for operation.

## 4.2 Operation with other compressed air supplies

Basically, any air supply which is available can be used for operation of Mini-Lifting Bags as long as the pressure does not exceed 10 bar and the air is free of oil. Amongst others, the set of transition pieces (Art. No.: 1600 0125 01) with the following adapters are available for operation with other air sources:


1. Truck compressed air connection, dual brake system.
   For tapping air out of the trailer coupling head.
2. Dummy coupling
   Seals off the control line of the brake system

**Remember! Ensure that the truck does not roll, use brake blocks!**

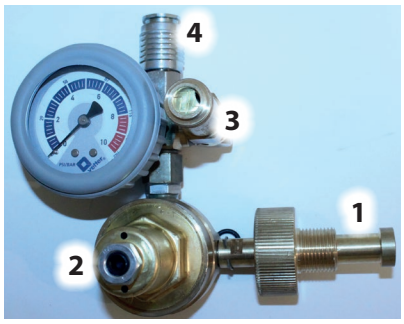
3. Truck tyre inflation device adapter
   For tapping off air from the so-called tyre inflation bottle near the brake.

**Remember! The tyre inflation connection must be ensured by a safety valve as a standard!**

4. Truck tyre valve
   Inflation with a normal hand or foot pump as well as other air supplies for tyre inflation
5. Truck tyre valve connection, can be clamped
   For extracting air for the spare tyre
6. Adapter for the local air pressure network.
7. Adapter Construction-site compressor
8. Air supply hose, 10 m, green, with blocking valve
9. Case, red

## 4.3 Operation set of 8 bar Super Mini Lifting Bags for compressed air filling

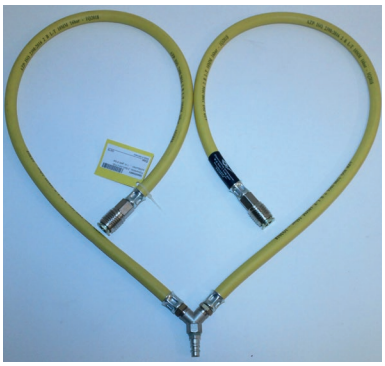
**The single and dual controllers in the 8 bar fitting version do not correspond to the requirements of the Fire Service standard DIN EN 13 731!**




Screw the 8 bar inflation and safety valve fitting to the cylinder connection thread (1) firmly into the compressed air cylinder 1 liter/200 bar. The built-in pressure reducer (2) is permanently set to an outlet pressure of 10 bar. Close the discharger on the head of the safety valve by turning it clockwise. The type-tested safety valve (3) prevents the bags from overfilling above 8 bar.

The corresponding inflation hose is now connected to the outlet coupling (4).

Inflation hose 8 bar, 5 m, yellow, SK



Filling distributor, 2-way, with 2 inflation hoses, 1 m each, yellow

The couplings in the 8-bar system are equipped with double-locked safety couplings. To couple, press the hose or bag nipple into the coupling until it visibly and audibly engages.

To release the connection, press the nipple into the coupling against the spring pressure; after simultaneously pulling back the coupling sleeve, the connection is released.

Position the Super Mini Lifting Bags according to the application requirements.


To fill the Super Mini Lifting Bag, slowly open the valve of the compressed air cylinder (1) by turning it counterclockwise. Constantly observe the load and the pressure gauge (2). The current operating pressure in the bag is displayed on the pressure gauge.

When the desired or necessary lifting height or the maximum operating overpressure of 8 bar has been reached, close the cylinder valve by turning it clockwise.

If the inlet pressure is too high or the load increases, e.g. if the load slips, the maximum operating overpressure may be exceeded.

In order to prevent the maximum operating overpressure of 8 bar from being exceeded, the component tested safety valves blow off in the differential range of +/- 10 %.


To drain the Super Mini Lifting Bag and/or to decrease the load, open the release device at the head of the safety valve (1) by turning it counterclockwise.

**If, in an emergency, two Super Mini Lifting Bags have to be filled simultaneously via the 2-way filling distributor, please note that when lifting, lowering or emptying, both bags act like one, single bag.**

## 4.4 Dismantling of the lifting bag system after use

Dismantling of the lifting bag system is carried out after ensuring the lifted load and complete deflation of the lifting bag system, including dismantling of all accessory parts in the reverse order.

## 4.5 Limit for the period of use

Since there is no duty to discard lifting bags (as, e.g., there is for rescue cushions), we recommend discarding the lifting bags at the latest after 18 years if they are deployed and stored properly and are regularly inspected.

## 4.6 Care, maintenance

The lifting bag equipment is to be cleaned after each operation. Cleaning is normally carried out with warm water and a detergent.

**Cleaning must never be carried out with a chemical cleaning agent and never with high-pressure hot water devices.**

Drying is made at normal room temperature. A bag is to be immediately discarded if, during inspection, any sign of damage is established (refer to Page 6). Repair is not possible. If needed, components such as manometers, safety valves and piston valves can be exchanged. Hose couplings and nipples can also be exchanged. After necessary repair, the equipment is to be checked according to the repetitive tests. This special test is also to be documented.

The VETTER guarantee is 36 months for Mini-Lifting Bags.

## 5. Trouble-shooting for faults

If the safety valve blows too early because of foreign body penetration caught up inside then the blow-off valve is to be fully opened on the head of safety valve by turning counter-clockwise so that the compressed air can escape. If the foreign body is not removed, the safety valve must be replaced. Then check to make certain that it functions perfectly.

**Should the sealing or sealing plate on the upper part of the valve be removed then correct operation can no longer be guaranteed.**

The safety valve is to be exchanged.

## 6. Storage

**When stored and handled properly, the properties of rubber products remain nearly constant for a long period of time. However when handled improperly and under unfavourable storage conditions, their physical properties and/or service life are shortened!**

Please comply with the following storage conditions:

Store in a place that is cool, dry, dust-free and moderately ventilated.

The storage temperature should be approx. 15 °C; never let it exceed 25 °C.

The temperature should also not fall below -10 °C.

If there are heating appliances and heating conductors in the storage room, they must be appropriately insulated so that the temperature of 25 °C is not exceeded. Maintain a minimum clearance between the heating appliances and the stored goods of 1 m.

Do not store rubber products in moist storage rooms. The relative humidity should be less than 65 %.

Protect the rubber products from light (direct exposure to sunlight, artificial light with high proportion of UV). The windows in the storage room need to be correspondingly darkened.

Make sure that the storage room does not contain any appliances that cause ozone.

The storage room must be free of solvents, fuels, lubricants, chemicals, acids, etc.

Store rubber products without pressure, tensile stress or similar distortions since that can promote deformations or crack development.

Some metals such as copper and manganese can also have a damaging effect on rubber products.

For more information please refer to DIN 7716.

## 7. Repetitive tests

**Lifting bag systems are to be subjected to periodic maintenance and testing of rescue equipment in accordance with the relevant national regulations.**

The points listed below are merely recommendations of Vetter GmbH for Germany, based on the inspection principles of DGUV (Deutsche Gesetzliche Unfallversicherung - German statutory accident insurance) Principle 305-002:

- ✓ Testing on acceptance:
  Testing for completeness by the person/people delegated by the user.
  Visual check and operation test by a trained person according to the operation manual.
  Create test certificates.
- ✓ Visual check and operation test after each application/use by the user.
  Create test certificates.
- ✓ At least once a year, the lifting bag system must be subjected to a visual and functional test by a competent person (in Germany according to DGUV Principle 305-002).
  Create test certificates.
- ✓ At least every 5 years, or if there are doubts about the safety of reliability, the lifting bag system is to be subjected to a pressure test by a competent person (in Germany according to DGUV Principle 305-002) with further training of the manufacturer or a test by the manufacturer.
  Create test certificates.

The user is responsible for the correct and professional execution of the repetitive tests!

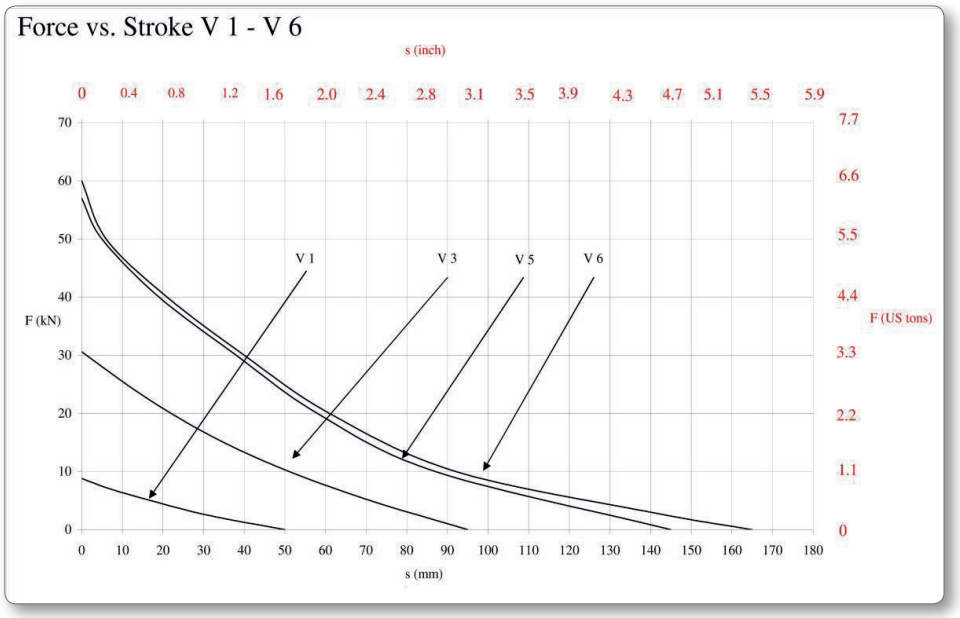
## 8. Technical Data

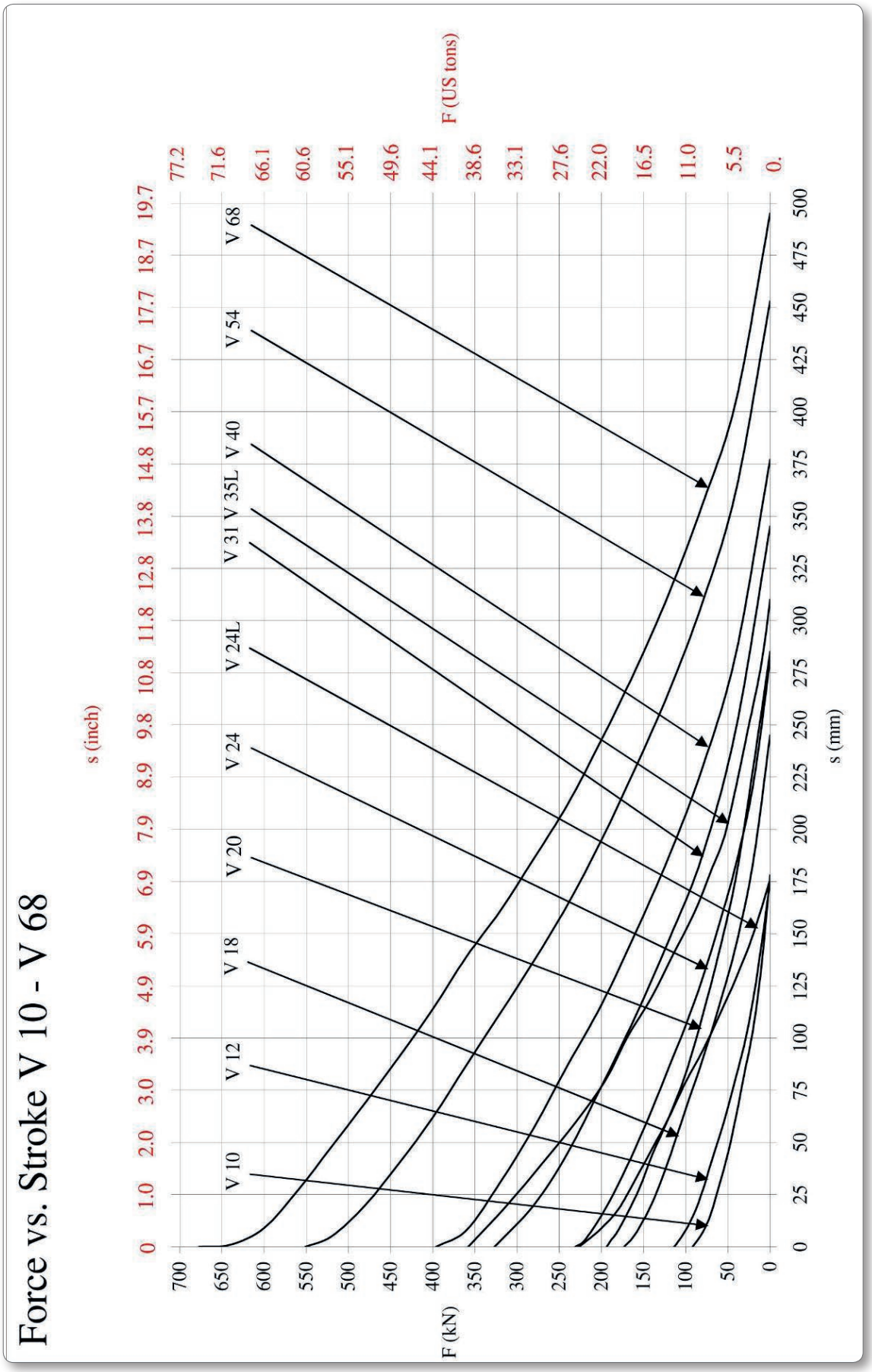
| **Mini- Lifting Bags aramide reinforcement** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type** | | **V 1** | **V 3** | **V 5** | **V 6** | **V 10** | **V 12** |
| Art.-No. | | 1314009300 | 1314009500 | 1314018200 | 1314009600 | 1314002200 | 1314002400 |
| Lift power,max | to | 1.0 | 3.3 | 5.7 | 6.4 | 9.6 | 12.0 |
| | US tons | 1.1 | 3.6 | 6.3 | 7.0 | 10.6 | 13.2 |
| Lift height, max | cm | 7.5 | 12.0 | 14.5 | 16.5 | 20.3 | 20.0 |
| | inch | 3.0 | 4.7 | 5.7 | 6.5 | 8.0 | 7.9 |
| Size | cm | 14x13 | 25.5x20 | 28x28 | 29.5x29.5 | 37x37 | 32x52 |
| | inch | 5.5x5.1 | 10x7.9 | 11x11 | 11.6x11.6 | 15x15 | 13x20 |
| Insertion height | cm | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | inch | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Air capacity | l | 2.7 | 15.8 | 28.4 | 39.6 | 82.8 | 96.3 |
| | cu.ft. | 0.1 | 0.6 | 1.0 | 1.4 | 2.9 | 3.4 |

| Type | | V 1 | V 3 | V 5 | V 6 | V 10 | V 12 |
|---|---|---|---|---|---|---|---|
| Operating pressure max. | bar | 8 | 8 | 8 | 8 | 8 | 8 |
| | psi | 116 | 116 | 116 | 116 | 116 | 116 |
| Test pressure | bar | 14 | 14 | 14 | 14 | 14 | 14 |
| | psi | 203 | 203 | 203 | 203 | 203 | 203 |
| Weight | kg | 0.5 | 1.0 | 1.4 | 1.9 | 3.3 | 3.9 |
| | lbs | 1.1 | 2.2 | 3.1 | 4.2 | 7.3 | 8.6 |
| **Type** | | **V 18** | **V 20** | **V 24** | **V 24 L** | **V 31** | **V 35 L** |
| Art.-No. | | 1314002500 | 1314011800 | 1314002600 | 1314002700 | 1314002800 | 1314018300 |
| Lift power,max | to | 17.7 | 19.4 | 24.0 | 24.0 | 31.4 | 35.8 |
| | US tons | 19.5 | 21.4 | 26.5 | 26.5 | 34.6 | 39.5 |
| Lift height, max | cm | 27.0 | 28.0 | 30.6 | 20.1 | 37.0 | 31.0 |
| | inch | 10.6 | 11.0 | 12.0 | 7.9 | 14.6 | 12.2 |
| Size | cm | 47x52 | 48x58 | 52x62 | 31x102 | 65x69 | 43x115 |
| | inch | 19x20 | 19x23 | 20x24 | 12x40 | 26x27 | 17x45 |
| Insertion height | cm | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 | 2.5 |
| | inch | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 | 0.98 |
| Air capacity | l | 195.3 | 224.1 | 296.1 | 211.5 | 517.5 | 349.4 |
| | cu.ft. | 6.9 | 7.9 | 10.4 | 7.5 | 18.0 | 12.3 |
| Operating pressure max. | bar | 8 | 8 | 8 | 8 | 8 | 8 |
| | psi | 116 | 116 | 116 | 116 | 116 | 116 |
| Test pressure | bar | 14 | 14 | 14 | 14 | 14 | 14 |
| | psi | 203 | 203 | 203 | 203 | 203 | 203 |
| Weight | kg | 5.7 | 6.2 | 7.2 | 6.8 | 10.1 | 10.0 |
| | lbs | 12.6 | 13.7 | 15.9 | 15.0 | 22.3 | 22.1 |

| Type | | V 40 | V 48 | V 54 | V 68 |
|---|---|---|---|---|---|
| Art.-No. | | 1314002900 | 1314028300 | 1314003000 | 1314003100 |
| Lift power,max | to | 39.6 | 49.3 | 54.4 | 67.7 |
| | US tons | 43,7 | 54.3 | 60.0 | 74.6 |
| Lift height, max | cm | 40.2 | 45.5 | 47.8 | 52.0 |
| | inch | 15.8 | 17.7 | 18.8 | 20.5 |
| Size | cm | 78x69 | 82x82 | 86x86 | 95x95 |
| | inch | 31x27 | 32x32 | 34x34 | 37x37 |
| Insertion height | cm | 2.5 | 2.8 | 2.8 | 2.8 |
| | inch | 0.98 | 1.1 | 1.1 | 1.1 |
| Air capacity | l | 675.0 | 900.0 | 1,117.8 | 1,457.1 |
| | cu.ft | 23.6 | 31.8 | 39.5 | 51.4 |
| Operating pressure max. | bar | 8 | 8 | 8 | 8 |
| | psi | 116 | 116 | 116 | 116 |
| Test pressure | bar | 14 | 14 | 14 | 14 |
| | psi | 203 | 203 | 203 | 203 |
| Weight | kg | 12.2 | 14.4 | 17.3 | 20.7 |
| | lbs | 26.9 | 31.8 | 38.1 | 45.6 |

## 9. Diagrams: Force vs. Stroke




Force vs. Stroke V 10 - V 68
s (inch)
0 1.0 2.0 3.0 3.9 4.9 5.9 6.9 7.9 8.9 9.8 10.8 11.8 12.8 13.8 14.8 15.7 16.7 17.7 18.7 19.7
77.2 71.6 66.1 60.6 55.1 49.6 44.1 38.6 33.1 27.6 22.0 16.5 11.0 5.5 0.
F (US tons)
V 10
V 12
V 18
V 20
V 24
V 24L
V 31 V 35L
V 40
V 54
V 68
F (kN)
700 650 600 550 500 450 400 350 300 250 200 150 100 50 0
0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500
s (mm)

## EC Conformity Declaration (available on request)

**in accordance with Directive 2006/42/EC**

Manufacturer name and address

**Vetter GmbH**
**A Unit of IDEX Corporation**
**Blatzheimer Str. 10 - 12**
**53909 Zülpich**

We hereby declare that the Mini Lifting Bags for lifting and lowering loads

**Type:** _____
**Serial-No.:** _____
**Model:** _____
(refer to equipment label, to be entered by the customer)

meets the following relevant provisions:

**Directive 2006/42/EC on Machinery**

Applied harmonised standards, references to which have been published in the Official Journal of the European Union:

**DIN EN ISO 12100**
**EN 13731**

Applied national standards and technical specifications:

Authorised representative for the compilation of technical documents:

**Vetter GmbH**
**A Unit of IDEX Corporation**
**Blatzheimer Str. 10 - 12**
**53909 Zülpich**

This EC Conformity Declaration was issued:

Zülpich, 07.11.2019
(Place, Date, Signature)

## Place your trust in emergency pneumatics!

We are the company who can help you, find a solution to your problem!

**Vetter GmbH**
A Unit of IDEX Corporation

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