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Introduction

Lifting bags may only be operated with compressed air, never with flammable or aggressive gases. The lifting bags may only be filled using original Vetter fittings. Check the equipment before and after every use for perfect working order. Pay attention to DIN 7716 if stored for longer periods of time. We will be happy to supply an excerpt from this standard.

- Safety instructions**
- Use only Vetter original fittings. Only these fittings have been tested in the works in accordance with the Pressure Vessel Legislation.
 - Please check the perfect condition of the equipment and lifting bags before and after use.
 - Insert lifting bags at suitable points so that at least 75 % of the bag's surface is beneath the load.
 - Avoid angles larger than 30° (relationship between base and load to be lifted). The bag could be catapulted out of the gap. Create a parallel base to the load to be lifted whenever possible using a sturdy substructure.
 - Never place more than two bags on top of one another.
 - Secure load against slipping. Keep inserting

props the higher the lifting height.

- If a substructure is used always ensure that this is stable and firm. The substructure must support at least the complete area of the bag and should be wider and longer than it is high.

 **Danger**
Risk of slipping

Never place metal on metal when propping up loads!

- Place stones, branches or similar materials under the bag to improve adherence if used on slippery surfaces (ice, snow, mud, etc.).
- Avoid point loads, e.g. building cramps, bolts.
- Never use bags on sharp edges or on very hot days. Use suitable liners and cover the complete surface of the bag.

- Protect bags against flying sparks during welding and cutting work.
- Do not place extra loads on bags, e.g. hydraulic props, winches, falling loads.
- **Never work under suspended loads, never reach under load. Keep your distance.**
- Avoid shearing stresses by squeezing the bag when the load is lowered.
- **Never stand in front of the bag, always to one side when in use since it can be catapulted out from under the load.**

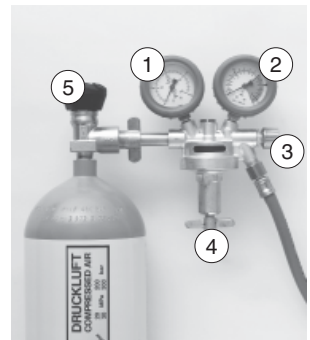
Operating with compressed-air cylinders

Connect pressure regulator with T-screw to compressed-air cylinder.

Close handwheel (3) of pressure reducer.

Open cylinder valve (5): manometer (1) shows the pressure in the cylinder.

Set the back pressure to approx. 2 bar with the adjusting screw (4) (display on manometer (2)).



Connect pressure reducer's air supply hose to dual controller with nipple.

Push nipple into coupling until it catches.

Vetter Low Pressure Lifting Bags 0.5 bar / 7.25 psi

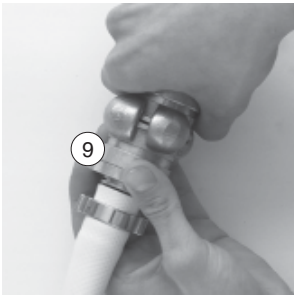
Vetter Medium Pressure Lifting Bags 1 bar / 14.5 psi

Vetter Low Pressure Bags 0.5 bar / 7.25 psi

Operating Low Pressure Lifting Bags with dual deadman controller

Connect the controller to the Lifting Bag with the inflation hose.

Push nipple into twin-lock coupling until it catches and tighten by hand (9).



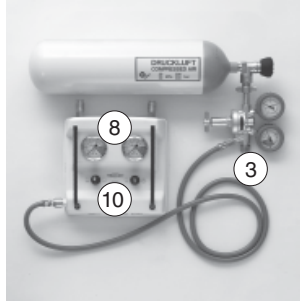
Open the handwheel (3) on the Vetter pressure regulator.

Pull back the lever (10) on the controller to inflate the Lifting Bag.

Keep an eye on the manometer (8) and the load.

Once the desired working pressure for lifting force and height is reached stop inflation by releasing the lever at a max. of 0.5 bar /

7.25 psi or 1 bar / 14.5 psi. The lever automatically returns to the middle position = deadman position.



If the working pressure exceeds 0.5 bar / 7.25 psi or 1 bar / 14.5 psi the safety valve opens.

The max. tolerance for opening and closing the safety valve may be $\pm 10\%$. The manometer (8) shows the pressure in the bag.

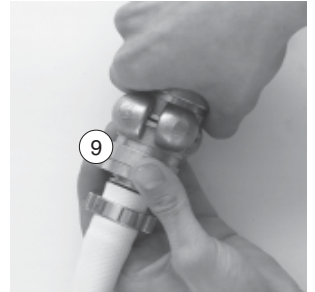
Push the lever forwards to deflate the Lifting Bag and/or lower the load.

Operating Low Pressure Lifting Bags with dual fitting controller

Connect the controller to the Lifting Bag with the inflation hose.



Push nipple into twin-lock coupling until it catches and tighten by hand (9).

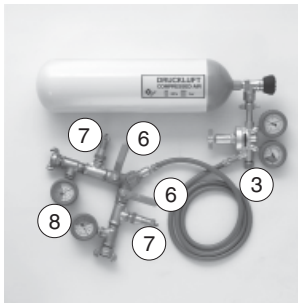


Place the bag in position.

Close the ball valve (6) and discharge device (7) on the head of the safety valve.

Open the handwheel (3) on the Vetter pressure regulator.

Open the ball valve (6) to inflate the Lifting Bag and raise the load.



Keep an eye on the internal pressures in the bag shown at the manometer (8) of the dual controller and the load. The safety valve prevents an overfilling of the bag.

Depending on the type, position and behaviour of the load during lifting, the Lifting Bags are filled either

- simultaneously and equally or
- gradually and / or individually.

Close the ball valve immediately in the event of a stop

or fault, find the cause and remedy.

The max. tolerance for opening and closing the safety valve may be $\pm 10\%$. The manometer (8) shows the pressure in the bag.

Open the discharge device on the head of the safety valve (7) by turning anti-clockwise to deflate the Lifting Bag and / or lower the load.

Operating with other compressed-air sources

Vetter adaptor sets are available for other compressed-air sources.



- Compressed-air mains (15)
- Truck tyre inflator (16)

Warning

Tyre inflation connector must be protected by a safety valve.

- Truck air brake systems (17)

Warning

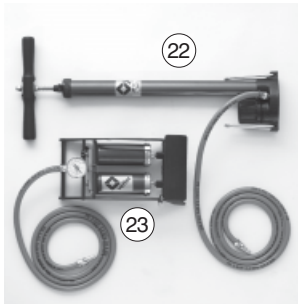
Seal off control line with the dummy coupling (18). Secure truck with wheel blocks.

Vetter Low Pressure Lifting Bags 0.5 bar / 7.25 psi

Vetter Medium Pressure Lifting Bags 1 bar / 14.5 psi

Vetter Low Pressure Bags 0.5 bar / 7.25 psi

- Truck tyre valve (19).
For inflation with a normal hand or foot pump.
- Truck tyre valve connector (20). To take air from the spare tyre.



- Building site compressor (21).
- Hand (22) or foot (23) pump with manometer.

Reducing adaptors and air pumps are available from the manufacturer.

If the maximum pressure from the compressed-air supply exceeds 4 bar / 58 psi a pressure reducer must be used and the pressure reduced to approx. 2 bar / 29 psi.

Practical tips

You should normally use at least two bags of the same size and design. Place each bag as close as possible to the end of the load.

Pull bag under the load with a working line or lower between loads to be separated. On account of the low bearing pressure [maximum 0.5 kg / cm² (7.25 psi) or 1.0 kg / cm² (14.5 psi)] substructures are rarely required, even on soft bases.

Secure the load against slipping during lifting by bracing or other suitable measures. Place Lifting Bags completely under load wherever possible (though with at least 75% of their surface). The lower the contact area between the lifting bag and load, the lower the lifting power.

Place the side wall material between the top and bottom of the bag before inserting under the load. If the insertion height or area is inadequate for a proper

placement of the lifting bags, Vetter Mini Lifting Bags can usually be used to quickly create the necessary space.

Troubleshooting

If a safety valve opens prematurely because a foreign body has penetrated the system, open the discharge device at the head of the safety valve fully by turning anticlockwise so that compressed-air can escape. If this does not remove the foreign body the top part of the valve must be unscrewed. Unscrew in an anticlockwise direction using a pipe wrench. Carefully remove the valve cone and remove the foreign body in front of the sealing plate. Screw the top part of the valve back on tight and check for perfect operation. The preset pressure may not be changed. If the lead or leaded plate on the top part of the valve is removed a safe function can no longer be guaranteed - return the device to the manufacturer.

If this ices up because of an excess atmospheric humidity in connection with low temperatures use a normal defroster (such as is used for car locks).

Maintenance and servicing

Minor damage such as cracks, cuts or punctures can be repaired by the user with the enclosed repair kit as follows:

- a) Select a patch which is approx. 5 cm larger than the damage on all sides.
- b) Mark patch on bag.
- c) Roughen up the surface of the bag and one side of the patch.
- d) Apply a thin layer of special adhesive on the roughened up surface of the bag and the patch.
- e) Leave special adhesive approx. 20 minutes to dry until no longer tacky.

f) Press patch firmly onto prepared area of the bag and rub.

g) Leave bag at least 48 hours in deflated state.

The bag should be tested by a safety expert after the repair.

Recurrent tests

Tests for lifting bags are based on the Pressure Vessel Legislation and DIN 14152 Part 1*. The tests contained herein are to be carried out as specified. Lifting bags with a maximum working pressure of 0.5 bar / 7.25 psi do not have to be tested by a safety expert but can be tested by a qualified tester.

Vetter Lifting Bags 0.5 bar / 7.25 psi are subjected to a constructional and pressure test as well as an approval test in accordance with § 9 of the Pressure Vessel Legislation by a work's tester.

Performance of tests

Tests on delivery by user

During this test in accordance with DIN 14 152 Part 1, Item 5.2* the device should be checked by the user's qualified tester to ensure that all parts have been delivered and that none are damaged. The bags are to be inflated up to 0.2 times the permissible working pressure, i.e. to 0.1 bar / 1.5 psi. The qualified tester should then perform a visual check.

Recurrent tests

The lifting bag system should be checked after every use, though at the latest after one year, to ensure that all parts are complete and none are damaged. If all parts are complete and present the lifting bag should be inflated to 0.5 times the maximum working pressure of 0.5 bar / 7.25 psi, i.e. 0.25 bar / 4 psi, and then washed with luke-warm soapy water. Check for cracks, wear, cuts or

* Pressure Vessel Legislation and DIN 14152 Part 1 are only valid in Germany.

Vetter Low Pressure Lifting Bags 0.5 bar / 7.25 psi

Vetter Medium Pressure Lifting Bags 1 bar / 14.5 psi

Vetter Low Pressure Bags 0.5 bar / 7.25 psi

other damage. Lifting bags are made of neoprene-coated fabric. However, air diffuses through neoprene (completely safe during work with the bag). During tests for leaks with leak-finder spray and warm soapy water this effect appears as a fine-pore foaming. This is typical for the material and should not be rated as a leak. Only if air escapes profusely or more than 10 % is lost after 1 hour should the bag be repaired or returned to the manufacturer. Otherwise inflate the bag to the maximum working pressure of 0.5 bar / 7.25 psi \pm 10 %. At 0.55 bar / 8 psi the safety valve on the controller should be fully open, the pressure inside the bag may not rise any further.

If the safety valve does not open fully, stop the test and remedy the fault in the manner explained under "Troubleshooting". Once the fault has been remedied repeat this part of the test.

In accordance with the Pressure Vessel Legislation and DIN, the user is responsible for the correct performance of the recurrent tests.

We recommend that a written record be kept of the test and results.

Vetter offers courses to train qualified testers.

Table of recurrent tests

Time Interval	Type of test	Tester*	Basis*
Before initial commissioning	Acceptance inspection in manufacturer's works	Work's tester	Pressure Vessel Legislation § 9
After receipt by the user	Check on delivery	Qualified tester	DIN 14 152, Part 1, Item 5.2
After every use	Visual and functional inspection	Qualified tester	DIN 14 152, Part 1, Item 5.3.2
Annually	Visual and functional inspection	Qualified tester	DIN 14 152, Part 1, Item 5.3.3
After repairs	Test on special occasions	Qualified tester	Pressure Vessel Legislation § 11

* Pressure Vessel Legislation and DIN 14152 Part 1 are only valid in Germany.

Vetter Low Pressure Lifting Bags 0.5 bar / 7.25 psi

Vetter Medium Pressure Lifting Bags 1 bar / 14.5 psi

Vetter Low Pressure Bags 0.5 bar / 7.25 psi

Technical data

Vetter Low Pressure Lifting Bags 0.5 bar / 7.25 psi

Model		VSL 12	VSL 7	VSL 5	VSL 3
Type		0/12	I/6	II/4	III/3
DIN-code*		LH50S	LH30S	LH20S	LH10S
Product No.: complete set		111 00 000	112 00 000	113 00 000	114 00 000
Product No.: individual bag		111 01 000	112 01 000	113 01 000	114 01 000
Lifting power (2 bags = 1 set)	kN (to)	113 (11.3)	65 (6.5)	45 (4.5)	29 (2.9)
	US-tons	12.5	7.2	5	3.2
Lifting height	cm	110	62	60	45
	in.	43	24	24	18
Diameter	cm	120	91	76	61
	in.	47	36	30	24
Max. allowable working pressure	bar	0.5	0.5	0.5	0.5
	psi	7.25	7.25	7.25	7.25
Air req. for 2 bags	litres	3729	1209	816	393
	cu.ft.	132	43	29	13.14
Nominal content 1 bag	litres	1243	403	272	131
	cu.ft.	44	14	9.6	4.6
Test pressure	bar	0.65	0.65	0.65	0.65
	psi	9.4	9.4	9.4	9.4
Insertion ht. (uninflated), approx.	cm	3	3	3	3
	in.	1.2	1.2	1.2	1.2
Weight, 2 bags with valise	kg	44	25	20	14
	lbs.	97	55	44	31
Weight complete set	kg	58	39	34	28
	lbs.	128	86	75	62

Vetter Medium Pressure Lifting Bags 1.0 bar / 14.5 psi
for export only

Model		VSM 24	VSM 14	VSM 10	VSM 6
Type		1/230	1/130	1/90	1/60
DIN-code*					
Product No.: complete set		311 00 000	312 00 000	313 00 000	314 00 000
Product No.: individual bag		311 01 000	312 01 000	313 01 000	314 01 000
Lifting power (2 bags = 1 set)	kN (to)	226 (22.6)	130 (13.0)	90 (9.0)	58 (5.8)
	US-tons	25	14.3	9.9	6.4
Lifting height	cm	110	62	60	45
	in.	43	24	24	18
Diameter	cm	120	91	76	61
	in.	47	36	30	24
Max. allowable working pressure	bar	1.0	1.0	1.0	1.0
	psi	14.5	14.5	14.5	14.5
Air req. for 2 bags,	litres	4972	1612	1088	524
	cu.ft.	175	57	38	19
Nominal content, 1 bag	litres	1243	403	272	131
	cu.ft.	44	14	9.6	4.6
Test pressure	bar	1.3	1.3	1.3	1.3
	psi	18.9	18.9	18.9	18.9
Insertion ht. (uninflated), approx.	cm	3	3	3	3
	in.	1.2	1.2	1.2	1.2
Weight, 2 bags with valise	kg	45	26	21	15
	lbs.	99	57	46	33
Weight, complete set	kg	59	40	35	29
	lbs.	130	88	77	64

* Pressure Vessel Legislation and DIN 14152 Part 1 are only valid in Germany.



Vetter Low Pressure Lifting Bags 0.5 bar / 7.25 psi

Vetter Medium Pressure Lifting Bags 1 bar / 14.5 psi

Vetter Low Pressure Bags 0.5 bar / 7.25 psi

Vetter Low Pressure Bags 0.5 bar / 7.25 psi *

Type / Model	LH10	LH30	LH10 S	LH20 S
Art.-No.	11801000	11802000	11803000	11804000
Lifting capacity kN	22.40	61.90	10.82	22.32
Lifting capacity kg	2240	6190	1082	2232
Nominal capacity kN	11.20	30.95	10.82	22.32
Nominal capacity kg	1120	3095	1082	2232
Lifting height cm	36.5	60	45	65
Nominal stroke cm	18	30	45	65
Size cm	65 x 69	125 x 99	50 x 45	70 x 65
Nominal content, litres	64	284	121	369
Air requirement at 0.5 bar, litres	96	426	182	554
Weight kg	2.0	5.0	3.5	8.0
Working pressure bar	0.5	0.5	0.5	0.5
Test pressure bar	0.65	0.65	0.65	0.65
Bursting pressure bar	1.5 - 5.6	1.5 - 5.6	1.5 - 5.6	1.5 - 5.6
Insertion height cm	2	2	4	4

* not available in USA

LH30 S	LH50 S
11805000	11806000
31.07	50.72
3107	5072
31.07	50.72
3107	5072
65	90
65	90
90 x 70	110 x 93
526	1152
789	1728
9.5	11.0
0.5	0.5
0.65	0.65
1.5 - 5.6	1.5 - 5.6
4	4

**EC Declaration of Conformity in the
intendment of the EC Machine Directive
89 / 392 / EEC**

We

Manfred Vetter GmbH & Comp.
Blatzheimer Strasse 10-12
D-53909 Zülpich

hereby declare that the lifting bags

(0/12; I/6; II/4; III/3; 1/230; 1/130; 1/90; 1/60)
for raising and lowering loads

Serial No.:

Design:

(see ratings plate, to be completed by customer)

comply with the following pertinent regulations in
their standard design:

*Machine Directive 89 / 392 / EEC
as amended by Directives 91 / 368 / EEC,
93 / 44 / EEC, 94 / 68 / EEC.*

Harmonised standards employed:

EN 292 Part 1 / 2

National standards and technical specifications
employed:

Pressure Vessel Legislation

Internal measures ensure that the standard
lifting bags always comply with the require-
ments of the latest EC Directives and applic-
able standards.

Zülpich, October 27, 1995