

# Aircraft Lifting Bags

Lifting out of Limits



## Place your trust in emergency pneumatics!

We are the enterprise, which helps you to find the right solution!

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## Why recovery equipment

### Rapid recovery in critical situations

- › allows rapid action on site
- › material protecting recovery

**“Basically, airplanes are built to fly and have no towing eyes like those on cars” says Hans Hofer in describing the challenges of most aircraft recoveries.**

In the interest of aerodynamics, modern airplanes are increasingly sensitive in design and construction, with the difficulty that one needs special equipment and know-how to avoid further damage and the resulting additional financial losses when recovering an aircraft.

*\*Former head of the airport fire brigade Frankfurt, Fraport AG*



A timely removal is the goal of recovery

### “Aircraft skids off the runway”

Headlines such as these frequently reached us. Recently in the media there has been an increasing number of aircraft skidding off of runways during starts and landings causing the nose to become stuck in snow or in the adjacent grass strip. Damaged aircrafts can block the runway, taxiway and gate:

- › the airport will **lose several million €** per day  
Example: Learjet ca. 0.25 million €  
B 737 ca. 0.50 million €  
A 340 ca. 2.00 million €
- › in addition, the **airlines** lose a further **1 – 10 million €** through flight cancellation and costs for possible passenger compensation
- › damaged image for the airport operator and the airline.



Foto: Alexander Blum

## Why Aircraft Lifting Bags

### Secure lifting on any surface

- › high lateral load tolerance
- › smooth lifting by avoiding point loading
- › relatively quick to deploy
- › good adaptation to different surfaces

If the taxiway is blocked by an aircraft, the quick and safe action of the recovery team is of particular importance. Aircraft lifting bags are specifically designed to lift aircraft of various sizes and types. The professional lifting of an aircraft represents the first step for fast and gentle recovery. In addition to the fast operational readiness, there are numerous other factors that justify the use of aircraft lifting bags.

### Why Aircraft Lifting Bags:

- › low insertion height of max. 25 cm (9.8 inch) compared to recovery jacks
- › exceptional side stability compared to recovery jacks
- › Aircraft Lifting Bags can take sheering forces during angle lift
- › because of their contact surface and operating pressure also useable for uneven ground beside the runway
- › can be repaired
- › long life duration of approx. 18 – 20 years



Aircraft Lifting Bags – quick and secure recovery



## Why Vetter

### Decades of experience and confidence

- › first ALB already produced in 1981
- › many years of experience
- › individually tested (with inspection seal)
- › made in Germany



Since the early 1980s Vetter GmbH has been producing quality aircraft lifting bags for airports around the world at its site in Zülpich. Long-standing international cooperation with airport fire brigades make Vetter your reliable partner. The divided contact chambers of Vetter aircraft lifting bags enable optimum adaptation to the attachment surfaces on aircraft, so that the pressure is distributed optimally. With a maximum insertion height of 25 cm (9.8 inch) and a bag surface of up to 14 m<sup>2</sup>, lifting bags are ideal to lift aircraft evenly up to 4 m (157.5 inch, without base). The number of control systems and hoses to be used depends on the number of chambers of the lifting bag sets. In sets with divided contact chambers this can be controlled separately in order to control the sensitive contact with the aircraft more effectively.

The selection of the appropriate aircraft lifting bags depends, among other things, on the following factors:

- › Type and positioning of the damaged aircraft
- › Recovery weight of the aircraft
- › Attachment areas for the aircraft lifting bag
- › Specifications of recovery guidelines (maximum surface pressure)



### 1 bar technology – the innovation

Our **Vetter** aircraft lifting bags 1 bar/14.5 psi are characterized by their sturdiness, strength, exceptional side stability and stability under load. As opposed to the 0.5 bar/7.25 psi series, the side stability of the 1 bar/14.5 psi series is increased by approx. 40 %. A significantly improved lateral load tolerance provides increased stability and greater safety when lifting aircraft. The lifting bags, hoses and controllers are fitted with quick-action couplings enabling easy and time-saving inter-coupling of the individual elements. That makes fast and effective recovery possible.

**Note:** The Vetter Aircraft Lifting Bags are also available with 0.5 bar technology.



Each set's designation is based on its lifting power and maximum lifting height:

### ALB 30/305: at least 30 t (300 kN) lifting power + 305 cm max. lifting height

1.0 bar <i>ALB-Sets = Nominal lift. power</i>	Lifting height, max.	Types of Aircrafts	suitable ALB Sets
ALB 3/100 = 66 kN (6.6 t)	100 cm/39 inch	e.g. Regional Jets, CRJ 900, Dash 8, F 50	3 x ALB 14/160
ALB 5/120 = 112 kN (11.2 t)	120 cm/46.8 inch	e.g. B 717, B 727, B 737 A 319, A 318, F 100, F 50	2 x ALB 30/245 2 x ALB 30/305
ALB 14/160 = 280 kN (28 t)	160 cm/62.4 inch	e.g. B 707, B 727, B 757, B 767, A 300, A 321, A 320	2 x ALB 30/245 4 x ALB 30/305
ALB 30/245 = 650 kN (65 t)	245 cm/95.6 inch	e.g. B 747, B 777 A 340, A 330, MD 11	2 x ALB 30/245 4 x ALB 30/305 2 x ALB 40/305
ALB 30/305 = 650 kN (65 t)	305 cm/119 inch		
ALB 30/380 = 650 kN (65 t)	380 cm/148 inch		
ALB 40/305 = 874 kN (87.4 t)	305 cm/119 inch		
ALB 60/400 = 1320 kN (132 t)	400 cm/156 inch		

**For large airplanes such as the A380, Vetter offers you special 60-ton lifting bags.**

**Vetter offers recovery sets to accommodate various aircraft categories. We would be pleased to assist you in selecting the appropriate set. Please do not hesitate to contact us: +49 (0) 22 52 / 30 08-0 or [vetter.rescue@idexcorp.com](mailto:vetter.rescue@idexcorp.com)**

### ALB 1/23 and 1/13 – The specialist for small aircrafts

Recently we developed the 1-bar ALB 1/13 and ALB 1/23 aircraft lifting bags especially for small airplanes such as Piper, Cessna or Learjet. These lifting bags can be used in recovering small aircraft up to a theoretical recovery weight of 23 tons (50.7 lbs). With their low insertion height of 8 cm (3.2 inch) and their low weight, these lifting bags can be brought into position quickly and easily, even in the smallest openings between the airplane and the ground. Like the normal aircraft lifting bags, they feature protection pads to protect sensitive structures.



# Vetter Contour matching

Optimum adjustment to any shape

- › optimum distribution of lifting force
- › lifting capacity is fully utilised
- › suitable for universal use
- › enables minimum pressure point weight



## “Straight and round don’t match.”

Aircraft recovery teams worldwide are faced with extremely difficult and varying situations when carrying out lifting operations of an aircraft on ground. The modern contour matching system developed by Vetter engineers together with Frankfurt airport specialists, is a result of the special needs in such situations. With the new vacuum contour chambers you get a better hold on the situation at the operation site.



Left: before / right: after, vacuum drawn

## Everything is stable and gently under control

Applicable for all types of aircraft, the stable chambers meet the highest safety specifications. Applied any amount of times, they enable guaranteed straight lifting with the minimum of pressure point loading on the sensitive aircraft body and create a stable transition between the lifting bag and the aircraft. Costly secondary damage can be avoided and the full-surface contact ensures maximum load stability.



Perfect match of “straight” and “round”

## Why is contour matching essential?

According to Mr. Hofer\*, contour matching results in a clear improvement in safety, especially as regards load stability with an aircraft recovery. The lifting power of the lifting bags can be used to its full extent and the danger of damage to both airplane and lifting bags is minimised. The Vetter vacuum chambers are a perfect adaptation of the “straight” lifting bags to the “round” airplane.

\*Former head of the Airport fire brigade Frankfurt, Fraport AG

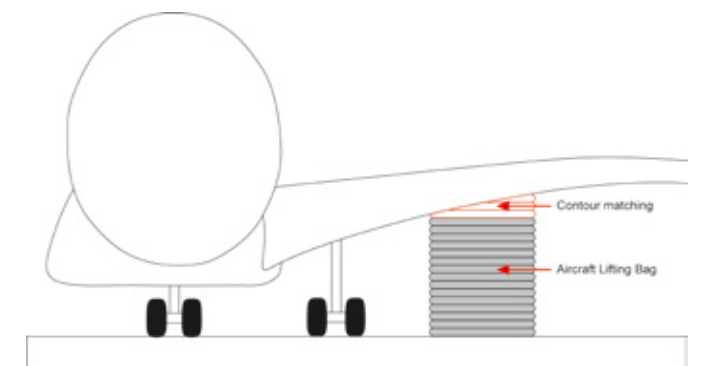
## Sets Contour matching\* – consisting of:

Art.-No.	Beschreibung	Set 30 to	Set 40 to	Set 60 to
		3500008601	3500008701	3500008801
3500006301	ALB single chamber, 2,300 x 1,000 x 200 mm, 0.5 bar	3	6	9
3500006401	ALB single chamber, 2,300 x 500 x 200 mm, 0.5 bar	3	6	9
3500008201	ALB single chamber, 1,400 x 1,000 x 200 mm, 0.5 bar	6	15	18
3500006100	ALB single chamber, 2,300 x 1,000 x 200 mm, Vacuum	3	4	6
0350003802	ALB controller, deadman, 10-fold (0.5 bar)	2	3	4
0351001400	Air distributor, claw/quick coupling 6-fold	1	1	1
0350007401	Inflation hose, 10 m, yellow, quick coupling	30	45	60
0350019802	ALB controller, deadman, 8-fold, Vacuum	1	1	1
0350022600	Prefilled bags, 400 x 600 mm, filled with 0,02 cbm styrofoam balls	60	60	60
0350022700	Labelset nos. 1 – 25	2	2	2
0350022800	Labelset nos. 26 – 50	0	2	2

\* Technical changes reserved.

Would you like to receive detailed information about our contour matching systems? Request our free animated “Aircraft Recovery” CD for a demonstration. The animation shows how easy it is to use. We look forward to hearing from you!

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**[vetter.rescue@idexcorp.com](mailto:vetter.rescue@idexcorp.com)**



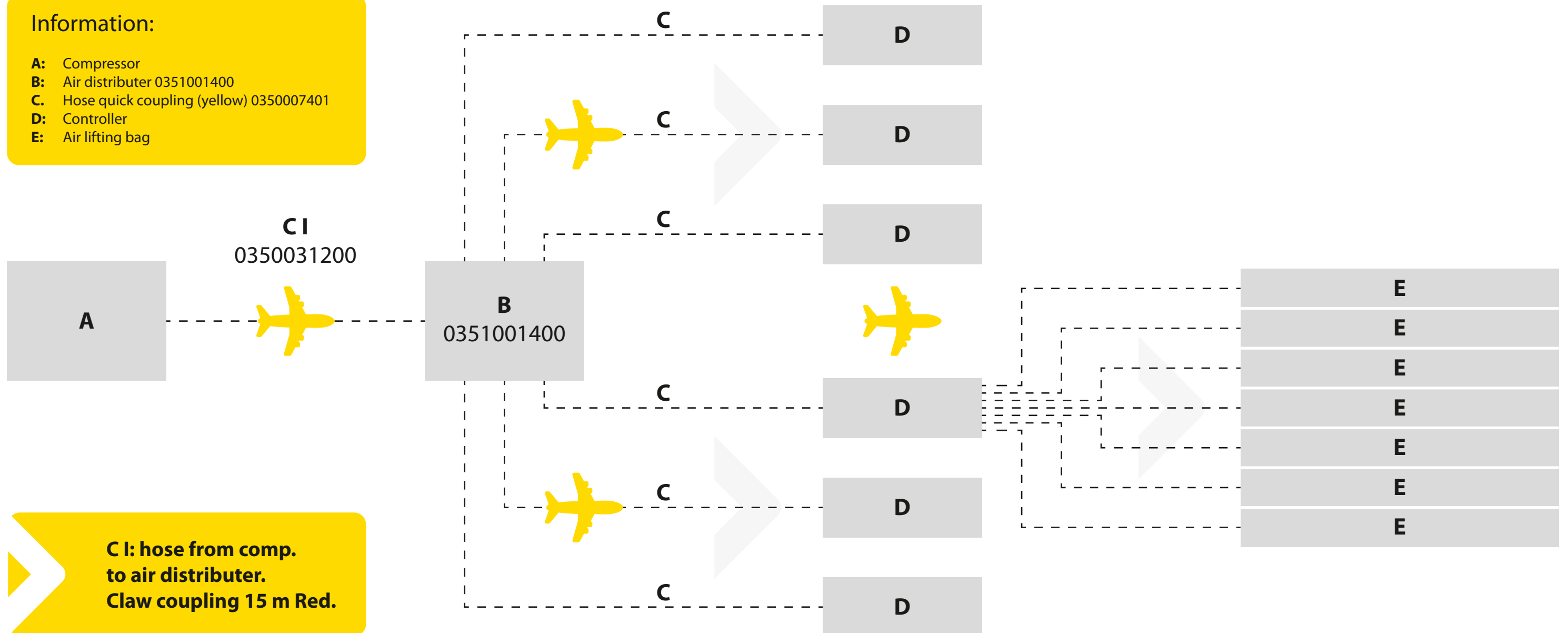


# Operation diagram aircraft lifting bags



## Information:

- A: Compressor
- B: Air distributor 0351001400
- C: Hose quick coupling (yellow) 0350007401
- D: Controller
- E: Air lifting bag



## Vetter single chambers

### Practical power pack

The Vetter single chambers can be used flexibly and are therefore ideally suited for the recovery of aircraft in inaccessible locations: Where other chambers reach their limits, these cushions can be stacked at any height. In addition, the product is particularly resource-saving in terms of repair and maintenance, as it is always a single chamber and not a combination of chambers.

- › easy to transport
- › only 2 persons necessary for use
- › can also be used in inaccessible terrain
- › flexible in height
- › simple repair
- › rapid maintenance and testing
- › easy to clean
- › inexpensive and simple replacement procurement, since only one chamber has to be newly procured



Single chambers are connected via velcro technology

## Vetter Base Bags

### Stable lifting at height

Vetter Base Bags are the optimal support when you need to go out there. Vetter Base Bags can be connected to each other so that the desired area or height can be achieved. This makes it very easy to place the lifting bags at the right location – Euro pallets or similar aids are no longer necessary.

- › equipped with a safety valve for 0.5 or 1.0 bar
- › equipped with quick-release couplings
- › can be connected to each other by the straps attached to the base bags
- › the base bags are equipped with Velcro and fleece, so they hold together more easily



### Single chambers

	ALB 14 t	ALB 30 t	ALB 40 t	ALB 60 t
<b>Art.-No.</b>	–	–	–	–
<b>Total area (L x W)</b> <i>cm/inch</i>	214 x 154 84.3 x 60.0	298 x 243 117.3 x 95.7	440 x 219 173.2 x 86.2	440 x 324 173.2 x 127.6
<b>Support area (L x W)</b> <i>cm/inch</i>	200 x 140 78.7 x 55.1	284 x 229 111.8 x 90.2	426 x 205 167.7 x 80.7	426 x 310 167.7 x 122.0
<b>Weight, approx.</b> <i>kg/ibs</i>	12 26.5	19 41.9	25 55.1	35 77.2
<b>Höhe pro Kammer</b> <i>cm/inch</i>	20 7.9	20 7.9	20 7.9	20 7.9

### Base Bags

	ALB 30 t	ALB 40 t
<b>Art.-No.</b>	–	–
<b>Total area (L x W)</b> <i>cm/inch</i>	370 x 310 145.7 x 122	510 x 290 200.8 x 114.2
<b>Support area (L x W)</b> <i>cm/inch</i>	350 x 290 137.8 x 114.2	490 x 270 192.9 x 106.3
<b>Weight, approx.</b> <i>kg/ibs</i>	60 132.3	80 176.4
<b>Höhe pro Base Bag</b> <i>cm/inch</i>	60 23.6	60 23.6

## Technical data\*

### 1.0 bar

ALB Sets Art.-No.	Lifting power t/US tons	Lifting height, max. cm/inch	Bag chambers	Support area (L x B) cm/inch	Total area (L x B) cm/inch	Insertion height (deflated bag) cm/inch	Air require- ment litre/ cu. ft.	Packing dimensions of the box (L x B x H) cm/inch	Dimensions of the packing bag (L x B x H) cm/inch	Weight approx. kg/lbs	Weight of set approx. kg/lbs
<b>ALB 3/100</b> 3510000800	6.6 7.3	100 39	5	98 x 68 39 x 27	112 x 82 44 x 32	7 2.8	1,722 60	113 x 48 x 60 45 x 19 x 24	110 x 30 x 40 43 x 12 x 16	26 57	68 150
<b>ALB 5/120</b> 3510000900	11.2 12.4	120 47	6	140 x 80 55 x 32	154 x 94 61 x 37	8 3.1	3,396 120	115 x 123 x 61 45 x 48 x 24	110 x 40 x 40 43 x 16 x 16	41 90	207 456
<b>ALB 14/160</b> 3510001000	28 30.9	160 63	8	200 x 140 79 x 55	214 x 154 84 x 61	10 3.9	10,618 374	180 x 63 x 71 71 x 25 x 28	170 x 55 x 45 67 x 22 x 18	93 205	185 408
<b>ALB 30/245</b> 3510001100	65 71.7	245 96	14	284 x 229 112 x 90	298 x 243 117 x 96	15 6.0	32,626 1,152	270 x 109 x 96 106 x 43 x 38	240 x 90 x 60 95 x 35 x 24	256 564	450 993
<b>ALB 30/305</b> 3510001200	65 71.7	305 120	17	284 x 229 112 x 90	298 x 243 117 x 96	20 7.9	40,850 1,442	270 x 109 x 96 106 x 43 x 38	240 x 95 x 65 95 x 37 x 26	320 706	513 1,131
<b>ALB 30/380</b> 3510001700	65 71.7	380 150	21	284 x 229 112 x 90	298 x 243 117 x 96	20 7.9	49,300 1,740	270 x 109 x 96 106 x 43 x 38	240 x 100 x 70 95 x 39 x 28	380 838	588 1,297
<b>ALB 40/305</b> 3510001300	87.4 96.4	305 120	20	426 x 205 168 x 81	440 x 219 173 x 128	20 7.9	58,174 2,054	270 x 109 x 96 106 x 43 x 38	240 x 100 x 70 95 x 39 x 28	480 1,058	681 1,502
<b>ALB 60/400</b> 3510001400	132 145.6	400 157	25	426 x 310 168 x 122	440 x 324 173 x 128	25 9.8	118,532 4,184	370 x 108 x 101 146 x 43 x 40	340 x 100 x 80 134 x 39 x 32	840 1,852	1,155 2,547

\* Technical datas relate to single bags. Technical changes reserved.

#### Aircraft Lifting Bags 1.0 bar (14.5 psi):

Working pressure: 1.0 bar (14.5 psi)

Test pressure: 1.5 bar (21.75 psi)

ALB Sets Art.-No.	Lifting power t/US tons	Lifting power of set t/US tons	Lifting height, max. cm/inch	Insertion height (deflated bag) cm/inch	Diameter cm/inch	Air require- ment at 1.0 bar litre/cu. ft.	Inflation time approx. sec.	Weight approx. kg/lbs	Weight of set approx. kg/lbs
<b>ALB 1/13</b> 3510002400	6.5 7.2	13 14.3	62 24	10 3.9	91 35.5	1,038 37	62	21 46	63 139
<b>ALB 1/23</b> 3510002300	11.3 12.5	22.6 24.9	110 43	12 4.7	120 46.8	3,023 107	191	30 66	83 183

## Technical data\*

### 0.5 bar

ALB Sets Art.-No.	Lifting power t/US tons	Lifting height, max. cm/inch	Bag chambers	Support area (L x B) cm/inch	Total area (L x B) cm/inch	Insertion height (deflated bag) cm/inch	Air require- ment litre/ cu. ft.	Packing dimensions of the box (L x B x H) cm/inch	Dimensions of the packing bag (L x B x H) cm/inch	Weight approx. kg/lbs	Weight of set approx. kg/lbs
<b>ALB 3/100</b> 350000300	3.3 3.6	100 39	5	98 x 68 39 x 27	112 x 82 44 x 32	7 2.8	1,292 46	113 x 48 x 60 45 x 19 x 24	110 x 30 x 40 43 x 12 x 16	26 57	68 150
<b>ALB 5/120</b> 3500005200	5.6 6.2	120 47	6	140 x 80 55 x 32	154 x 94 61 x 37	8 3.1	2,550 90	115 x 123 x 61 45 x 48 x 24	110 x 40 x 40 43 x 16 x 16	41 90	207 456
<b>ALB 14/160</b> 350000400	14.8 16.3	160 63	8	200 x 140 79 x 55	214 x 154 84 x 61	10 3.9	7,964 281	180 x 63 x 71 71 x 25 x 28	170 x 55 x 45 67 x 22 x 18	93 205	185 408
<b>ALB 30/245</b> 350000500	30 33.1	245 96	14	284 x 229 112 x 90	298 x 243 117 x 96	15 6.0	24,510 865	270 x 109 x 96 106 x 43 x 38	240 x 90 x 60 95 x 35 x 24	256 564	450 993
<b>ALB 30/305</b> 350000600	32.5 33.5	305 120	17	284 x 229 112 x 90	298 x 243 117 x 96	20 7.9	30,638 1,081	270 x 109 x 96 106 x 43 x 38	240 x 95 x 65 95 x 37 x 26	320 706	513 1,131
<b>ALB 30/380</b> 3500007500	32.5 33.5	380 150	21	284 x 229 112 x 90	298 x 243 117 x 96	20 7.9	39,975 1,412	270 x 109 x 96 106 x 43 x 38	240 x 100 x 70 95 x 39 x 28	380 838	588 1,297
<b>ALB 40/305</b> 350000800	43.7 48.2	305 120	20	426 x 205 168 x 81	440 x 219 173 x 128	20 7.9	43,631 1,540	270 x 109 x 96 106 x 43 x 38	240 x 100 x 70 95 x 39 x 28	480 1,058	681 1,502
<b>ALB 60/400</b> 3500001000	66 72.8	400 157	25	426 x 310 168 x 122	440 x 324 173 x 128	25 9.8	88,900 3,138	370 x 108 x 101 146 x 43 x 40	340 x 100 x 80 134 x 39 x 32	840 1,852	1,155 2,547

\* Technical datas relate to single bags. Technical changes reserved.

#### Aircraft Lifting Bags 0.5 bar (7.25 psi):

Working pressure: 0.5 bar (7.25 psi)

Test pressure: 0.75 bar (10.88 psi)



# Accessoires

## Inflation hoses

### Inflation hose with quick action coupling

- > 10 m (32 ft.)
- > yellow

0350007401



### Compressed-air hose with claw coupling

- > 10 m (32 ft.)
- > yellow

0350007301



### Set of inflation hoses

- > incl. transport- and storage box

20 pieces: 0351001100

30 pieces: 0351001200

40 pieces: 0351001300



### Hose roller box

- > 320 m (12.6 inch)

3500011000



## Compressors & Accessoires\*

### Mobile compressors

Model 7/31: 0350006600

Model 7/41: 0350007100



### After cooling

- > for mobile compressors model 7/31 and 7/41

0350007301



### Filter combination ZTV-SIB 90

- > for mobile compressors model 7/31 and 7/41

0350006800



## Other

### Compressed air distributor

- > 1 inlet claw coupling,
- > 6 shut-off outlets with quick-action coupling

0351001400



### Vacuum adapter incl. noise reduction

- > for deflation of Aircraft Lifting Bags

0351001500



## Dead man controller 1,0 bar

### 10-section controller

- > incl. transport- and storage box

0351000701



### 10-section controller, incl. 3 contour chamber controllers

- > incl. transport- and storage box

0351000701



### 17-section controller, incl. 2 contour chamber controllers

- > incl. transport- and storage box

351000901



### 17-section controller, incl. 3 contour chamber controllers

- > incl. transport- and storage box

351000800



## Dead man controller 0,5 bar

### 10-section controller

- > incl. transport- and storage box

0350003801



### 10-section controller, incl. 3 contour chamber controllers

- > incl. transport- and storage box

350003401



### 17-section controller, incl. 2 contour chamber controllers

- > incl. transport- and storage box

0350024801



### 17-section controller, incl. 3 contour chamber controllers

- > incl. transport- and storage box

350004201



Vetter offers some more accessories for Aircraft Recovery like Combination lifting tackles. Contact us: +49 (0) 22 52 / 30 08-0 or vetter.rescue@idexcorp.com

\*Technical Data on request