Place your trust in emergency pneumatics!

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

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vetter.de
Why recovery equipment
Rapid recovery in critical situations

› allows rapid action on site
› material protecting recovery

Why Aircraft Lifting Bags
Secure lifting on any surface

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

“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

“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.

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.

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 usable for uneven ground beside the runway
› can be repaired
› long life duration of approx. 18 – 20 years

A timelny removal is the goal of recovery

Foto: Alexander Blum

Aircraft Lifting Bags – quick and secure recovery
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 m², 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.

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

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

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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

<table>
<thead>
<tr>
<th>1.0 bar ALB-Sets</th>
<th>Lifting height, max.</th>
<th>Types of Aircrafts</th>
<th>suitable ALB Sets</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALB 3/100 = 66 kN (6.6 t)</td>
<td>100 cm/39 inch</td>
<td>e.g. Regional Jets, C 900, D ash B, F 50</td>
<td>3 x ALB 14/160</td>
</tr>
<tr>
<td>ALB 5/120 = 112 kN (11.2 t)</td>
<td>120 cm / 46.8 inch</td>
<td>e.g. B 777, B 737, B 747 A 319, A 318, F 100, F 50</td>
<td>2 x ALB 30/245</td>
</tr>
<tr>
<td>ALB 14/160 = 280 kN (28 t)</td>
<td>160 cm / 62.4 inch</td>
<td>e.g. B 787, B 747, B 757, B 767, A 300, A 321, A 320</td>
<td>2 x ALB 30/245</td>
</tr>
<tr>
<td>ALB 30/245 = 650 kN (65 t)</td>
<td>245 cm / 95.6 inch</td>
<td>e.g. B 747, B 777 A 340, A 330, MD 11</td>
<td>2 x ALB 30/245</td>
</tr>
<tr>
<td>ALB 30/305 = 650 kN (65 t)</td>
<td>305 cm / 119 inch</td>
<td>4 x ALB 30/305</td>
<td>2 x ALB 30/305</td>
</tr>
<tr>
<td>ALB 30/380 = 650 kN (65 t)</td>
<td>380 cm / 148 inch</td>
<td>4 x ALB 30/305</td>
<td></td>
</tr>
<tr>
<td>ALB 40/305 = 874 kN (87.4 t)</td>
<td>305 cm / 119 inch</td>
<td>For large airplanes such as the A380, Vetter offers you special 60-ton lifting bags.</td>
<td>2 x ALB 30/245</td>
</tr>
<tr>
<td>ALB 60/400 = 1320 kN (132 t)</td>
<td>400 cm/156 inch</td>
<td>4 x ALB 30/305</td>
<td></td>
</tr>
</tbody>
</table>

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.

- Set ALB 1/23
- Double ALB deadman controller
- Developed especially for small planes such as Cessna

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
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.

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.

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

Left: before / right: after, vacuum drawn

Perfect match of “straight” and “round”

Sets Contour matching* – consisting of:

<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>Beschreibung</th>
<th>Set 30 to 3500008601</th>
<th>Set 40 to 3500008701</th>
<th>Set 60 to 3500008801</th>
</tr>
</thead>
<tbody>
<tr>
<td>3500006301</td>
<td>ALB single chamber, 2,300 x 1,000 x 200 mm, 0.5 bar</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>3500006401</td>
<td>ALB single chamber, 2,300 x 500 x 200 mm, 0.5 bar</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>3500008201</td>
<td>ALB single chamber, 1,400 x 1,000 x 200 mm, 0.5 bar</td>
<td>6</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>3500006100</td>
<td>ALB single chamber, 2,300 x 1,000 x 200 mm, Vacuum</td>
<td>3</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>0350003802</td>
<td>ALB controller, deadman, 10-fold (0.5 bar)</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>0351001400</td>
<td>Air distributor, claw/quick coupling 6-fold</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0350007401</td>
<td>Inflation hose, 10 m, yellow, quick coupling</td>
<td>30</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>0350019802</td>
<td>ALB controller, deadman, 8-fold, Vacuum</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0350022600</td>
<td>Prefilled bags, 400 x 600 mm, filled with 0.02 cbm styrofoam balls</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>0350022700</td>
<td>Labelset nos. 1 – 25</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>0350022800</td>
<td>Labelset nos. 26 – 50</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

* 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!

+49 (0) 22 52 / 30 08-0 or vetter.rescue@idexcorp.com
Information:
A: Compressor
B: Air distributor 0351001400
C: Hose quick coupling (yellow) 0350007401
D: Controller
E: Air lifting bag

C I: hose from comp. to air distributor. Claw coupling 15 m Red.
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

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

<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>ALB 14 t</th>
<th>ALB 30 t</th>
<th>ALB 40 t</th>
<th>ALB 60 t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area (L x W) cm/inch</td>
<td>214 x 154 /84.3 x 60.0</td>
<td>298 x 243 /117.3 x 95.7</td>
<td>440 x 219 /173.2 x 86.2</td>
<td>440 x 324 /173.3 x 127.6</td>
</tr>
<tr>
<td>Support area (L x W) cm/inch</td>
<td>200 x 140 /78.7 x 55.1</td>
<td>284 x 229 /111.8 x 90.2</td>
<td>426 x 205 /167.7 x 80.7</td>
<td>426 x 310 /167.7 x 122.0</td>
</tr>
<tr>
<td>Weight, approx. kg/lbs</td>
<td>12 /26.5</td>
<td>19 /41.9</td>
<td>25 /55.1</td>
<td>35 /77.2</td>
</tr>
<tr>
<td>Höhe pro Kammer cm/inch</td>
<td>20 /7.9</td>
<td>20 /7.9</td>
<td>20 /7.9</td>
<td>20 /7.9</td>
</tr>
</tbody>
</table>

### Base Bags

<table>
<thead>
<tr>
<th>Art.-No.</th>
<th>ALB 30 t</th>
<th>ALB 40 t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area (L x W) cm/inch</td>
<td>370 x 310 /145.7 x 122</td>
<td>510 x 290 /200.8 x 114.2</td>
</tr>
<tr>
<td>Support area (L x W) cm/inch</td>
<td>350 x 290 /137.8 x 114.2</td>
<td>490 x 270 /192.9 x 106.3</td>
</tr>
<tr>
<td>Weight, approx. kg/lbs</td>
<td>60 /132.3</td>
<td>80 /176.4</td>
</tr>
<tr>
<td>Höhe pro Base Bag cm/inch</td>
<td>60 /23.6</td>
<td>60 /23.6</td>
</tr>
</tbody>
</table>
### Technical data

#### 1.0 bar

<table>
<thead>
<tr>
<th>ALB Sets</th>
<th>Art.-No.</th>
<th>Lifting power</th>
<th>Lifting height, cm/inch</th>
<th>Bag chambers</th>
<th>Support area (L x B) cm/inch</th>
<th>Total area (L x B x H) cm³</th>
<th>Insertion height (deflated bag) cm/inch</th>
<th>Air requirement at 1.0 bar</th>
<th>Packing dimensions of the bag (L x B x H) cm³</th>
<th>Dimensions of the packing bag (L x B x H) cm³</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALB 3/100</td>
<td>3510000800</td>
<td>6.6</td>
<td>5</td>
<td>108 x 68</td>
<td>112 x 62</td>
<td>7</td>
<td>1,722</td>
<td>113 x 48 x 60</td>
<td>110 x 30 x 40</td>
<td>26</td>
<td>68</td>
<td>49</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALB 5/120</td>
<td>3510000900</td>
<td>11.2</td>
<td>4</td>
<td>140 x 80</td>
<td>154 x 64</td>
<td>8</td>
<td>3,396</td>
<td>115 x 123 x 61</td>
<td>110 x 40 x 40</td>
<td>41</td>
<td>207</td>
<td>90</td>
<td>436</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 0.5 bar

<table>
<thead>
<tr>
<th>ALB Sets</th>
<th>Art.-No.</th>
<th>Lifting power</th>
<th>Lifting height, cm/inch</th>
<th>Bag chambers</th>
<th>Support area (L x B) cm/inch</th>
<th>Total area (L x B x H) cm³</th>
<th>Insertion height (deflated bag) cm/inch</th>
<th>Air requirement at 0.5 bar</th>
<th>Packing dimensions of the bag (L x B x H) cm³</th>
<th>Dimensions of the packing bag (L x B x H) cm³</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
<th>Weight approx. kg/lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALB 3/100</td>
<td>3500000100</td>
<td>3.3</td>
<td>5</td>
<td>98 x 68</td>
<td>112 x 62</td>
<td>7</td>
<td>1,292</td>
<td>113 x 48 x 60</td>
<td>110 x 30 x 40</td>
<td>26</td>
<td>68</td>
<td>49</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ALB 5/120</td>
<td>3500000200</td>
<td>5.6</td>
<td>6</td>
<td>140 x 80</td>
<td>154 x 64</td>
<td>8</td>
<td>2,550</td>
<td>115 x 123 x 61</td>
<td>110 x 40 x 40</td>
<td>41</td>
<td>207</td>
<td>90</td>
<td>436</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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*Technical data 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)

**Aircraft Lifting Bags 0.5 bar (7.25 psi):**
- Working pressure: 0.5 bar (7.25 psi)
- Test pressure: 0.75 bar (10.68 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

- 20 pieces: 0351001100
- 30 pieces: 0351001200
- 40 pieces: 0351001300

Hose roller box

- 320 m (12.6 inch)
- 350001000

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

Vetter offers some more accessories for Aircraft Recovery like Combination lifting tackles. Contact us: +49 (0) 2252 / 30 08-0 or vetter.rescue@idexcorp.com

*Technical Data on request

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

- 17-section controller, incl.
  - 2 contour chamber controllers
  - incl. transport- and storage box
  - 0351001301

Dead man controller 0,5 bar

- 10-section controller
  - incl. transport- and storage box
  - 0351000701

- 17-section controller, incl.
  - 2 contour chamber controllers
  - incl. transport- and storage box
  - 0351001301

- 10-section controller, incl.
  - 3 contour chamber controllers
  - incl. transport- and storage box
  - 03510003401

- 17-section controller, incl.
  - 3 contour chamber controllers
  - incl. transport- and storage box
  - 0350004201