161-5 Series High Pressure Flat Form Lift Bag
Instruction Manual

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1. Preliminary remarks

Lifting air bags should only be deployed by persons who have read this instruction manual prior to use.

The maximum inflation pressure is 145 PSI

The lifting bags can only be used with compressed air.

Under exceptional circumstances, they can be pressurised with water but it is not possible to use the accessories designed for air inflation. Special accessories are necessary (upon request).

No other liquids or gases may be used for pressurization.

2. Safety instructions

- Wear safety equipment for protection: helmet, goggles, safety boots, safety clothing and gloves.
- Only work with inflation components supplied by the original manufacturer.
- Before and after each use, check that accessories and lifting bags are in perfect condition and that they conform to requirements.
- Do not subject the lifting air bags to loads greater than their lifting capacity.

- Insert the lifting cushion at the appropriate point so that at least 75% of the surface of the lift bag is positioned under the load.
- Avoid angles in excess of 30° in relation to the base. The lift bag could slide and be ejected. As far as possible, create a base that is parallel to the surface of the load to be lifted, using a stable reinforcement.

- Never stack more than two lift bags on top of one another.
- Take steps to ensure that the load cannot slide. As the lifting operation progresses, shore up the load by using appropriate cribbing.

- When creating a cribbing system, always make sure that the cribbing material is stable. The reinforcement must be at least capable of supporting the entire surface of the cushion; its length and width must be greater than its height.
- Where there is a slippery base (ice, snow, clay soils etc.), place stones, branches or other similar objects under the lift bag in order to increase ground adhesion.

- Avoid sharp loads such as construction hooks or screws for example.
- Never use the cushions over sharp edges or over burning or incandescent elements. Use suitable intermediate layers and cover the entire bearing surface of the lift bag.
- Temperature range for continuous use: - 5°F to +130°F
- Temperature range for short periods: - 15°F to + 185°F
- Protect the lift bags from sparks during welding or separation operations.

Caution

Sliding risk: when shoring up, never place metal on metal.

Warning

Never stand under the raised load. Never place your hands under the load. Keep at a safe distance.

- Avoid shearing due to the crushing of the lift bags as the load is lowered.
- Discontinue use where there is any risk of falling, breakage or bursting.

Warning

Never stand in front of the cushions when in use but always to one side: ejection hazard under unfavourable circumstances.

3. Lifting capacity performance

161-5 Series Air lifting bags operate according to the following physical principle:

Pressure x surface = Lifting force

Because there is an increase in lift bag's convexity during the lifting operation, the active bearing surface is reduced; this causes the lifting force to decrease as the stroke increases.

If the available pressure is less than 145 PSI, it will be necessary to calculate the lifting force as follows: Lifting force (read from the relevant curve for the cushion used at the chosen height on the Force/Height diagram - See page 10 -) divided by 145 (PSI), multiplied by the value of the available air pressure (PSI).

If circumstances allow, the weight of the load and its lifting height should be determined before work starts. The Force-Lifting height diagram (see page 10) will help you to select the appropriate size of lift bag.

The curves given refer to the complete raising of the entire load, with a pressure of 145 PSI. If the weight is not known, or in the event of an emergency operation requiring prompt action, the largest cushion that can be inserted under the load should be selected.

Applying leverage requires less force than lifting!

In many cases it is still possible to apply leverage to the load, in spite of the fact that the lifting capacity of the lift bag might not be sufficient to raise it.

4. Increasing lifting height and lifting force

In order to increase lifting height, **no more than two cushions may be stacked together**. When determining the total lifting force, only the lifting strength of the smallest lift bag (which must be placed uppermost) should be considered. The lifting heights can be added together.

In order to increase lifting force, lift bags should be placed under the load side by side.

If **two or more** lift bags are used **side by side**, their respective lifting capacities are added together. The lifting height achievable will then be that of the smallest lift bag.

5. 161-5 Series Air lifting bags

The 161-5 Series Air lifting bags range includes 12 sizes of between 1.5 and 89 US tons. They consist of an Aramid fibre reinforcement. They are made up of several layers of material. Each bag is hot vulcanised in a mould under vacuum in one single operation, thus dispensing with the need for adhesive bonding or seaming.

The inflation hoses come in two lengths: 16 feet and 32 feet (other lengths available on request). They are available in 5 different colors: blue, red, yellow, green and black.

Components of the lift bag system :

Compressor or compressed air bottle (SCBA)

Pressure regulator with CGA 347 universal hand-tight inlet

Inflation hoses

Inflation Controller

161-5 Series Air Lifting Bags

The configuration of the control accessories/inflation hoses/lift bags is identical across the range and prevents the inflation of lift bags to an operating pressure above 145 PSI. Never bypass the inflation control unit by connecting the pressure regulator directly to the lift bag. The inflation controller has a safety valve and pressure gauges corresponding to the pressure range and they prevent any over-inflation of the lift bags. Each pressure stage has its own connection system compatible with its pressure level.

Lift bag markings:

Month and year of manufacture

Stroke and lifting capacity

Maximum inflation pressure

EN standard and year (see end of instructions)

6. Inflation hoses and safety couplers

The inflation hoses are supplied in different colors. This color differentiation prevents the various lift bags used from being mixed and ensures that they can be controlled from the correct side of the inflation system.

The inflation hoses are fitted with double lock safety couplers.

To connect the hose end-fitting, push the end-fitting into the coupler until you feel it firmly engage.

To disconnect, push the hose end-fitting into the coupler by applying pressure to the spring and, at the same time, pull out the coupler ring: this breaks the connection. This prevents the coupler from being disconnected accidentally.

7. Air supply with an external source

If the supply pressure exceeds 145 PSI, the use of a pressure regulator is required.

If the compressed air contains oil, use an oil separator.

8. Air supply with a 3000 or 4500 PSI bottle

Connect the pressure regulator to the compressed air bottle by means of the threaded end-fitting.
Close the pressure regulator tap.
Open the tap valve on the bottle: the pressure gauge indicates the pressure in the bottle.
Using the control knob, adjust the secondary pressure to approx. 145 PSI (indication on the pressure gauge).

Connect the pressure regulator air intake hose to the inflation controller input coupler by pushing the end-fitting into the coupler.

9. Using lifting bags with a dual deadman control system

Each supply system has a connector that receives the hose from an air source: bottle, compressor, pump etc.

Connect the inflation hoses of different colors to the lift bag(s) you wish to use.

Single or dual handheld deadman controller with pushbuttons:

This has one or two separate lines allowing for the independent inflation of 1 or 2 lift bags.
To inflate the lift bags, press the upper button. Inflation stops when the button is released. To deflate, use the lower buttons and, again, release them to stop the operation.

When the lifting process is complete, disconnect the deflated lift bags and the inflation hoses . Close the air intake. To empty the pressure regulator, or the hose from the external air supply source, pull the control lever and then push it briefly in order to empty the air from the integrated check valves.

Dual deadman control system:

This has two separate lines allowing for the independent inflation of 2 lift bags.
Each inflation operation is performed via a "deadman" control lever and a line pressure control gauge.

PUSH forward to inflate (to the desired lifting height).

If the maximum operating pressure of 145 PSI is reached, the inflation process must be stopped by releasing the control lever. This will automatically return to the neutral position = deadman position.

PULL to deflate.

When the lifting process is complete, disconnect the deflated lift bags and the inflation hoses. Close the air intake. To empty the pressure regulator, or the inflation hose running from the external air supply source, push the control lever and then pull it briefly in order to empty the air from the integrated check valves.

Single or dual control system (valves and fittings):
These controllers have no return to the safety position (neutral).
Each inflation operation is carried out by means of a ball valve. Deflation is carried out by opening the safety valve cap.


10. Guarding against exceeding the maximum operating pressure of 145 PSI

Excessive filling pressure or a load increase (due, for example, to slippage of the load itself) can cause the maximum operating pressure to be exceeded. The tested proportional safety valves fitted to the control units release the pressure with a margin of tolerance of ±10%, so as to prevent the maximum operating pressure from exceeding 145 PSI.

11. Information for practical use

Examples for the safe and effective deployment of lifting bags:

The distance between the lift bag and the load to be lifted should be minimized as much as possible by means of an appropriate shoring system; this maintains both power and lifting height. For example, a shoring system could be made from squared timber, the surface of which should be no smaller than the lift bag.

- Position the lifting bags under the load requiring lifting, in contact with the entire surface, or at least 75% of it, so that the contact surface between the bags and load is as large as possible and to prevent the bag from sliding.

11.1. To perform the lifting operation, the lower bag, which serves as a base, is fully inflated first and then the upper bag is inflated with care. Never start by inflating the upper bag while the lower bag is deflated. Lowering is carried out in the reverse order: first deflate the upper bag and only then start to deflate the lower bag. Never deflate the lower bag either before or at the same time as the upper bag.

- Avoid using the lifting bags on thin, non-reinforced metal surfaces. Inflating the lift bags could damage these surfaces as the 145 PSI operating pressure exerts a pressure of 145 pounds per inch² on the bearing plane and on the load.

Raising round loads:

Place two lift bags – preferably of the same size – on either side of the load and inflate them slowly.

Warning
If the load is of small diameter (the angle of incidence thus being steeper), the bags could be ejected.

Raising track vehicles:

Insert the lift bag under the load; enlarge the bearing surface if necessary

(at the axles for example). Take steps to ensure that the load cannot slide. Inflate the bag slowly.

Spreading grates: To release trapped persons or to open up access for fire fighters. Insert the bag between the grate bars or between the grate and the masonry and inflate slowly.

Warning

Risk of injury by pieces of metal and loosened stones. The bags' strength can cause the grate bars to break or the grate could suddenly come away from the masonry.

12. Maintenance, servicing and storage

After each use or after a relatively long period in storage, check that the lifting lifting bags and associated accessories are complete and in perfect working order. Where necessary, contact 161-5 Series directly for a detailed checklist for visual inspections and functional tests.

The lifting bags can be cleaned with soap and warm water. They should then be dried at room temperature. The use of hydrocarbons or chemicals for cleaning is prohibited.

After use or after a relatively long period in storage, start to inflate the lifting bags carefully to a pressure of 7PSI and check for the presence of any faults. If no damage is detected, for example in the form of notches or cracks, increase the pressure to no more than 60 PSI.

If notches or cracks appear, revealing the Kevlar reinforcement, the use of this bag should be discontinued. Repairs are not possible for reasons of safety.

To prolong the service life of the bags, it is recommended that they be stored away from light and at room temperature.

13. Service life and damage

Service life

The lifting bags are subject to a process of natural ageing. Even though the bags might seem, visibly, to be in perfect condition, non-detectable ageing phenomena may have compromised tightness and weakened resistance. The service life of a lift bag is approximately 10 years, depending on usage, but will not exceed 15 years. After a 10-year period of usage, an expert can reduce the frequency of inspections. An inspection every 2 years is recommended.

Damage to the end-fitting:

A damaged end-fitting on a lift bag can be replaced. To do this, carefully heat the threaded area of the end-fitting using a dryer, in order to remove the adhesive. Unscrew the end-fitting by applying light pressure, while at the same time blocking the thread (using tubing flats) with the aid of 2 appropriate open-end wrenches.

Damage to the couplers:

The lifting bags have no moving parts that are subject to wear or require maintenance. However, malfunctions can occur when deflating them: bag coupler frozen due to below-zero temperatures or cold, damp air; ice can form inside the bag male plug. In this event, use an aerosol de-icer or heat the nipple manually.

If a foreign body is present in the nipple, push a blunt metal wire through the end-fitting to dislodge it.

Damage to safety valves:

Safety valves are factory-adjusted. If a foreign body has entered the valve, dismantle the removable section and clean it. After re-assembly, check that the adjusted pressure has not changed.

Damage to the hose and control unit:

Where necessary, hoses and control units should only be repaired by approved specialist companies or by the manufacturer.

14. Periodic inspections

See table overleaf.

The operator is responsible for carrying out the new inspection.

The 'expert' is a person who has been trained by the manufacturer or by one of the manufacturer's subsidiaries. This qualification is accredited by a certificate.

15. Periodic Inspections Table

Interval Date	Type of inspection	Inspector	Documentation	Basis
Prior to first deployment	Control of manufacturing standards	Expert or factory inspector	yes	NF EN13731 February 2008
After each use but at least once a year	Visual inspection and functional test	Specialist		Manufacturer's recommendation
Every 2 years	Visual inspection and functional test	Specialist	yes	
Every 5 years	Pressure tests of air bag types 24/30, 30/38 , 43/54 , 54/68 , 65/81	Expert or factory inspector	yes	
Every 10 years	Pressure tests of air bag types 1/1.3, 3/4, 6/8 , 10/13 , 14/18 , 19/24 , 24/30L	Expert or factory inspector	yes	
In the event of any safety concern	Inspection for a specific reason	Expert or factory inspector	yes	

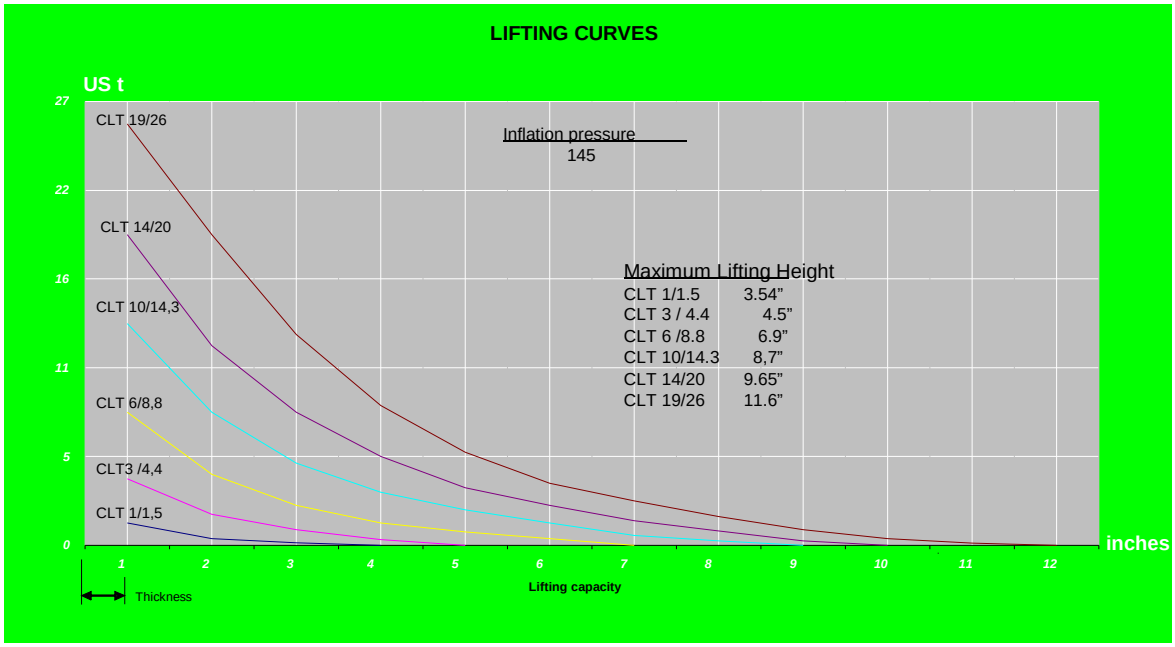
16. Technical characteristics

SPECIFICATIONS:

		161-50606	161-50808	161-51212	161-51515	161-51717	161-52020
Size	**Inch**	6 x 6	8 x 8	12 x 12	15 x 15	17 x 17	20 x 20
Thickness	**Inch**	0.86	0.86	0.86	0.86	0.86	0.86
Insertion Height	**Inch**	0.90	0.90	0.90	0.90	0.90	0.90
Weight	**Pounds**	1.54	2.86	4.84	7.5	9	13
Max Lift Height	**Inch**	3.54	4.5	6.9	8.7	9.65	11.6
Max Lift Capacity	**USt**	1.8	4.4	8.8	14.3	20	26
Volume	**Ft^3**	0.021	0.035	0.21	0.38	0.45	0.88
Max. Required Air Volume	**Ft^3**	0.19	0.32	1.9	3.5	4.13	7.9
Max. Inflation Pressure	**PSI**	145	145	145	145	145	145
Test Pressure	**PSI**	218	218	218	218	218	218
Min. Burst Pressure	**PSI**	580	580	580	580	580	580

		161-52222	161-51340	161-52424	161-53030	161-53333	161-53636
Size	**Inch**	22 x 22	13 x 40	24 x 24	30 x 30	33 x 33	36 x 36
Thickness	**Inch**	0.86	0.86	0.86	0.86	0.86	0.86
Insertion Height	**Inch**	0.9	0.9	0.9	0.9	0.9	0.9
Weight	**Pounds**	15.5	16.5	18.7	27.5	36.3	43
Max Lift Height	**Inch**	12.6	8.5	13.6	16.1	18.3	20.3”
Max Lift Capacity	**USt**	33	33	42	59	74	89
Volume	**Ft^3**	1.27	0.98	1.62	2.8	4.0	5.68
Max Required Air Volume	**Ft^3**	11.4	8.9	12	25.4	36.8	51
Inflation Pressure	**PSI**	145	145	145	145	145	145
Test Pressure	**PSI**	218	218	218	218	218	218
Burst Pressure	**PSI**	580	580	580	580	580	580

16. Height/pressure curve, Proanl Lift Bags 1/1.5 to19/26



17. Height/pressure curve, 161-5 Series Lift Bags 24/33 to 65/89