

611-2370 (35-165) Vacuum Lifter

Caution:

Do not attempt to lift more than 50 lbs. (23kg.) with the 35-165 Vacuum Lifter. Breakage and/or injury could result from falling items.

Introduction:

Study the effect of air pressure with our Vacuum Lifter and lift up to 50 lbs!

The 35-165 Vacuum Lifter is a simple but effective demonstration of the power of air pressure. This inconspicuous rubber disk will lift objects many times its own weight without glue, tape or adhesives of any kind.

This 10.5 inch black rubber disk will appear to “adhere” to any flat smooth surface. Place the disk on a table and try to lift it off with the handle, it is almost impossible. Air pressure is approximately 15 lbs per square inch, when all of the air is evacuated from under this disk, up to 1300 lbs of pressure is being applied to the Vacuum Lifter! With just a lift of the edge air is allowed under the disk and it will lift off easily.

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Assembly:

Attach the supplied handle to the center of the Vacuum Lifter. Simply loop the string through the handle and the through the hole in the center nub of the rubber disk. Secure the string with a knot.

Care and Storage:

The 35-165 should be kept flat when not in use. The lifter will not perform properly if it is allowed to warp or curl. The Lifter should be kept at a cool temperature and medium humidity. Clean dust and debris from the bottom before use.

How to use:

1. Pass the Lifter around to show that it is flexible and is non-adhesive.
2. Find an appropriate item to demonstrate the lifter upon: Items with a smooth, flat, hard surface will work. The surface must be at least 11 x 11 inches. The item being demonstrated with must not weigh more than fifty lbs. (23kg.). Common surfaces that work well are flat, smooth topped stools, cutting boards, and shelves.
3. Demonstrate that the Vacuum Lifter is not glued down by sliding around on the surface being lifted.

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4. Clear the immediate area of bystanders before lifting the surface in case the Vacuum Lifter slips or the string breaks.
5. Lift the item slowly and evenly into the air.
6. After setting the item back down, lift the edge of the disk with your fingers to remove it from the surface of the lifted item.
7. Discuss the effects of air pressure on the disk, and the surface lifted

Alternatively, you may have students perform the demonstration. Begin by having a smaller student lift the Vacuum Lifter off of the surface by the edge. Show how easily it came off. Next, have a larger, stronger student try to lift up the disk using the handle connected to the center hub. Follow the demonstration with a discussion about air pressure.

Performance Suggestions:

The 35-165 Vacuum Lifter works best if the surface is very smooth, and very flat. The lifter will leak a small amount of air over time due to imperfections in the rubber composition. Wetting the bottom of the Vacuum Lifter with a small amount of water will help it to create a tighter seal. This usually isn't necessary unless a timed experiment is being performed.

The vacuum lifter performs

best if it and the surface being lifted are washed clean of any dust and debris.

Discussion:

The 35-165 Vacuum Lifter works on the principle of air pressure. This demonstrates the reason that suction cups stick, it is not the negative pressure under the cup, it is just more pressure on the outside keeping it secured. There is an enormous amount of air pressure pressing down on all of us, but it seems as though the air is light, and non-oppressive.

Just how much pressure? Air pressure is about 15 lbs. per square inch at sea level. This is why the 35-165 Vacuum Lifter is so powerful. Lets do the math:

The Lifter has a 5.25 inch radius (**r**). The area (**a**) of a circle is calculated as:

$$a = \pi r^2$$

This calculates the area of the Vacuum Lifter as 86.59 square inches. At 15 lbs. per square inch, the Vacuum lifter is being held down by 1299 lbs of force!

We do not recommend using the Vacuum Lifter to lift an item more than fifty lbs. The vacuum lifter is not perfect, and air will leak under the edge. This makes the operational lifting weight much less. Additionally, the center hub which transfers the weight to the lifting string will not support weights of more than fifty lbs.



Warranty and Parts:

We replace all defective or missing parts free of charge. Additional replacement parts may be ordered toll-free. We accept MasterCard, Visa, checks and School P.O.s. All products warranted to be free from defect for 90 days. Does not apply to accident, misuse or normal wear and tear. Intended for children 13 years of age and up. This item is not a toy. It may contain small parts that can be choking hazards. Adult supervision is required.

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