

Checking a vacuum lifting device with a vacuum pump / injector (Venturi jet)

It must be possible to answer 'yes' to the following questions for a CE-compliant device in the EU. This is the minimum list of questions for a vacuum lifting device. Only devices of this kind should still be used in the EU.

The workplace safety directive in Germany stipulates that this should be the case.

Is the type plate fitted?

- Who is the manufacturer of this device?
- Does the type plate provide any indication of the manufacturer, including his address?
- Are the warning notices available in the language of that country?
- Are the warning notices legible?
- Are the carrying capacities of the device and its dead weight indicated?
When using extensions, these carrying capacities for individual configuration levels should also be indicated.

Is the device CE-compliant?

- Is the CE mark applied?
- Is there an operating manual for the device, in the national language of the user?
- Does the device have a conformity declaration?

Visual inspection of the device

- Are the lips of the suction cup / suction cups still in perfect condition, without cracks, cuts or distortions?
- Are the hose lines still in perfect condition?
- The paint on the welded seams should not exhibit any signs of cracking. If cracks are visible, the welded seams should be inspected by a specialist.
- Does the frame of the device have any signs of distortion? This should not be the case.
- Is the electrical wiring still in perfect condition?
- Is a vacuum reservoir provided for each vacuum circuit?

How is the seal integrity of the device tested?

Place the device with all suction cups on a smooth, clean glass or steel surface. Switch on the device and set it to SUCTION. The indicator on the vacuum meter should be inside the green range. Switch off the device to stop any further vacuum being generated. Now observe the vacuum meter. Within five minutes, the vacuum should not drop by more than 0.1 bar.

At the same time, this tests the function of the non-return valve.

When there are several vacuum circuits, each of those vacuum circuits should be tested individually.

On devices with several injectors (Venturi nozzles), every injector must be equipped with a vacuum meter and a vacuum switch for the warning signal in order to comply with EU standard EN 13155.

How can the carrying capacity of the device be tested?

For this, you need a crane scale and a glass or steel plate weighing twice as much as the nominal weight of the device. In other words, you need a weight of 1000 kg for a device rated for loads of 500 kg.

- Attach the device to the crane scale and set the value to zero, or note the reading for the device.
- Depending on the application, the load test is only performed vertically or horizontally or on a device where both cases can arise, in both positions.
- APPLY SUCTION to the plate with all suction cups.
- Ensure a sufficient safety distance before slowly starting to increase the load by tightening the crane hook.
- The device therefore needs to be able to lift twice the nominal load rating. That equates to a load of 1000 kg on a device rated for loads of 500 kg. The load should be held in place for 5 minutes.
During this time, the device must not slip or break away from the load. Also, no residual distortion may occur.

On devices with higher safety requirements, e.g. on construction sites or in rooms where it is not possible to leave the danger area, several vacuum circuits must be provided.

On devices of this kind, the load test must be carried out after the failure of a vacuum circuit.

Tip:

If no correspondingly large test plate is available, only individual suction cups or groups of suction cups can be tested. Tests of this kind are easy to perform on individually isolatable suction cups.

How can the warning system be tested?

For this, we have a test set with a plate, a control vacuum meter and a manual vent valve. This makes it possible to reduce the vacuum and to check if the warning signal is triggered at levels slightly below the normal vacuum.

- Fit all suction cups except one to a smooth, clean plate. You can seal off this single suction cup with a plate from our test kit.
- Set the device to SUCTION.
The plates are attached by suction.
- Now slowly open the vent valve on our test kit to enable the vacuum to be released slowly. Once you reach a value of approx. -0.55 bar, leave the vent valve in this position.
- Now the warning signal for insufficient vacuum should be apparent.
- Also observe the control vacuum meter during this process to find out if it acts in accordance with the warning system.

On devices with a power supply, the warning signal should also sound if the power supply is interrupted. At this point, the power supply or the supply of compressed air is interrupted.

On devices with several vacuum circuits, this test must be conducted on all vacuum circuits individually.

Is the function of the actuator members still operational?

Check the function of detents on mechanical turning and swivel functions on this device to ensure that they are all operational.

- Does the detent lock again automatically?
- Can the detent be loosened?
- Can the detent be loosened accidentally?

Even with pneumatically, electrically or hydraulically operated movements, the movement must be in response to a single press of a button. When the button is released, the movement must stop immediately.

All of this is simply to ensure that, as the party responsible for workplace safety, you have done everything necessary. After all, that should be the objective of conscientious maintenance.