

What you should know about using the vacuum lifter at temperatures below 0°C

A question that is asked frequently:

“We wish to work with the vacuum lifter at temperatures of less than 0°C. Do you have a device that can do this?”

That is not always an easy question to answer. If the question refers only to the suction plate, then it is an easy one to answer.

Our normal black rubber mixture can be used down to temperatures as low as -4°C / -5°C. From -10°C and below, there is a risk of the suction cup lips breaking because they get progressively harder as the temperature drops. Friction, and therefore the carrying capacity, also decline at low temperatures. It also gets progressively harder to attach the device because the suction cup lips get harder and become harder to adjust.

Suction cups made of silicone rubber can be used down as far as -20°C, so solutions do exist.

Then there really is no reason why this can't be done - or do other factors also need to be taken into consideration?

The problem is the humidity

The problem is to do with the residual humidity in the device, or with the humidity that is drawn in. The valve seat only provides a good seal in the complete absence of dirt. If ice crystals form in the device, these can impair functionality and can even cause a complete system failure. A single ice crystal in the non-return valve is enough to compromise the operational safety of the vacuum lifter. In the event of a power failure, there is then insufficient vacuum over the specified 5 minute period, and the load will drop.

If a thin coating of ice forms over the vacuum switch, this prevents it from switching properly to issue the required warning signal or to switch the vacuum pump back on again.

For this reason, a manufacturer of vacuum lifters will avoid any description of using a vacuum lifter at sub-zero temperatures in the Operating Manual if he has any concerns whatsoever about the ambient conditions.

Anyone using a vacuum lifter at cold temperatures should know this.

- The carrying capacity of the suction cups declines.
- The function of the non-return valve may be impaired.
- Valves no longer switch correctly.
- In some circumstances, warning signals may no longer be issued.

Examination results

If you would like to read more information on the effects of sub-zero temperatures on suction cups, here is the link to a test report on an examination conducted by the Technical University in Kiel (Fachhochschule Kiel). We commissioned this test from them back in 2003.

<https://www.pannkoke.eu/files/Seiten/Service%20und%20Downloads/Downloads/Vakuumtechnik/VT-Info%2016%20-%20Wie%20wirken%20sich%20niedrige%20Temperaturen%20auf%20die%20Tragfaehigkeit%20des%20Saugers%20aus%20%E2%80%93%20dargestellt%20am%20Sauger%20388.pdf>

Our advice

For safety reasons, leave this well alone!

If that is not possible, then please pay careful attention to the following points:

- Conduct a functional test, checking the vacuum display and the warning signal.
- Ensure that everything is dry.
- Never leave the vacuum generator out in the cold for longer than absolutely necessary.
- Use appropriate suction cups for sub-zero temperatures.

Your personal safety and that of your payroll staff is at stake!