

## ***Session of the specialised unit “Construction” of the Machine Construction and Metal Accident Prevention & Insurance Association The Safety of Vacuum Lifting Devices***

The technical supervisors of the Machine Construction and Metal Accident Prevention & Insurance Association, who predominantly oversee construction sites, are organised under the specialised unit “Construction”. In their session on 8 September 2004 in the Association’s educational institution “Schierke Building”, they dealt with the theme “The Application of Vacuum Lifting Devices at Construction Sites”. We were invited as one of the leading manufacturers of vacuum lifting devices in Germany.

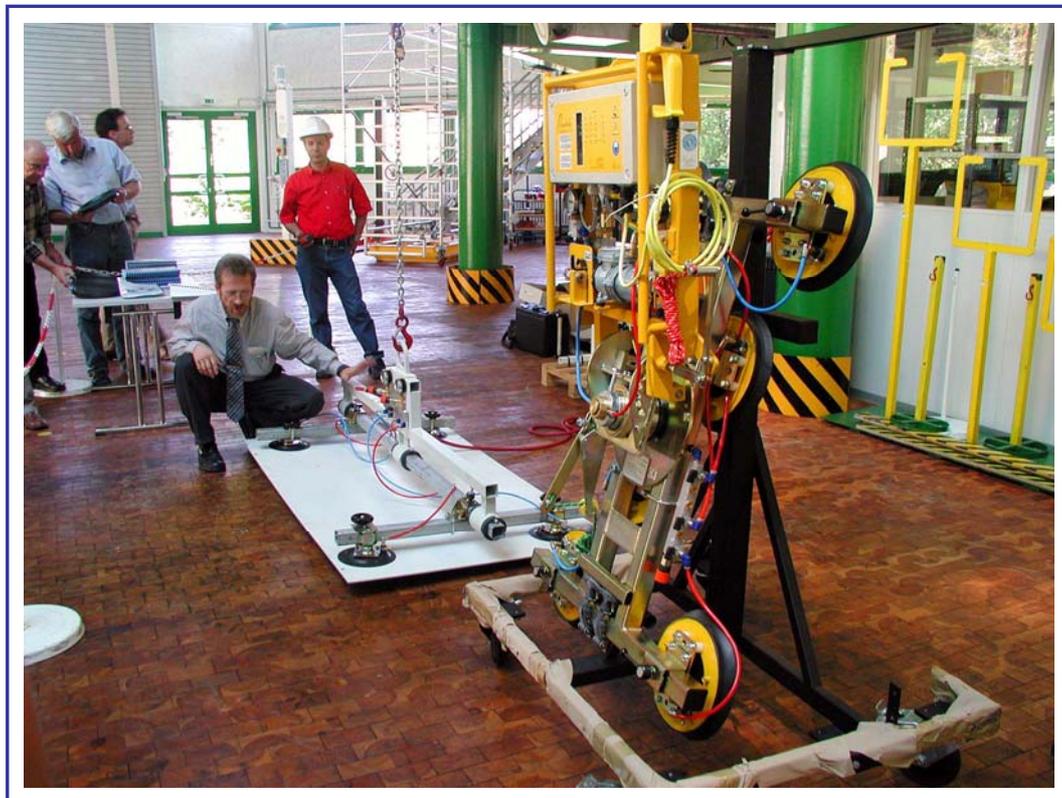
Engineer Kunze of the “Technical Committee for Machine Construction, Hoisting Devices, Mills and Factory Buildings” and Engineer Kammerer of the “Technical Committee for Construction” presented the legal position in the event of accidents.

For applications on construction sites, the accident prevention regulation “Load Suspension Gear on Crane Equipment” (VBG 9a) had always posed the higher requirements, to the ban of operatively force-fit load handling attachment. New devices must now comply with Regulation Standard EN 13155.



Afterwards, we presented our training course on the handling of vacuum lifting devices as well as the implementation of the standard EN 13155 on a vacuum lifting device. A battery-operated vacuum lifting device of the Type Kombi 7211-DS2 was presented, which was manufactured to have a load-carrying capacity up to 600 kg. for use on construction sites. Additionally the test results from the University of Applied Sciences of Kiel, Germany for individual suction cups under various conditions, as well as its device comparison tests, were presented and commented on.

Some theoretical perceptions which apply to the application and design of vacuum lifting devices were actually demonstrated for the technical supervisors.



With single circuit systems the leakage of a suction cup or a hose is sufficient and the carrying capacity is no longer warranted when the system cannot compensate the leak. In this case the reason for the leakage occurring, whether a failure on the part of the device or the glass, is irrelevant, as without the partial vacuum in the area of operation - the glass pane falls down.

The European safety draft standard EN 13155 requires a reserve machinery capacity, i.e. a multiple circuit vacuum system. With a dual circuit system there are two independent vacuum circuits. If one vacuum circuit loses its partial vacuum the other one is able to hold the load. This standard requires for vacuum lifting devices which are used at construction sites to provide vacuum systems where each vacuum circuit holds the rated load with a twofold safety. Unfortunately not all suppliers provide this, as substantiated by the basic physical considerations and test reports of the University of Applied Sciences of Kiel, Germany.



The device Kombi 7211-DS2 fulfills the safety draft standard EN 13155 in every aspect.

That every vacuum system of a device must have the ability to hold the rated load with a two-fold safety means this, that on the lower limit of the operating range with both vacuum systems intact it must hold a **four-fold rated load**.

With other devices on the market, where the number of the suction cups as used in the earlier single-systems has not been increased, any assertion to this effect without further analyses is fully questionable.

We due to the reserve machinery capacity requirement, doubles the number of suction cups on its dual circuit system devices.

Above all, we offer that all our customers have the right to be at the factory's final inspection in Lübeck to witness the load test with the two-fold rated load. In addition, every vacuum system has its own vacuum reservoir with a non-return valve as well as a vacuum control meter and vacuum measuring device for activating the acoustical and optical warning signal. In case of a power failure a warning signal is also activated. As additional equipment, a luminous-intense flashing light can be attached in order to make the warning signal more widely visual.

The device Kombi 7211-DS2 from us fulfills not only the safety standard EN 13155 in every aspect, but also the requirements of safety draft standard prEN 13035-2. Safety draft standard prEN 13035-2 concerns, among other considerations, the application of vacuum lifting devices outside of the factory and is specially designed for the handling of flat glass.

The exact title of this safety draft standard reads:

*Machines and plants for the manufacture, treatment and processing of flat glass  
– Safety requirements –  
Part 2: Storage, handling and transportation equipment outside the factory”*



For larger devices, a network operation of these vacuum lifting devices is possible. For this reason, we are in the position to produce vacuum lifting devices for 6 x 3 m. panes with a weight of approximately 1800 kg. that conform to the safety draft standard EN 13155.



All the technical supervisors were in agreement that the risk of accidents with vacuum lifting devices that conform to the EN 13155 is considerably reduced. The Kombi 7211-DS2 fulfills these requirements. For devices that conform to the safety draft standard EN 13155, there is no longer a discussion of excluded areas of use, as such exclusions are not necessary for such types of devices in the view of modern vacuum technology.

Authors:

Bernd Pannkoke, Engineer  
Pannkoke Flachglastechnik GmbH

and

Hans-Jürgen Kunze, Engineer  
The "Technical Committee for Machine Construction, Hoisting Devices, Mills and Factory Buildings"  
The Machine Construction and Metal Accident Prevention & Insurance Association