Customer Object Specification

Layer Pad Specifications for Palletising Area

TD10010229 EN 01

KRONES

Table of Contents

1 Basic information

1.1 Terms

Layer pads are used to produce additional stability in the palletising stack, base pads and covers are additionally used to protect the packs against damage and dirt. For reasons of simplicity,hereinafter, base pads, layer pads and covers are simply referred to as layer pads.

1.2 Scope of this specification

In order to reach the best possible a.m. functions as well as to reach a process-reliable, automated handling of base pads, layer pads and covers, a large number of characteristics has to be considered.

The required characteristics of the layer pads to increase the stability of the pallet stack depend substantially on the pack characteristics, such as the friction coefficient of the carton and film packagings on the layer pads. Therefore, general recommendations and specifications cannot be made at this point. Unless otherwise agreed, the increase of stability of the pallet stack by use of base pads, layer pads and covers lies in customer's responsibility.

The required characteristics of the layer pads in order to ensure a process-reliable, automated handling depend substantially on the applied technologies. This specification has the objective to describe the layer pad characteristics as technology-independent as possible, so that the following specifications are very restrictive.

1.3 Deviations from this specification

Nevertheless, under certain conditions, deviations from this specification are possible. For example, a processing of layer pads with lower grammages, as mentioned below, are possible; however only if additional modules of the KRONES module component system for packing materials are applied.

This way, layer pads deviating from the properties mentioned below can be processed, whereupon this must be mentioned in separate documents individually and specifically. In addition, tests in the KRONES technical centre are to be performed; the layer pad samples must be absolutely identical with the layer pads in the order. Non-specified deviations from this specification can result in limited performance and processability, even to the incapability to process.

1.4 Ambient conditions

As the characteristics of the layer pads are influenced by ambient conditions (at manufacture, transport, storage and application), it has to be considered that the characteristics are maintained during all relevant ambient conditions (that means both under normal conditions according to EN ISO 2233 and under the real conditions on site). This shall apply also to the deterioration of layer pads and/or to their reuse.

If layer pads are obtained from several suppliers, the characteristics must be identical, too, so that a differentiation concerning machine technology is not necessary.

1.5 Services and loss ratios

Unless otherwise agreed, no indications concerning output rate of the layer pad inserter are made, but indications of the complete palletising application. Downtimes for changing the layer pad stack are not considered.

The loss ratio shows the part of the gripping processes with loss of layer pads divided by the complete number of gripping processes referring to a representative period of time. The possibly remaining stack on the layer pad pallet as well as the layer pads which are manually removed in case of stack height exceeding are not part of the loss ratio. Also losses by deviations of specified characteristics are not part of this loss ratio. KRONES guarantees a loss ratio of 0.5 % during the gripping process according to the above-mentioned definition. This means that 5 of 1,000 picked layer pads may be lost during the gripping process.

Deviating loss ratios or guaranteed remaining layer pads on the stack can be reached by taking further technical measures. For this, separate agreements are necessary.

2 Properties of layer pads

2.1 Materials for layer pads

Common materials for layer pads are

- Paper
- Cardboard
- Corrugated cardboard
- Plastic

Generally, all materials can be processed, provided that they comply with the following specifications. Different layer pad materials are possible by taking further technical measures. For this, separate agreements and specifications are necessary.

2.2 Layer pad dimensions

When selecting the layer pad size, the size of the layer to be palletised is essential. In general, too large layer pads may damage the film during wrapping, while too small layer pads may negatively affect the pallet's stability.

The layer pad should therefore be 10-20 mm smaller than the base size of the respective layer.

General specifications concerning thickness can not be made. The typical thickness of layer pads lies in the range of 2 to 5 mm. It is important that the layer pads have a constant thickness in order to avoid inclined stacks.

2.3 Dimension tolerance of layer pads

The permissible dimension tolerance related to the a.m. dimensions is +/- 0.25 % of length and +/- 0.25 % of width. This means that a layer pad of 1,000 mm length is allowed to be 997.5 mm up to 1,002.5 mm. Regarding the thickness, deviations of up to +/- 5 % are allowed.

Each deviation of dimension may cause a position deviation on the loading pallet. For example, a layer pad, which is 2 mm too small, can be positioned offset by 2 mm on the pallet.

2.4 Form

Layer pads must be rectangular, the edges are allowed to be rounded down / chamfered by less than 5 % of the total length/width but maximum to 40 mm. Holes or other gaps are not allowed.

2.5 Flexibility/bending property/plastic formability

Layer pads must have an easy bending property and must not deform plastically when separating/ gripping.

2.6 Grammage

In case of layer pads made of paper, carton or corrugated cardboards the grammage (surface weight) must lie between 300 – 400 g/m², in case of plastic layer pads between 500 – 2,000 g/m².

2.7 Evenness, corrugation, cupping

Layer pads must be absolutely even. This includes especially that they must not be corrugated and they must not show any cupping. Furthermore, planar layer pads combined with stacked containers must not fade to a corrugated shape.

2.8 Damage

The layer pads must be undamaged.

2.9 Surface

Example of a waxed layer pad (not permissible)

Sticking layer pads are not allowed. Surface structuring, coatings and impregnations, imprints and finishes which lead to a degradation of the suction and / or the gripping process, are not allowed. Two or more different surfaces are not permissible.

For example, rubberised and waxed layer pads are not permissible.

2.10 Porosity

The layer pads must not be porous.

2.11 Sticking layer pads

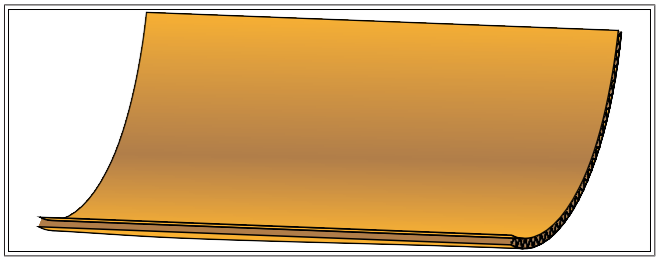
Statically loaded layer pads, outer fibre toothing between the layers or other characteristics which may lead to sticking layer pads, are not permissible.

2.12 Humidity and moisture

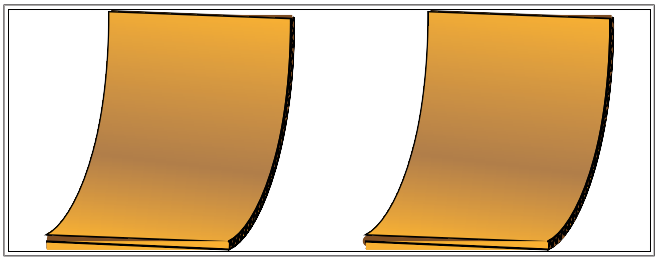
Humidity and moisture of the layer pads are not permissible.

2.13 Special requirements on layer pads made of corrugated cardboard

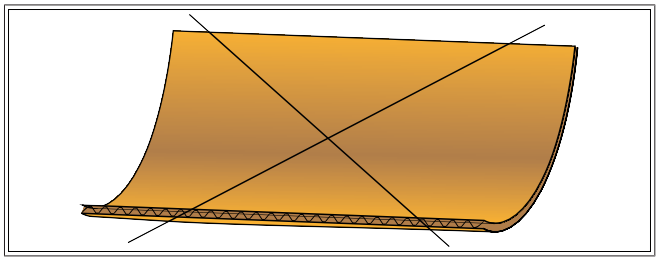
When using layer pads of corrugated cardboard, it has to be considered that the corrugation direction has to be arranged in parallel to the long side for complete layers, but for half layers it has to be arranged in parallel to the short side.



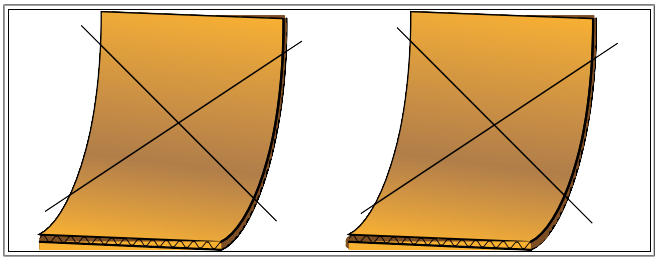
The permissible contour of the hollow chambers/inside corrugation for complete layers



The permissible contour of hollow chambers/inside corrugation for half layers



The impermissible contour of the hollow chambers/inside corrugation for complete layers



The impermissible contour of hollow chambers/inside corrugation for half layers

2.14 Characteristics of layer pad stack

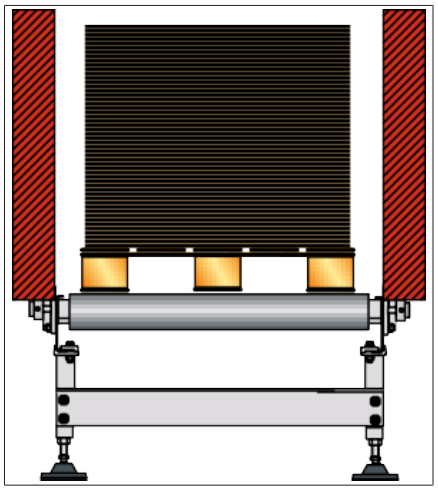
In order to ensure a process-reliable handling of layer pads, not only the a.m. characteristics of the layer pads have to be fulfilled, but also the following requirements on the layer pad stack.

2.15 Accuracy of stack

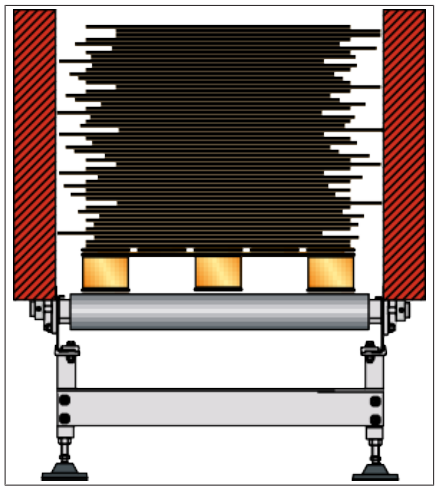
The stack deviation (position and orientation) and/or the inclined position of the layer pad stack should be kept at a minimum to ensure an optimal positioning of the pad on the layer. Basically, a layer pad, which is picked from a not centred stack, can be deposited only as exact as it was picked up. This includes also the positioning of the layer pad pallet on the provision area.

Using layer pads, which are smaller than the layer surface to be covered, inaccuracies are less visible than in case of larger layer pads or pads with the same size. However, smaller layer pads may result in unstable pallets. A larger layer pad, placed inaccurate, may have more negative effects on the wrapper.

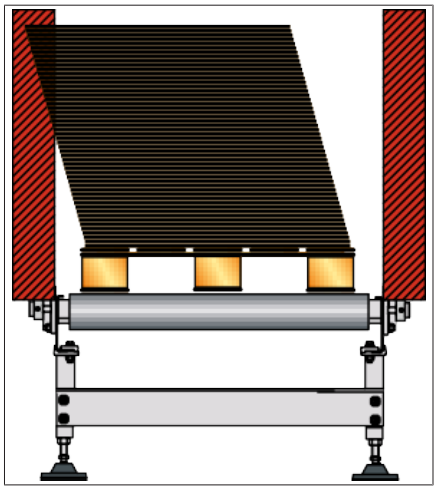
Depending on the applied technology (transfer table, stand-alone centring unit) the layer pads can be centred within a certain capture range. The capture range includes all deviations of position or layer of the complete layer pad stack; that means, for example, the pallet position on the PalCo, layer pad stack on the layer pad pallet and the inclined arrangement of the layer pad stack itself. Rotational deviations reduce the capture area according to the angle deviation.



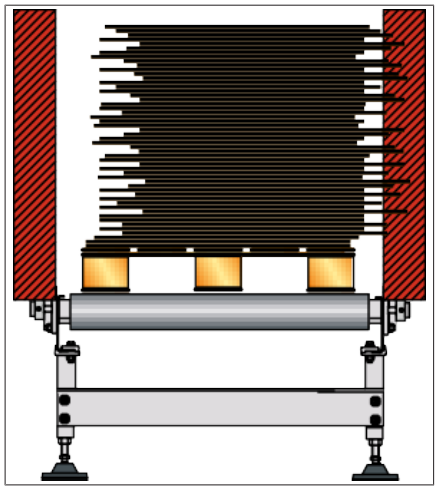
Pallet without stack deviations



Pallet with permissible stack deviations



Pallet with impermissible stack deviations



Pallet with impermissible stack deviations

The capture area is marked white, the area outside of the capture area is marked red.

2.16 Stack height

Layer pad stacks must be lower than 1,500 mm on the pallet (pallet included) or lower than 1,000 mm in a modular magazine (magazine not included). Base layer stacks must be lower than 500 mm (without pallet/modular magazine).

2.17 Evenness of stack

Layer pads stacks must be even within 10 mm, meaning that for each layer the difference between the highest and the lowest position of the top layer is not allowed to exceed 10 mm.

Parallelism deviations of the provisioned top layer (table and/or pallet conveyor) reduce the permissible evenness deviation respectively.

To ensure that the suction cups always close, the evenness deviation in the contact area of the suction cups is not allowed to be too great. In an area measuring 100 mm long or 100 mm wide, the height deviation is not allowed to exceed 5 mm.

- Maximum oversize + 5 mm in layer pad top left corner, maximum undersize - 5 mm in layer pad bottom right corner -> permissible
- Maximum oversize + 4 mm in top left corner, maximum undersize - 4 mm at distance from 80 mm to each other -> not permissible

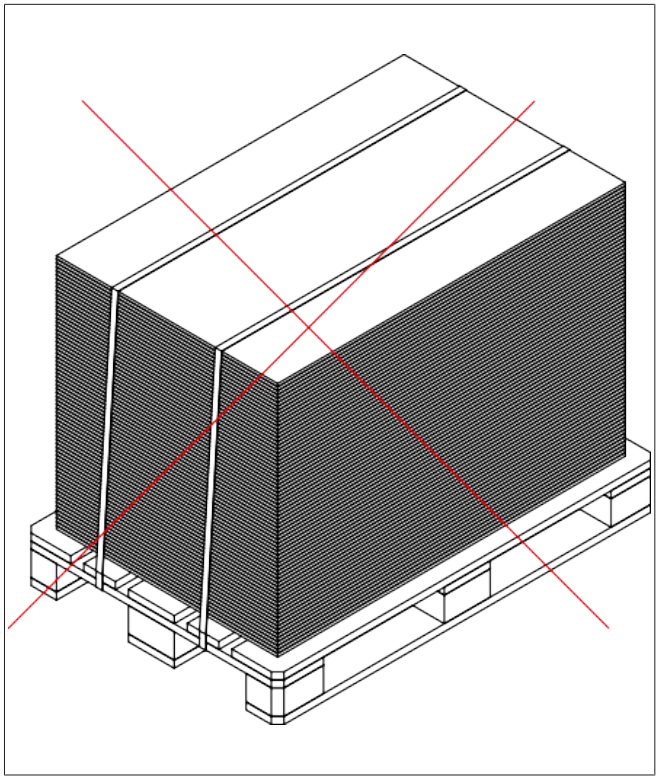
2.18 Effect of the carrier pallet on the stack quality

Carrier pallets are mostly made of wood. If cover boards with greatly differing heights etc. result in negative change to the layer pad stack due to pallet damage, then this leads to restrictions in the processability and to output reductions (also see "Evenness of stack" section).

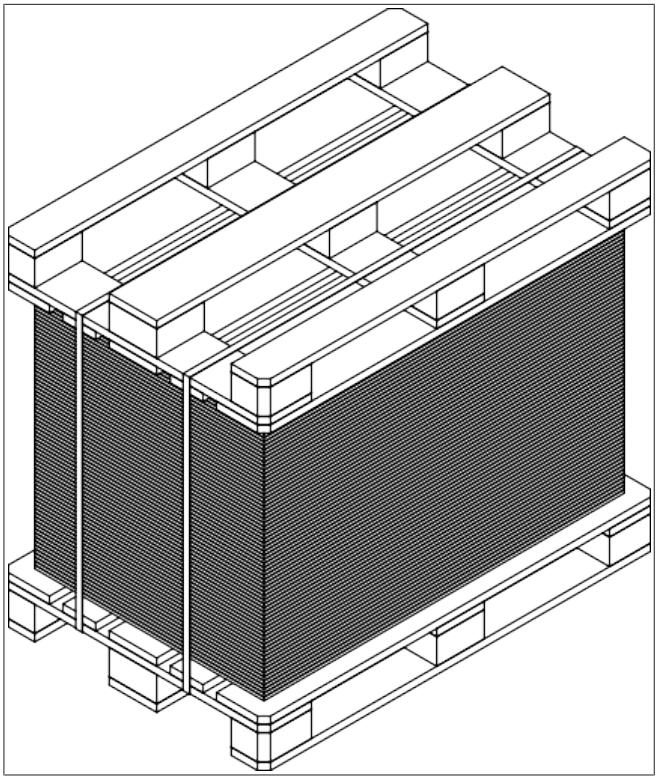
In addition, different pallet heights cause a remaining layer pad stack. Unless otherwise agreed and implemented by additional technical measures, a remaining stack can not be avoided.

2.19 Transport and storage of the layer pad stack

The layer pad manufacturers mostly use transport strappings which fix the layer pad stack properly on the pallet. Protection angles (angle frames), inverted trays or top boards are necessary for a top edge protection.



Impermissible transport



Permissible transport

An edge protector by inverted trays or top boards is absolutely essential.

Edge protectors and strappings have to be removed by the operator before they are fed into the machine. It is recommended that the strapping of a new stack is loosened only after the stack has been deposit on the pallet conveyor. This guarantees a proper condition of the stack for the bringing-in. After the release the stack can be fed into the line by RESET.

Pallets with already opened layer pad stacks should be covered with a dust-proof inverted tray/cover plate, ideally re-strapped and imperatively stored in a dry room. When transporting an unbound stack, special care is required that the unbound stack does not change the position and / or is not shifted.

Supplied layer pad stacks are to be stored dry and handled according to the principle "first in – first out". Longer storage times can effect negatively the processing quality and the output. Dust and dirt-proof storage is also necessary.

Heavy additional weight on the layer pad stack causes frequently a layer pressing. Layer pad pallets must therefore not be stacked on each other, as this could lead to processing problems.

2.20 Other characteristics

With partially different material densities or thickness of the layer pad surface (e.g. higher material concentrations or point-by-point moisture absorption), so-called point-by-point height offsets or height differences in the stack height may occur in case of permanent accumulation of these deviations.

So, a stack of layer pads with thicker edges tends to arch in the middle heavily downwards. If one half of the layer pads is thicker than the other one, the so-called wedge-stacking effect occurs, where one half of the layer pads side raises higher than the other side. Such kind of effects are only allowed within the a.m. specifications.

Besides, the stack must be free of foreign matters and contaminations (e.g. dust layers).

Cupping (concave and/or convex) are not permissible in the stack at any position.

Damaged or faulty pallets must not affect the stack quality.

2.21 Special features when processing several formats / several types of layer pads in one line

In lines with several formats with length and/or width delta of 200 mm (largest layer pad - smallest layer pad) an examination by the construction department is necessary. This is also valid for lines processing strongly different types of layer pads (e.g. thin paper and plastic layer pad, thin paper and Chapatex layer pad etc.).

2.22 Special features when processing half layer pads

When processing half layer pads two stacks are on a pallet. Both stacks must have the same number of layer pads. The height difference of two stacks on one pallet must not be more than 10 mm between the top point of the highest stack and the lowest point of the lowest stack.

Both stacks must be separated from each other by a dividing plate or similar. This plate must be removed before being fed to the machine. Furthermore, the layer pads must have rounded edges so that a divider can be inserted between the stacks at the position of the dividing plate. By large corner radiuses of the layer pads it is easier for the divider to be integrated between both half layer pads stacks as it is with small corner radiuses. The necessary minimum stack accuracy depending on the radiuses can be indicated by a thumb rule with factor 1.5. That means that a layer pad with radius 30 mm must

not be provided more imprecise than +/- 20 mm in a double stack. (Already mentioned further stack accuracy specifications remain unchanged.) The layer pads can be placed with the gripper with a distance between the layer pads, which corresponds to the width of the divider. Otherwise, a drawing mechanism with constant stroke has to be provided.