

Technical Guidelines Jokey Group



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1 Preliminary remark

As one of the leading manufacturers of plastic packaging, with 14 production sites worldwide and approximately 1,800 employees, we are a global and flexible partner. Quick decision making paths and personal contact form the key elements of maximum customer and service orientation.

High quality and hygiene awareness are self evident for us. Under this premise, all our plants are certified according to DIN EN 9001 and follow strict hygiene management, which we already introduced at the end of 1997 according to HACCP requirements (DIN ISO 22000:2005) and continue to optimise. Furthermore, a large part of our production is supplemented by the requirements of the BRC version 5 and we are affiliated with the non-profit organisation Sedex.

To become a member of the Sedex database, we conducted an audit according to the SMETA Guide which includes and assesses the following four areas:

- Health and safety
- Employment standard
- Business integrity
- Environment

The goal of membership in Sedex is to share the certified results of social audits with our customers and to anchor and improve responsible and ethical business practices in the global supply chain.

Our quality assurance not only includes documentation with certificates, but also the continuous development of our skills and the intensive exchange of experience with our customers. Therefore, we are open to individual customer audits and use the knowledge gained from these.

We point out that we partially work with contract manufacturers for special products (e.g. lid with a spout, wet wipes dispenser, tinting plugs). These are, however, integrated into our quality and hygiene management and are subject to continuous checks by our employees.

The following technical guidelines serve as an aid in questions about storage, transportation and filling of our products as well as to the requirements for proper handling to avoid damage.

2 Material information

For the manufacture of our products we use thermoplastic plastic polypropylene (PP), which is more ecological compared to the conventionally used polyethylene (PE). In addition, the use of PP offers other advantages in contrast to PE:

- equal load resilience at a significantly lower weight
- lower disposal weight and therefore

- lower disposal costs

3 Recycled materials

These technical guidelines only provide limited information about the use of recycled and regenerated materials and their properties. Please see our separate guidelines on the use of recycled materials.

Recycled materials are plastics that are chemically treated to achieve their technical characteristics, are compounded and reground. Packaging made from recycled material can have a slight smell. This can especially occur when the products are exposed to higher temperatures or stored in poorly ventilated areas. Therefore, products which are manufactured partially or completely from recycled materials are not suitable as commodities or as food packaging. Under this premise, the material is processed and disposed of in a separate internal process.

4 Reaction of plastics to chemicals

Certain substances such as solvents can change the properties of plastic packaging and consequently have an impact on the capacity of the container.

Since we cannot guarantee the compatibility of the container in relation to the respective contents, it is imperative that you as a customer perform appropriate storage and transportation tests before filling recipes with aggressive ingredients. These tests are always necessary if you are not sure which substances are classified as aggressive. On request we are happy to assist and contact our raw material suppliers in order to ask questions regarding compatibility with the ingredients of the product to be filled, provided they are outside the requirements of EU Regulation 10/2011 "on plastic materials and articles intended to come into contact with food."

5 Use of containers

The products manufactured by us are, unless otherwise agreed and fixed separately in writing, developed and manufactured as one-way packaging. A guarantee for the specified product characteristics is therefore only applied in the context of the initial filling of the container.

5.1 Food industry - food

If there is a food label on the bucket base, then our packaging is suitable for direct contact with all food types. Appropriate migration tests are carried out by an accredited laboratory. We can provide the results of these tests as well as declarations of conformity on request.

5.2 Chemical industry - non food

With regard to the sustainability of our products, we rely on 100% recyclable material, an aspect which is already reflected at the beginning of the product life cycle.

Residues from production are recycled and reused as recycled material for the production of non-food packaging. The prepared products are ideally suited for filling paints, detergents etc. and allow you as a dealer to take a responsible attitude towards our environment.

6 Storage of containers

For storage in outdoor and indoor areas the following points and their explanations are to be observed in order to avoid any distortion or other damage of the products. In particular, we would like to emphasise point 9, "Filling", where the storage conditions before the filling process are described.

6.1 UV protected storage

To prevent damage by UV irradiation, neither empty nor filled containers may be stored outdoors. If this is not possible due to the storage capacity, the containers should be stored so that they remain protected from UV radiation. This can for example be done by additionally covering the container with a UV stable plastic tarp.

6.2 Storage of empty containers

Due to the climatic vulnerability of the container and outer packaging, they have to be stored in a dry and constant temperature. This not only serves to protect against moisture, but also effectively counters the formation of condensation which can cause damage especially to decorated plastic packaging. Therefore, these types of packages must generally be stored in dry rooms. Furthermore, contamination by dust and dirt despite treatment with an antistatic agent cannot be ruled out, so clean storage must be guaranteed.

Damage caused by the slicing of the pallets with a knife can lead to increased risk of breakage. For this reason, the use of special foil knives is essential.

7 Transport security

During the transport and the subsequent storage of goods special stresses occur. Therefore, effective measures for cargo security are essential. This includes the protection of the individual freight units, such as the pallets on the cargo area of the respective means of transport (truck, trailer, railway carriage, ship containers, aircraft loading, etc.). The packaging must be protected against external influences such as slipping, falling and other mechanical damage. Protection against contamination, moisture and direct sunlight must also be ensured (see also section 6.1, "UV protected storage").

Generally, our products are designed for transport on load carriers (Euro pallets). Single shipment by packaging services such as UPS, DHL, FedEx etc. can occur due to specific properties only after consultation with us.

Appropriate measures for securing cargo units can be found in the VDI guidelines for transport and simulation (guideline 2700 and 3968) and must be observed. Further, the stresses allowable during the transportation process must be followed, which are regulated in the VDI guidelines "Transport".

The sufficient assurance of packaging can be ensured by a hole and wrinkle free shrink hood made of PE. This has been shown by vertical and horizontal tests that were carried out on complete cargo units in a packaging laboratory in accordance with ASTM D 4169. The film thickness used for this is based on the weight of the goods, where at least 85 μ must be given. It was also evident in the experiments that sufficient cargo security is not guaranteed by stretching the packaging, which leads to a concerning weakening of the statics. Due to these results, we recommend the shrinkage of packaging on the respective load carriers.

For information on the permissible stacking and loading schemas, please refer to the relevant product specification that can be obtained upon request from us or see our website. We point out that the stacking and loading schemes we specify only apply as long as the standard load capacity is given in accordance with the information provided under section 10.1.

8 Handling of containers

Our containers require proper handling, due to their specification and composition as well as the individual design characteristics in order to prevent damage to the containers. To ensure the proper handling of packaging, it is therefore imperative that information on

- Storage of containers
- Transport security
- Filling
- Product properties

are read and followed carefully. Rough handling like the hitting, pushing or throwing of packaging can lead to deformity and damage to the product and should be refrained from.

9 Filling

The generally permissible filling temperature is 85°C. We can advise you if this is not compliant with your filling temperatures.

If the containers were purchased directly from the warehouse, they must have a minimum temperature of 5°C prior to the filling process. One should assume a temperature increase of about 2.5°C per hour under a closed hood.

The migration tests carried out in accordance with the requirements of Regulation (EU) No 10/2011 and the standard test OM2 (10 days at 40°C) cover any long-term storage at room temperature, including heating at 70°C for up to two hours or heating to 100°C up to 15 minutes.

10 Product properties

In the following, the characteristics of the products are described in terms of capacity, density and design options.

Here, the following characteristics and explanations refer exclusively to our standard product designs. They give no information on packages that differ from the standard (see point 11, "Individual packaging requirement properties").

10.1 Loading capacity

The underlying standard load for the period of six months from delivery refers, unless otherwise specified, to finished products which are stored and transported on a flat Euro pallet at a temperature of 20°C (dynamic). It should be noted that the standard capacity can be greatly influenced by the climate.

Any information relating to capacity is generally based on the following three weight categories

- *L = light*
i.e. the filling material has a specific weight (density) of <1 g/cm³
- *M = medium*
i.e. the filling material has a specific weight (density)¹ of <1.5 g/cm³
- *H = heavy*
i.e. the filling material has a specific weight (density)¹ of <1.8 g/cm³
- *UL = ultra light*

The resilience of the respective weight depends on the stacking. For information on this, please refer to our product specifications under "load recommendation for standard lid at 20°C on the bottom container." The recommended pressures may not be exceeded under any circumstances. Several pallets may also not be stacked above one another.

Also note that containers made of transparent PP have reduced impact strength, resulting in a reduction of the standard load capacity. Therefore, only low static and dynamic loads are permitted for filling, storage and transport.

As part of the transport processes the loads indicated are to be understood as referring to shrunken pallets (see also point 7 "Transport security").

10.2 Use of containers in the microwave

Generally our products are suitable for use in a domestic microwave oven up to 1000 watts. In principle, however, there is a risk of deformation which increases proportionally to the wattage.

In a series of experiments, the behaviour of the containers was observed and evaluated at 360, 600 and 1000 watts and a heating time of up to five minutes. Based on the results obtained, we recommend the use of the containers in the microwave at 800 watts for a maximum of two minutes. A higher wattage and a longer time lead to a significant temperature rise of the container so that it is no longer touchable with bare hands.

Based on the migration tests carried there is no cause for concern, as these were carried out in accordance with the requirements of Regulation (EU) No 10/2011 and the standard test OM2 (food contact conditions 10 days at 40°C), including heating at 70°C for up to two hours or heating to 100°C up to 15 minutes.

10.3 Barrier

Due to the individual requirements for the container and its use, a detailed explanation on the barrier properties is not possible. It is therefore necessary to consider whether the barrier properties for the specific objectives are sufficient.

10.4 Decorations

For the individualisation of plastic packaging, we offer the printing process discussed below.

10.4.1 IML

During in-mould labelling (IML) the selected label is inserted into the injection mould and integrated into the production process of the packaging. Here, the connection of the IML with the packaging occurs due to the temperature of the liquid plastic so that no adhesive layers have to be used. Through the direct integration of the IML in the production process of packaging, the packaging and IML form an inseparable unit.

10.4.1.1 Information

Offset/tolerances	<i>Offset:</i>	0-4 mm (depending on container size)
	<i>Tolerances:</i>	2000 ppm
Colour tolerances		slight discrepancies between the printed colour profile/PDF and the finished IML
Warranty		1 year
Disclaimer		Colour tolerances

10.4.2 Dry offset

Dry offset is an indirect high pressure printing process with true colours (Pantone, HKS). Here, all colours are first printed wet in wet onto a rubber cloth and transferred to the container. For this, however, all colours must be omitted against one another because no additional colour can be produced by the printing of two or more primary colours together.

10.4.2.1 Information

Print size		see item specification
Offset/tolerances	<i>Vertical</i>	± 5 mm
	<i>Horizontal</i>	± 3 mm
	<i>Comments</i>	are affected by the conicity of the container
Number of colours	<i>Bucket</i>	max. 6 true colours
	<i>Lid</i>	max. 4 true colours
Colour tolerances		The color tolerance is manually conducted by a visual adjustment with a master sample or pantone respectively HKS Colour Guide. Deviations are perceived visually and will be corrected then. As only real colors are used in the dry offset, deviation are just lighter or darker as the original color.
Colour adhesion		Test of scratch resistance and colour adhesion with Tesa No. 4204
Text size	<i>Positive type</i>	6 points
	<i>Reverse type</i>	10 points
	<i>Comments</i>	Refrain from using light and fine types in the case of reverse type.
Barcodes	<i>Minimum size</i>	SC2
	<i>Comments</i>	Must be placed falling (so that the lines run horizontally)
Texture of Delivered films	<i>Repro film</i>	1:1 (to be applied laterally inverted with the film side)
	<i>Negative film</i>	must be brushed on the coated side
	<i>Smooth films</i>	Cannot be used
	<i>Blackening of the film</i>	min. log. seal 3.20
	<i>System marks</i>	Provide film with 3 system marks; one left of the printed image, 2 below the printed image
	<i>Setting colour gradients</i>	in lighter tones min. 5% tone value; (do not set from 0-100%)
	<i>Comments</i>	Insert black correction fluid to cover imperfections. If possible, separate screen and line elements.
Delivery of data		as high resolution PDF/X

10.4.3 Digital Print

Digital printing is transfer printing in the CMYK colour mode. Initially, all colours are printed on a transfer medium and then transferred to the appropriate containers. Here, the HKS and Pantone colours are converted to CMYK values.

For the printing of coloured containers, a special white toner is used as a fifth colour. This true colour is to be entitled "white colour" in the document and placed as the first object. It should be noted that the underlying objects are always overprinted (setting: "overprinting" or "multiply").

10.4.3.1 Information

Print size		see item specification
Offset/tolerances	<i>Vertical</i>	± 5 mm
	<i>Horizontal</i>	± 3 mm
	<i>Comments</i>	are affected by the conicity of the container
Number of colours	<i>Composition of printing inks</i>	cyan, magenta, yellow, black
Colour tolerances		- Formation of lower colour variations in the conversion of the HKS or Pantone colours - deposited motif loses about 5% of the colour intensity
Colour adhesion	<i>Test methods</i>	Test of scratch resistance and colour adhesion with Tesa No. 4204
Text size	<i>Positive type</i>	6 points
	<i>Reverse type</i>	10 points
	<i>Comments</i>	Refrain from the use of light and fine types and hairlines in reverse type.
Barcodes	<i>Minimum size</i>	SC2
	<i>Comments</i>	Must be placed falling (so that the lines run horizontally)
Pictures/graphics	<i>BW and colour images</i>	300 dpi
	<i>Bitmap</i>	600 dpi
	<i>Comments</i>	Line drawings should be placed as vector graphics.
Delivery of data	<i>File</i>	as high resolution PDF/X
	<i>Comments</i>	Create the PDF file so that there is a 10 mm wide rim around the container size.

10.5 Impermeability

To determine the impermeability of our products, we have established a separate working definition for testing that is explained below. The result is thereby given in percent and describes the percentage of water loss.

10.5.1 General liquid density

To determine the overall liquid density, the bucket can be filled with water according to its nominal volume and tightly closed with the lid. In order for the loss of fluid in the result to be clear, the filled bucket is weighed before the test commences.

During the test the bucket is on its side (on the Temper evidence). After a trial period of three hours, the bucket is weighed again to calculate the loss of water based on the weight loss.

The relevant test protocols and their results can be provided on request. Please be aware that, unless otherwise agreed, we accept no liability with respect to the adequate resistance of our packages even after sending the test protocols.

Even the thickest containers only have suitable suitability for the filling of products with creeping properties, such as primers, deep penetrating primer, wood glazes, etc.

We are happy to discuss additional requirements e.g. for the hot filling of our packaging, in a personal consultation.

10.5.2 Shaking capacity

In combination with the buckets of weight classes M and H we offer special shaking lids, which experience has shown can achieve the best mixing result. However, shaking with standard lids is possible. Here, it is however important to note that the distribution of the pigments depends on the segment contour as well as the possible deposits of pigment residues. This can cause the concentrate to remain at the edge during mixing and cannot be washed out.

Furthermore, the pressing force of the shaker/mixer is adapted to the plastic containers because the containers can buckle at too high a setting (2.5 and 5 litre over 2.5 kN - 10 litres more than 3.0 kN). We will gladly provide appropriate presetting test equipment for temporary use.

Please see our article specifications for further information about the suitability of the products for shakers.

In addition, we inform you that due to the properties of the raw material, containers made out of transparent plastic are not suitable for use in the shaker/ mixer (see also point 10.1 "Load capacity").

10.6 Weight/measure tolerances and deviations

The values for tolerances of weight and measure given in the article specifications are due to slight variances in production. These are particularly formed if different tools are used for the manufacture of the product. A reduction in quality is however not connected to this.

In addition, the ovality of the bucket edge can be affected by external influences, such as transport process. However, this does not impair the quality and the further processing of the containers.

10.7 Hygiene requirements

All of our packages leave our factory sterile and must be protected by you to maintain the hygiene chain from contamination. This means: From the time of delivery you are responsible for complying with food hygiene regulations.

10.8 Static loading

The packaging we produce is preventively provided with an antistatic agent to prevent electrostatic charging of the products. We indicate a shelf life of six months for the antistatic agent under the following conditions:

- dry storage
- storage at temperatures above zero

Beyond this period no general anti-static efficacy can be guaranteed due to the container dependence on humidity and temperature.

11 Individual requirements of packaging properties

Individual requirements of packaging properties apply to packaging that differs from our standard product designs. These requirements include transportation, storage, filling, use or design.

If your product is different from the standard versions, you are responsible for gathering the appropriate information with regard to correct product handling, proper storage and use to avoid possible damage.

If the containers are to be stored outdoors, we can provide these with a UV stabiliser. In addition, we implement your individual packaging requirements and customise for example containers with special capacity demands (e.g. hot filling).

12 Traceability

The traceability of our containers is ensured in accordance with Regulation EU 1935/2004. We guarantee the clear and rapid traceability through the SSCC code that is on the pallet label. Consequently, it is imperative to keep the address labels/pallet identification numbers for internal documentation.

13 Disclaimer

Should the technical guidelines not be demonstrably complied with, we exclude our liability in accordance with paragraph 07 of our terms and conditions and accept no costs or guarantees for damages.

Appendix

	Tolerance	Permissible tolerance in ppm	Allowed in %
Contamination	0	0	0
Wrong IML	0	0	0
Missing IML	-	500	0.05
Low injections (visible in the container)	≤ 15 mm label width	1000	0.1
Large injections	> 15 mm label width	200	0.02
Crack in the wall or double labelled	-	500	0.05
Label orientation horizontal/vertical	> 3 mm from the centre	2000	0.2
Dry offset and digital print: Horizontal/vertical	± 3 mm/ ± 5 mm	2000	0.2
Not sprayed	> 2 mm deep	1000	0.1
Low level	0.5 - 1.0 mm length	500	0.05
High level	> 1.0 mm length	500	0.05
Technically unusable (uncover, unstack)	-	100	0.01
Bent, broken OV	-	500	0.05
Burns	-	500	0.05
Misprints digital and offset	-	200	0.02

Figure 1:Acceptance quality limit