

Work Instruction for Delivery Packaging



Work Instruction for Delivery Packaging

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Work Instruction for Delivery Packaging

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Work Instruction for Delivery Packaging

Introduction

This work instruction from KUKA Roboter GmbH (referred to hereafter as "KUKA") forms the basis for the delivery of parts (production material and goods for resale) to all plants and is to be regarded as a supplementary contractual agreement to the general Terms of Purchase.

1.1 Purpose

This work instruction informs suppliers about the KUKA packaging regulations to enable optimum delivery of suppliers' products. This is intended to guarantee a problem-free material flow between the suppliers and KUKA, taking quality-related, ecological and economical aspects into account.

The objective is the continuous use of packaging from the supplier to the point of use at KUKA.

1.2 Scope of validity

The work instruction is applicable for all KUKA suppliers who deliver parts to KUKA production plants.

1.3 Mutually applicable documents

3UDZ6XFW4S4A-6-622 – Part Tagging Definition | Directive

1.4 Terms

Individual packaging:	The first packaging to surround a product directly.
Bulk packaging:	Packaging which contains several individual packagings.
Sales packaging:	Packaging suitable for individual shipping. Can be individual or bulk packaging.
Pallet packaging:	Outside packaging which covers the complete base area of a pallet.

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Disposable packaging:	Packaging designed for one transport process without return and re-use of the empty packaging.
Reusable packaging:	Packaging designed for several transport processes with return and re-use of the empty packaging.
Small load carrier:	Stackable plastic or corrugated cardboard box used for transporting and storing parts.
Large load carrier:	Stackable plastic or corrugated cardboard box in pallet format used for transporting and storing parts.
Production goods:	Components delivered for further finishing in the KUKA production process.
Goods for resale:	Components delivered which are to be forwarded to the customer without the packaging being opened if possible.

2 General packaging principles

The supplier is responsible for ensuring both internally and externally that all the parts delivered are protected and packed properly so that they reach their destination at KUKA safely and without becoming damaged.

The supplier must adhere to the requirements of the work instruction and take any national and international requirements into consideration.

KUKA requires the use of recyclable materials for both disposable and reusable packaging and load carriers. The use of reusable packaging and load carriers should be preferred for ecological reasons.

- Avoidance of packaging waste:
Limit packaging waste to an absolute minimum.
- Avoidance of packaging:
Reusable and disposable packaging must be defined according to ecological and economical aspects and only the necessary packaging should be used.
- Packaging recycling:
The reusable and disposable packaging used must make environmentally friendly recycling possible.

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Independently of the type of packaging chosen, the following requirements must always be met for deliveries:

- Damage-free parts delivery
- Formation of efficient loading units
- Optimum use of space
- Delivery only in clean packaging
- Stacking ability
- Materials suitable for recycling
- Stability in terms of properties, shape and volume
- Problem-free unloading by industrial trucks
- Sufficient transportation safety devices
- Adherence to the prescribed standard dimensions
- Favourable part removal/optimum handling in the production process
- Correct identification through standardised marking
- Guaranteed corrosion protection

2.1 Specification of packaging

The supplier always selects and uses suitable packaging based on the requirements of this KUKA work instruction. This means the supplier is responsible for implementing the requirements of this work instruction in a meaningful way. Therefore the standard packaging described in chapter 4 is always the first choice.

Irrespective of this, KUKA is authorised at any time to prescribe the use of a specific packaging to the supplier. However, this does not release the supplier from his responsibility of delivering damage-free parts to the place of delivery at KUKA. If the prescribed packaging is not used or if requirements contained in the work instruction are disregarded, KUKA reserves the right to charge any additional costs arising from handling or repacking work or waste disposal to the supplier in the form of a handling fee of 200.- € per pallet. The supplier will be made liable for losses of quality resulting from inadequate or soiled packaging.

The packaging prescribed or released by KUKA can be changed by KUKA at any time during the series process after the first delivery.

Thus the following procedures are available for the selection of suitable packaging:

- According to the work instruction:
The supplier selects suitable packaging based on the requirements of the work instruction according the process described in chapter 5.
- Definition by KUKA:
KUKA prescribes precisely which packaging is to be used.

In both procedures the supplier has to fill out the packaging data sheet in chapter 6.

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The selection of packaging type is always related to the part properties, protection requirements, type of transport involved and general situation at the supplier's.

The number of parts specified to be transported in one set of packaging is binding for all deliveries to KUKA.

2.2 Safety and the environment

For all materials delivered by suppliers to KUKA, at least the respectively valid mandatory requirements for packaging, transport, storage and in relation to contents must be fulfilled.

2.2.1 Hazardous goods

Hazardous goods are substances which represent a concrete risk for humans, animals, the environment or public safety during transport in a public area (road, rail, water, air traffic). When hazardous goods are delivered, the local specifications concerning the marking and transport of hazardous goods must always be observed.

Respective safety data sheets must be provided to KUKA before delivery.

Marking must be carried out in accordance with the internationally applicable hazardous goods codes.

2.2.2 Permitted and non-permitted packaging materials

In order to keep the logistic effort required for the unmixed collection of materials to a minimum and design the recycling process as optimally as possible, only certain recyclable materials are permitted. All packaging must be made of environmentally friendly materials which are recognised globally as recyclable. Composites and bulk filling material such as packaging chips are not permitted.

The following table shows a summary of the materials permitted for use for KUKA packaging.

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	Permitted materials	Non-permitted materials
Composites	-	Composites are not permitted Exception: The supplier takes the packaging back.
General plastics - Disposable: - Reusable:	PE, PP, PS, PET (marking as per DIN 6120) PE, PP, PET, ABS (marking as per DIN 6120)	PVC, PC, EPS, PUR (special cases following previous agreement) PVC, PC, EPS, PUR (special cases following previous agreement)
Packaging materials made of plastics - Pre-cut films and foils - Bags and sacks - Protective and insulating caps - Thermo-formed inserts - Foams - Stretch foil	PE PE PE PE, PP, PET, PS, ABS PE (reusable also PP) PE (markings as per DIN 6120)	The printing on the plastic packaging materials must not exceed 3% of the foil surface unless this has been agreed in advance. Stickers, adhesive tapes and coatings not made of the same material. EPS, PUR Exception: The supplier takes the packaging back.
Paper and cardboard Corrosion-protection paper	Marking and management in accordance with RESY VCI paper types which can demonstrably be recycled together with paper/cardboard must be marked with the RESY symbol.	With water-insoluble coatings (e.g. wax, paraffin, oil, bitumen papers, paper self-adhesive tapes) Incompatibly impregnated or soaked paper (e.g. oil, bitumen paper) only following written permission from KUKA
Wood	According to IPPC standard (ISPM 15), chip boards/pressed pallets	Impregnated, painted, coated wood; wood wool
Straps and banding	PP, PET, steel	Polyamide, polyester
Filling materials	Paper, cardboard	Chips made of vegetable products; Chips or formed components made of polystyrene Wood wool

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2.3 Positioning of packaged goods and packing pieces

The layout of the packaged goods in the packaging or packaging material must be selected in such a way that the weight is distributed evenly. The size of the packaging should be appropriate for the packaged goods and the type of transport chosen. To stop the packaged goods slipping during transport and handling, all cavities within the packaging must be filled.

The layout of the packing pieces on a load carrier must be selected in such a way that the weight is distributed evenly.

The packing pieces must be distributed on the load carrier in such a way that they do not project beyond any of the edges of the load carrier.

2.4 Stacking ability of loading units and cast parts

All loading units must be able to be stacked. This must guarantee, for example, that pallets can be placed above one another (stacked) with or without stacking aids without any problems.

In the case of packaging made of corrugated cardboard, this means that the load-bearing ability must be checked by a stacking strength test. A safety factor of > 3 must be used. This is applied to the stacking strength determined in standard climate conditions.

The maximum height of a stack is 1000 mm incl. the load carrier used. If stacks which exceed this dimension of 1000 mm are to be delivered, this is only permitted following approval from KUKA, department R-GP.

2.5 Corrosion protection

All parts which are sensitive to corrosion as well as all machined and polished surfaces, particularly machined cast and wrought parts, require special protection and must thus have preventative corrosion protection.

Corrosion protection measures required by KUKA in accordance with applicable specifications/drawings must be implemented by the supplier unless agreed otherwise. In case that no special method of corrosion protection is required, the VCI-method or the desiccant method is always the first choice.

Independently of any corrosion protection applied to the material, parts must be delivered in such a way that they are protected against corrosive agents and surface damage during transport and storage.

Before delivery to KUKA it must be assured that all corrosion-sensitive parts have been preserved, wrapped or sealed and packaged. The supplier must guarantee corrosion protection for the following periods:

- Production goods: 12 months
- Goods for resale: 36 months

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2.6 Components sensitive to electrostatic charge

All components which are sensitive to electrostatic charge, such as motherboards, must be protected by special electrically discharging packaging components. Special foils, plastic padding, plastic containers or corrugated cardboard can be used for this. These special packaging has to be closed tight to prevent any contact to the electronic devices.

2.7 Impact-sensitive components

All components must be packed in accordance with section 2.1 in such a way that they are delivered to KUKA in a perfect condition. Impact-sensitive components such as toothed wheels, motherboards, hard drives must be especially protected, taking their sensitivity and type of transport chosen (individual or pallet shipping) into account. This must be achieved by suitable inner packaging.

2.8 Components with lacquered surface

All lacquered components have to be complete dry when packed in to the packaging. The surfaces need a special protection to prevent scratches of any other damage. Therefore these components have to be protected against any contact with other components, or other solid materials like wood, cardboard or plastics. For such kind of protection plastic foils, foam, fleece etc. should be used. The usage of reusable materials is always the first choice.

2.9 Casting components

Casting components should be transported in euro skeleton containers or by using euro collapsible frames together with euro pallets. In case of machined cast parts the machined surfaces need a special protection. Any corrosion protection has to be realized according chapter 2.5. Smaller and lighter cast parts can be transported in reusable containers according chapter 4.2.1 or by using cardboard boxes.

When cast parts are stacked, they must be supported by suitable wooden or corrugated cardboard structures so that they do no tilt during transport. In addition, the parts must be stacked in such a way that they can never tilt or result in a risk when parts are removed. Between all stacked casting components anti-slip-mats have to be used.




3 Marking

The clear and systematic marking of packing pieces and loading units is essential for the clear and fast identification of the parts delivered. The labels defined below show all the necessary contents which KUKA requires for smooth onward transport within the production plants or to the customer. The supplier must choose the size of label in such a way that the label can be glued to the prescribed surface and can be read and scanned at all times. The bar code to be used corresponds to the type code 128 as per DIN EN799.

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3.1 Individual packaging label

The individual packaging label makes the clear identification of the component packed in the individual packaging possible. The contents are defined in the following illustration:


KUKA	
Material no.:	 00123456
Description: ABCDEFGHIJKLMNOPQ	
Serial no.:	 00123456
 XXXXXXXXXXXXXXXXXXXXXXXXXXXX	

The bar code of the material number and the serial number is code 128. The bar code at the lowest point must be prepared according to bar code B-22 from the specification 3UDZ6XFW4S4A-6-622.

The individual packaging label must be glued to the individual component packaging. This can be a plastic foil or film, for example, in which the component is packed. If the component is in individual sales packaging, the label must be glued to the outside of the sales packaging. The side of the sales packaging visible from the outside when the sales packaging is stacked with others on a pallet must be chosen.

3.2 Bulk packaging label

The bulk packaging label makes the clear identification of the components which are packed together within the bulk packaging possible. The contents are defined in the following illustration:

KUKA	
Material no.:	 00123456
Description: ABCDEFGHIJKLMNOPQ	
Serial no.:	
00123456	00123456
00123456	00123456
00123456	00123456
Quantity: 6	
 XXXXXXXXXXXXXXXXXXXXXXXXXXXX	

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The bar code of the material number and the serial number is code 128. The bar code at the lowest point must be prepared according to bar code B-40 from the specification 3UDZ6XFW4S4A-6-622.

The bulk packaging label must be glued to the component bulk packaging. The side of the bulk packaging visible from the outside when the bulk packaging is stacked with others on a pallet must be chosen.

3.3 Pallet label

The pallet label makes the clear identification of all the components which are stacked on one pallet possible. A pallet may only ever contain one type of component. This means that only components with the same material number may be stacked on one pallet. The contents of the pallet label are defined in the following illustration:

KUKA	
Material no.:	 00123456
Description:	ABCDEFGHIJKLMNO P Q
Quantity:	6
 XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	

The bar code of the material number and the serial number is code 128. The bar code at the lowest point must be prepared according to bar code B-40 from the specification 3UDZ6XFW4S4A-6-622.











The pallet label must be glued on the pallet in height of 800mm stack in a position clearly visible from the outside. There is no need for a pallet label if all the individual packaging labels or bulk packaging labels of all the packaging on a pallet can be read and scanned from the outside.

3.4 Symbols for handling instructions

If the packaged goods should require special handling, this must be made clearly visible by means of information on the packaging.
The standard handling symbols on packaging are specified internationally in ISO R780 and DIN 55 402. The symbols must be included on the packaging since they are always self-explanatory and so overcome language problems in international transport operations.

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The following table illustrates a few selected handling symbols:

	Fragile goods		Sling here
	Top		Centre of gravity
	Keep away from heat (solar radiation)		Do not use forklift truck here
	Permissible stacking load		Component sensitive to electrostatic charge
	Keep dry		No hand truck here

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4 Standard packaging

At KUKA a distinction is made between the three types of packaging inner packaging, outer packaging and load carrier:

- The inner packaging is intended to pad or fix parts within the outer packaging depending on their sensitivity and the type of transport chosen.
- The outer packaging must withstand the forces (pressure, inertia etc.) from inside and outside.
- The load carrier protects the packaged goods during transport, guarantees safe transport and storage.

The selection of packaging type is related to the part properties, protection requirements, type of transport involved and general situation at the supplier's.

4.1 Inner packaging

The inner packaging is the smallest packaging unit. It may only contain one single item (parts with the same article number).

It can be

- reusable or
- made up of disposable packaging.

Typical types of inner packaging are:

- Padding materials
- Plastic inserts and inlays
- Bags or plastic pockets
- Corrugated cardboard and box packaging
- Netting tubes
- Inserts, inlays or pre-cuts made of cardboard

The decision about the necessity of inner packaging as well as its development and implementation is the responsibility of the supplier, whereby KUKA reserves the option of checking it.

4.2 Outer packaging

Outer packaging has the task of resisting forces from inside and outside (pressure, inertia etc.).

Examples of outer packaging include corrugated cardboard and box packaging, reusable containers, small load carriers.

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4.2.1 Reusable containers and small load carriers

The term small load carrier (German abbreviation: KLT) is used for largely standardised containers which are usually made of plastic and have been designed for part transport and storage.

The standardised and pool-compatible VDA small load carrier system according to DIN 30 820 or VDA recommendation 4500 has to be used as a KLT. Alternatively, a KLT made of corrugated cardboard according to VDA recommendation 4530 can also be used. In this case, however, care must be taken that the dimensions can be combined with one another.



The first choice of reusable containers:

- 200 x 150 x 150 mm
- 300 x 200 x 150 mm
- 400 x 150 x 150 mm
- 400 x 300 x 150 mm
- 600 x 400 x 220 mm

4.2.2 Corrugated cardboard and box packaging

Corrugated cardboard and box packaging is used both as individual packaging or inner packaging as well as for outer packaging.

In contrast to a normal cardboard box packaging, a corrugated cardboard box has a higher load-bearing capacity and is thus better suited for heavy weights.

	Corrugated cardboard and box packaging
Dimensions	<p>First choice of boxes:</p> <ul style="list-style-type: none"> • 150x110x130mm • 250x160x130mm • 350x110x130mm • 350x260x130mm <p>Different dimension have to be approved by KUKA, department R-GP.</p>
Overall weight	For manual handling: max. 20 kg
Requirements	

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	The quality of the box must guarantee sufficient stability for stacking and must be resistant to impact. Safety factor of the stacking strength > 3.
Stacking ability	The cardboard boxes must be able to be stacked without any restrictions. Where exceptions apply, the corresponding packaging must be marked.
Use	In the case of corrosion-sensitive parts, direct contact of the parts with the box must be avoided (e.g. by VCI films). Care must expressly be taken that the parts in the box are handled correctly and securely properly for transportation in order to avoid damage and resulting costs.
Usage requirements	Packaging boxes must be dry, intact and free of damage such as cracks, creases or holes

4.2.3 Wooden box

Wooden boxes are mainly used for premium parts which are transported by sea freight or air freight. Before wooden boxes are used, it must be checked whether there is an alternative and more effective packaging available which meets the requirements. Wooden boxes are always second choice.

The wooden boxes used must comply with the IPPC standard in accordance with chapter 2.2.2. The usage of wooden boxes has to be approved by KUKA, department R-GP.

	Wooden box
Dimensions	Various designs depending on usage requirements
Overall weight	Depends on the box structure
Requirements	Wooden box in accordance with DIN 55499. Parts which are packed in wooden boxes must be positioned in such a way that they cannot slip. Only wooden boxes which are free of any soiling and can be stacked safely are permissible.
Stacking ability	The wooden box must be sturdy as well as reliable and safe to stack. If the wooden box cannot be stacked, it must be marked accordingly.
Use	Wooden boxes are used to form loading units and should only contain one article.
Usage requirements	The wooden box must be in a fault-free and proper condition.
Marking	The wooden box must be treated and marked according to IPPC (ISPM 15).

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4.3 Load carriers

Load carriers have the task of protecting packaged goods during transport and guaranteeing safe transport and storage. The released load carriers include Euro pallets, Euro skeleton containers, Euro collapsible frames, disposable pallets and reusable containers.

4.3.1 Euro pallets

Euro pallets of the sizes 1200 x 800 x 140 mm (Euro pallet in accordance with DIN 15146 Part 2) and 1200 x 1000 mm (Euro industrial pallet in accordance with DIN 15146 Part 3) must be used.

The Euro pallets used must comply with all the points of DIN 15146 Part 2.

4.3.2 Euro skeleton containers

Skeleton containers are loading devices in materials handling. The dimensions of a skeleton container are standardised at 838 mm wide, 1240 mm long and 970 mm high, the unladen weight is approx. 84 kg.

The Euro skeleton containers used must comply with all the points of DIN 15155.

4.3.3 Euro collapsible frames

Euro collapsible frames are loading devices in materials handling. The wooden collapsible frames have between four and six metal hinges. When opened up, they can be stacked and combined with Euro pallets. When collapsed, they can be stored in a space-saving manner.

4.3.4 Disposable pallets

Disposable pallets are transport pallets used for the one-off transport from the supplier to KUKA. In contrast to reusable pallets (Euro pallets), for which there are various pool systems on the market, no exchange of disposable pallets take place. The last recipient in the delivery chain is responsible for disposing of the pallet.

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	Disposable pallet
Dimensions	1200 x 800 mm; deviations only after written approval from KUKA, department R-GP
Overall weight	Perm. overall weight varies depending on the material: Cardboard: up to 800 kg; chip board or wood: up to 1000 kg; plastic: up to 1000 kg.
Requirements	Disposable pallet made of wood, plastic, cardboard etc. List of permissible materials in accordance with chapter 2.2.2
Stacking ability	The pallet must be sturdy as well as reliable and safe to stack.
Use	Pallets are used to form loading units. Loads are secured on pallets using packaging aids (stretch film, straps etc.).
Usage requirements	The pallet must be in a fault-free and proper condition.
Marking	A disposable pallet made of wood must be treated and marked according to IPPC (ISPM 15).

4.3.5 Reusable containers

Before using a reusable container the usage of a standard packaging described in chapter 4.3.1 to 4.3.3 has to be checked. Reusable containers are always the second choice and have to be approved by KUKA, department R-GP.

4.4 Packaging aids

Packaging aids are used to seal packaging materials and increase the strength of the packing piece and thus the protection of the packaged goods. A distinction is made between packing aids, padding material and corrosion protection packaging.

4.4.1 Packing aids

Packing aids are used for safe transport or to protect the outer packaging etc.. Packing aids include pallet frames, stretch films, edge protection, shrink films etc..

4.4.2 Padding material

Padding materials are used to fix and pad out the packaged goods in the packaging; they are materials such as packing paper, foam film, bubble wrap etc..

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4.4.3 Corrosion protection packaging

Corrosion protection packaging is used to protect the goods from corrosion. Examples include VCI film, VCI paper, dessicant bags etc..

4.5 Cleaning and disposing of reusable packaging and load carriers

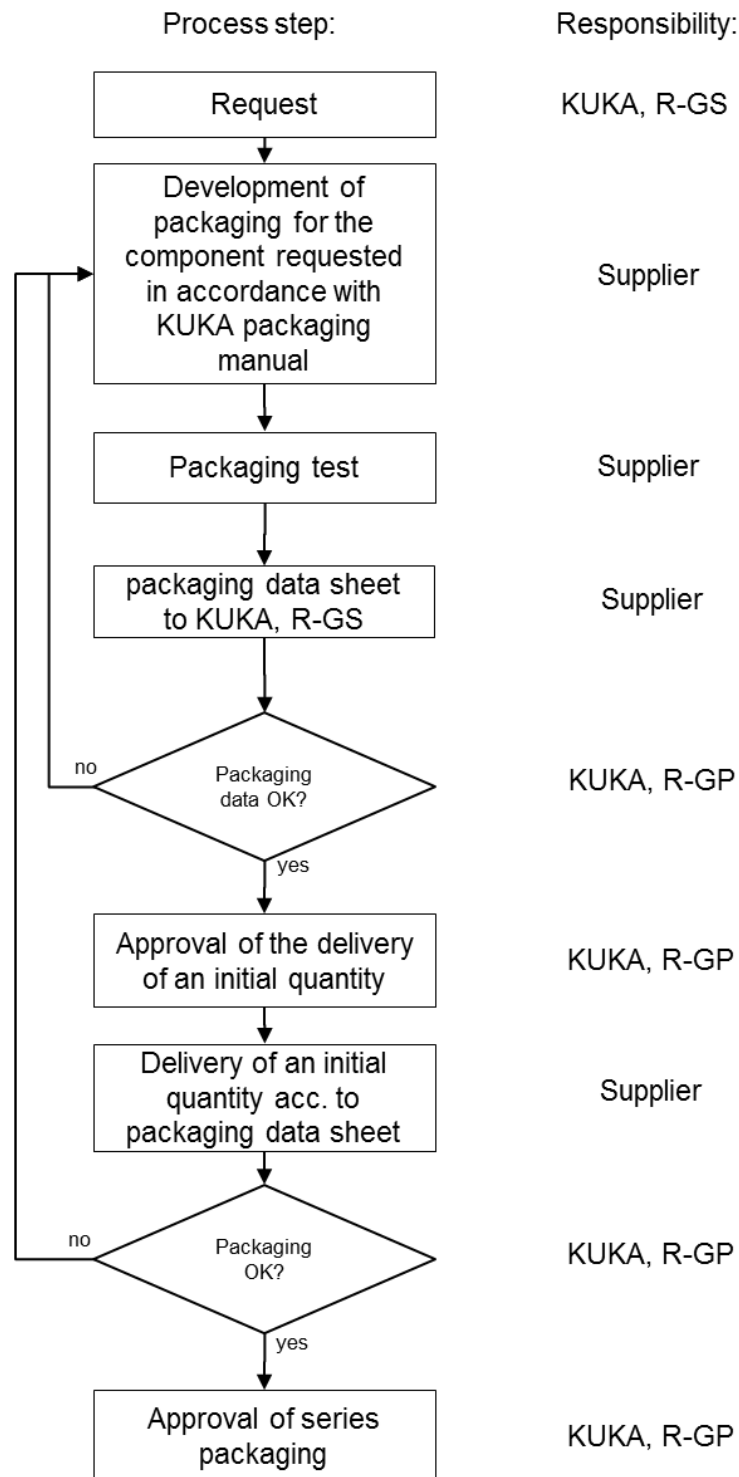
The function of reusable packaging and load carriers must be checked and unusable items must be eliminated, both by KUKA prior to returning them to the supplier as well as by the supplier before re-use.

Repairs or disposal of reusable packaging and load carriers which can no longer be used are the responsibility of the owner. If the question of ownership cannot be clarified without any doubt (e.g. in the case of pool systems), the possessor is responsible for disposal and replacement of the packaging materials and load carriers disposed of.

Suppliers are responsible for ensuring their parts are packed in clean packaging materials. Any cleaning which may be necessary (outside or inside) before the packaging materials are used again is thus always to be carried out by the supplier or a service provider assigned by the supplier. The cleaning of packaging materials also includes the removal of any labels and label residue.

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5 Packaging approval process



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6 Packaging data sheet

[Packaging data sheet](#)

KUKA		Packaging data sheet	
1. Product data			
Product:			
Code designation:			
Article number:			
Weight/part:			
2. Contacts			
	Supplier	Packaging Technology	Purchasing
Contact:		Jochen Wittmann	
Phone:		+49 821 797-2327	
Fax:		+49 821 797-412327	
E-mail address:		Jochen.Wittmann@kuka.com	
3. Preservation			
Type of preservation:			
4. Packaging data			
	Individual/sales packaging	Bulk packaging	Pallet packaging
Article number:			
Packaging materials:			
Dimensions:			
Filling quantity / unit:			
Packing pattern:			
Tare weight:			
Gross weight:			
Further packaging materials:			
Load-securing devices:			
Photos / sketches: (packaging opened)			
5. Remarks			
6. Signatures			
Supplier		KUKA Robot Group (Packaging Technology)	
Version:	Date:	Signature:	Signature:
2			

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7 Updating service

7.1 Change index

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