



Packaging Manual

Packaging Manual

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Abbreviations

APZ	Inspection certificate (Abnahmeprüfzeugnis)
w	Width
BA	Complaint (quality assurance) (Beanstandung (Qualitätssicherung)
BCC	Definition of the corrugation profile (fluting) of corrugated board packagings
EPA	Electrostatic Protected Area
ESD	Electrostatic Discharge
ESDS	Electrostatic Sensitive Devices
EUR	Euro(pallet)
h	Height
ISPM	International Standard of Phytosanitary Measures No.15 Guidelines for regulating wood packaging materials in international trade
l	Length
MA	Defects notice (Mängelanzeige)
PE	Polyethylene
PP	Polypropylene
PS	Polystyrene
RMA	Return Material Authorization
VCI	volatile corrosion inhibitor
VPE	Packaging unit(s) (Verpackungseinheit(en))

1 Introduction

The provisions of this packaging manual apply to all deliveries to Funkwerk Systems GmbH (hereafter named “Funkwerk”) to its locations in Kölleda and Karlsfeld. It also applies to internal deliveries between both locations. The provisions of this packaging manual are a part of each contractual relationship, in accordance with our General Terms and Conditions of Purchase (Allgemeinen Einkaufsbedingungen) and/or existing framework supply agreements.

The objective is to inform our contractual partners about existing guidelines and regulations regarding packaging and to support them in packaging development and choice of packaging materials, to ensure optimised and fault-free material flow between manufacturers / suppliers and Funkwerk. This is to be achieved through the following specifications and requirements:

- optimum packaging design,
- max. dimensions for containers, cartonboard and/or load carriers,
- correct and complete labelling/markings and
- most damage-free delivery and transport possible.

In justified cases, deviations from these packaging guidelines must be agreed with Funkwerk in advance.

2 Contacts

If you have any questions concerning this packaging manual or the dispatch of your delivery, please contact the following persons:

Delivery location: Kölleda

Head of Warehousing <i>Mr Stefan Hartung</i>	Phone: +49 3635 / 458-460 Email: stefan.hartung@funkwerk.com
Head of Purchasing <i>Mr Gabriel Heinecke</i>	Phone: +49 3635 / 458-410 Email: gabriel.heinecke@funkwerk.com

Delivery location: Karlsfeld

Head of Service <i>Mr Michael Neumann</i>	Phone: +49 8131 / 9075-114 Email: michael.neumann@funkwerk.com
Purchasing <i>Mr Carl-Georg Zagelmair</i>	Phone: +49 8131 / 9075-271 Email: carlgeorg.zagelmair@funkwerk.com

3 Packaging requirements

3.1 General packaging requirements

The packaging of deliveries to Funkwerk, in particular, must fulfil the requirements listed in the following:

- Damage-free (partial) deliveries – surface and mechanical protection (if applicable in end-consumer packaging),
- Transport safety/security,
- Rational load units,
- Optimum utilisation of the transport containers,
- Easy and problem-free handleability of the packaging unit(s),
- Easy removal of parts,
- Stackability,
- Fixings/sealing materials according to the size and weight of the delivery,
- Compliance with the standard dimensions specified in the following,
- Protection from moisture and dirt,
- Preferred use of returnable packaging (corresponding markings),
- Recyclable packaging material, reduced to the necessary minimum,
- Environmental compatibility and easy disposability,
- Appropriateness of the packaging costs.

The contractual partner is obliged to check the above-named points regularly during the entire contractual relationship for potential optimisation and if applicable to make adjustments in consultation with Funkwerk.

3.2 Transport markings / labelling of the packaging

Funkwerk has its own goods in transit insurance policy with ERGO insurance company. The contractual partner is therefore not entitled to invoice Funkwerk for insurance costs.

The transport from the contractual partner to Funkwerk shall only be made in accordance with the packaging requirements of this packaging manual. The objective is to prevent damage or partial loss of the goods during transport.

The contractual partner must mark each package with the Funkwerk part number, model status (version) and the delivered quantity per package. If a delivery is made up of several packages, these must be numbered and the total number of packages must be marked on the delivery note.

The marking must always be clear and easily visible for the recipient. Deliveries due to a complaint must be delivered separately and clearly marked, e.g. “Rework”, “Additional delivery”, the BA No., or similar information. The same applies to deliveries of samples, which the contractual partner must mark as “sample part delivery” and the corresponding purchase order number.

Packaging markings by means of labels must comply with the following:

- The identification must be easily visible, legible and if applicable, scannable,
- The dimensions and weight of the goods must be included on the labels,
- Two labels with the same content must be attached to end-consumer packagings: one label on the top and one label on an end face.
- Handling instructions to DIN 55 402 (e.g. markings on the top, particular protection (e.g. fragile package contents, or similar) must be followed,
- Invalid labels must be removed or stuck over.

3.3 Dimensional requirements of the packaging units

The packaging units must withstand a stacked height up to 135 cm without damage. The manufacturer / supplier must demonstrate this by means of a packaging study if requested by Funkwerk.

The following dimensions must be complied with to enable optimum utilisation of the shelving/rack capacities available to Funkwerk and effective use of space:

3.3.1 Parcel deliveries

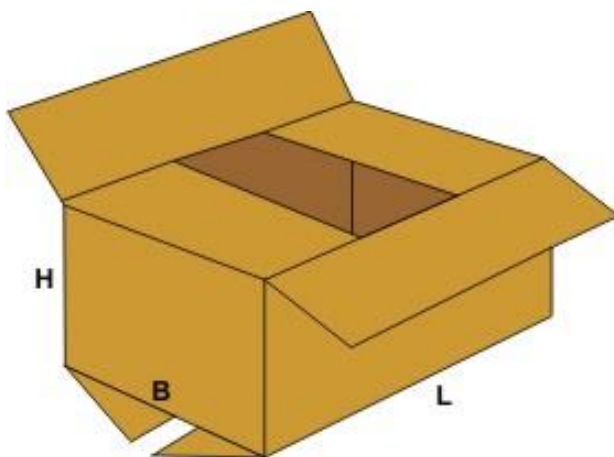


Figure 1 Carton dimensions

Allowable dimensions for **parcel deliveries**:

Size:	max. 40 x 40 x 30 cm (L x W x H) (Figure 1)
Exception:	Electronic components as rolled or tube goods
Weight:	max. 30 kg

3.3.2 Pallet delivery

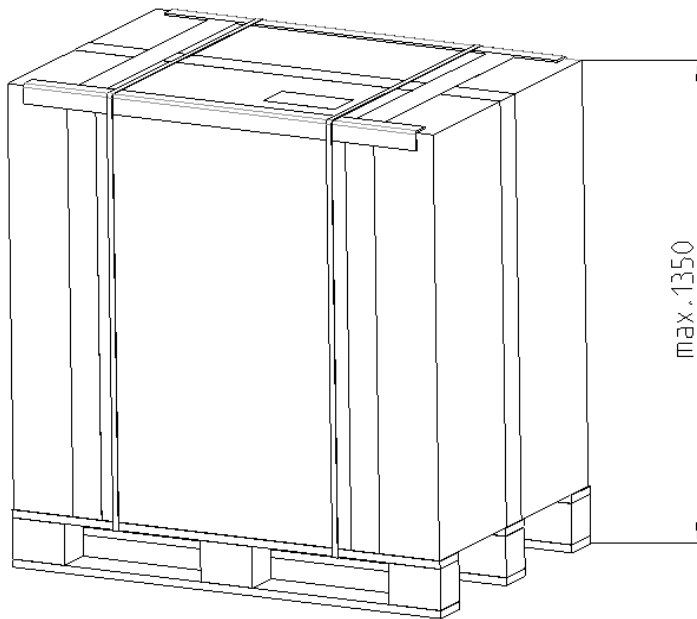


Figure 2 Pallet height

Allowable dimensions for **pallet deliveries**:

External dimensions: max. 1200 x 800 x 1350 mm (L x W x H) (see Figure 2)

The external dimensions of the pallet must not (!) be exceeded. The height of the total load unit must not exceed 1.35 m max. The allowable gross weight of a load unit must not exceed 500 kg max. The pallets must be fitted or secured with at least one stack protection pyramid (pallet cap). Dimensional deviations for technical reasons, e.g. deliveries of large volume packagings such as pallet containers, or similar, must be announced in advance and agreed with Funkwerk.

Pallet deliveries may only be made on Euro pallets (3.3.2.a) or EUR cage pallets (3.3.2b).

3.3.2.a “Euro pallets”



Figure 3 Euro pallet

Deliveries can be made on standardised pallet rack compatible EUR pallets (Euro pallets) in accordance with EN 13698-1 or on disposable wooden pallets with Euro pallet dimensions. Delivery on KAYPAL corrugated cardboard pallets is not permitted.

Allowable dimensions for “Euro pallets”:

Length (mm):	1200
Width (mm):	800
Height (mm):	150
Opening height (mm)	100
All. total weight (kg)	1000
Standing surface (m²)	0.96

3.3.2.b EUR cage pallets

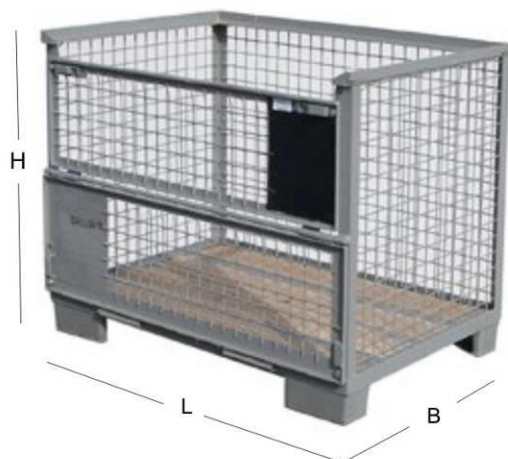


Figure 4 Cage pallet

Technical data:

- Width: 800 mm
- Height: 800 mm
- Length: 1200 mm
- Mesh size: 50 x 50 mm
- Weight: 85 kg
- Pool pallets according to EUR cage pool standards
- for pallet truck operation
- 1 side half drop-bottom
- with wooden bottom

Pallet deliveries can also be made on DB Europool cages standardised in accordance with DIN 15155/8-UIC 435-3:

Allowable dimensions for **EUR cage pallets**:

Length (mm):	1240
Width (mm):	835
Height (mm):	970
Weight (kg)	70
Standing surface (m²)	0.96

3.3.3 Printed board delivery

Printed circuit boards can be delivered in whole “panels” or as individual items. A “panel” or multiplier is the name used to describe multiple, identical circuit boards pooled together in a single layout.

A maximum 25 “panels” or individual printed boards may be grouped together in a friction and impact resistant package to form one packaging unit, provided this is not explicitly stated otherwise in the purchase order from Funkwerk.

Printed boards must be delivered as vacuum packed boards. The films used for this must be 0.30 mm thick. The expiry date of the storage life (shelf life) must be visibly attached on the packaging.

Printed board deliveries must not exceed a total weight of 30 kg.

“Panels” with non-usable individual printed boards must not be delivered. They are to be delivered in separately marked packaging units. The manufacturer/supplier must mark clearly mark defective printed boards as defective.

Within the packages, the “panels” must have a uniform orientation (no 180° rotation). Separating layers are not permitted.

3.3.4 Delivery of display housings

Displays are packed in device-specific packaging (usually cardboard). If necessary, this device-specific packaging is protected by additional outer packaging. For device-specific packaging a drawing has to be defined and need to be confirmed by our purchasing department.

Any device accessories are enclosed in a separate cardboard box / bag.

Standard boxes with any required – non-scratching – cushioning are to be used for assemblies/modules for which special packaging has not been designed. The cushioning serves as adapters between non-standardised packed products and the packaging.

Display packaging requirements:

- Devices from 15 kg in weight must be packed on a transport pallet. The pallet must have an opening height of 105 mm for transport by fork lift / hand pallet truck.
- If the pallet is to be loaded transversely (at right-angles) to the direction of travel, the packaging length must not exceed 2.4 m max. (width of the load area).
- The outer cardboard packaging must be sufficiently stable to ensure protection of the device, minimum quality 2.40 BCC to DIN 55468. The secondary packagings, e.g. film, must appropriately protect the device surface from scratches, grinding and chafing marks.
- The packaging must be secured by strapping. Edge protection profiles with dimensions 1100 x 40 x 40 x 4 mm must be used to protect the secondary packaging.
- Packagings of displays and display housings are not stackable. The outer packaging must therefore be fitted with fork lift/pallet truck protection (except for direct transport).
- The packaging must be able to be reused at least once for packing with the complete manufactured passenger information display.
- The packaging must be designed so that the already installed or still to be displayed displays are vertical and must be able to carry 30kg additional weight (display, glass).
- The packaging must be able to be recycled or disposed of homogeneously (only one type of material). I.e. composite materials may not be used.

3.3.5 Packaging material requirements

Otherwise, the following requirements apply regarding the packaging material used:

Type	Approved material	<u>Not</u> approved material
Plastics	PE, PP (max 5% of the area of PE films) printed, PE, PP, PS foam, PP strapping, Plastics with identification markings to DIN 6120	Plastic mixtures, rubber compounds, metal-plastic composite films, incompatibly impregnated and VCI films, polyamide and polyester strapping
Cardboard/cartonboard	Free from substances harmful for paper production	With water-soluble coatings or adhesives
Anti-tarnish paper	VCI papers, which can verifiably be recycled with paper/cardboard	Paper with incompatible admixes e.g. bitumen, oil or waxed paper
Wood	Untreated solid and plywood, wood wool or wooden packaging materials to ISPM 15	Particleboard, impregnated, coated/faced or lacquered wood

Returnable containers must be delivered in a cleaned condition only.

3.4 Protective measures for electronic components

The following protective measures must be taken for deliveries of electronic components:

- Electronic components, assemblies or modules must be packed in ESD protection packaging, e.g. conductive and shielding bags or containers.
- When packing the assemblies/modules in the ESD protective packagings, ESD protection measures must be implemented, e.g. do NOT (!) touch the assemblies/modules, earthing strap.
- Assemblies/modules must be protected against dust, moisture and impacts (enclose desiccant bag, seal the ESD bag)
- Assemblies, especially pins and contacts, must be protected against mechanical action.

The packaging must be marked with the following warning symbol for ESDS to EN 61340-5-1:



Figure 5 Examples of warning symbols for ESDS

The packed assemblies/modules must be sent in transport packaging. The transport packaging should allow stacking up to a height of 135 cm.

Moisture-resistant components must be marked with the information symbols for “hygroscopically sensitive components” (Figure 6).

[illegible]

Figure 7 Example of classifi-

4 Shipping documents

All deliveries intended for Funkwerk must be accompanied by the appropriate shipping documents (delivery note, roll-in card, etc.) according to DIN 4991 or alternatively in accordance with VDA 4912.

The contractual partner must note the following information clearly on the delivery note:

- Delivery note date,
- Delivery note and if applicable invoice number,
- Order and part number of the ordering party,
- Complaint report number in case of replacement deliveries for complaints,
- Delivered quantity,
- If products subject to obligatory serial numbering are delivered, a list of the scanable barcodes must be enclosed with the shipping documents,
- Number of packages.

If a delivery is made up of several packaging units, each unit must have its own delivery note or a copy of the delivery note.

If the delivery of an inspection certificate (APZ) 3.1 to EN 10204 has been agreed between the contractual partners, this must be enclosed with the delivery documents and separately marked as such.

5 Incoming goods

The incoming goods department of Funkwerk checks incoming deliveries for correctness of the recipient, obvious defects (e.g. transport damage) and completeness of the number of packages.

If the delivery is damaged, this is noted on the delivery document and is countersigned by the bearer (deliverer). In exceptional cases Funkwerk reserves the right to refuse to accept the delivery.

Incoming goods times of Funkwerk Systems GmbH:

Kölleda location:

Monday to Thursday: 06:30 – 15:15 (break: 09:00-09:20; 11:45-12:30)
Friday: 06:30 – 14:15 (break: 09:00-09:20; 11:45-12:30)

Karlsfeld location:

Monday to Thursday: 08:00 – 16:30 (break: 12:00-13:00)
Friday: 08:00 – 14:00

6 Goods inspection and complaints

If separate acceptance conditions have not been agreed with the contractual partner, a random test will be performed. This is based on the documents agreed with the contractual partner (e.g. quality assurance agreement, design drawing, test regulations, reference samples).

The contractual partner is informed of any delivery defects in a written defects notice (MA) or quality complaint (BA). The additional costs caused by the BA are passed on to the contractual partner.

Moreover, the purchasing department of Funkwerk, in consultation with the contractual partner, clarifies the further procedure for cure (supplementary performance).

7 Consequences of packaging manual infringements

The contractual partner is explicitly advised that a delivery made in disregard of a requirement in this packaging manual constitutes failure to provide proper fulfilment of their due contractual performance in accordance with §§ 362 ff. BGB (German Civil Code).

In the event of an infringement of the requirements specified in this packaging manual, among other things, Funkwerk can demand lump sum compensation for the costs or losses incurred:

No.	Type of infringement	Amount (€)
1.	unagreed delivery outside of incoming goods times	80.-
2.	Missing / incorrect documents as per Section 4	50.-
3.	Missing / incorrect labelling/markings as per Section 3.2, 3.3.3. and 3.4	per VPE: € 30.-
4.	Other infringements	at cost

The contractual partner is entitled to prove that the losses / costs were not incurred or only with a significantly less amount than the lump sum penalty.

Funkwerk's right to make further claims for reimbursement of costs and compensation remain unaffected by these lump sum penalties.

We reserve the right to make changes to this packaging manual without notice.