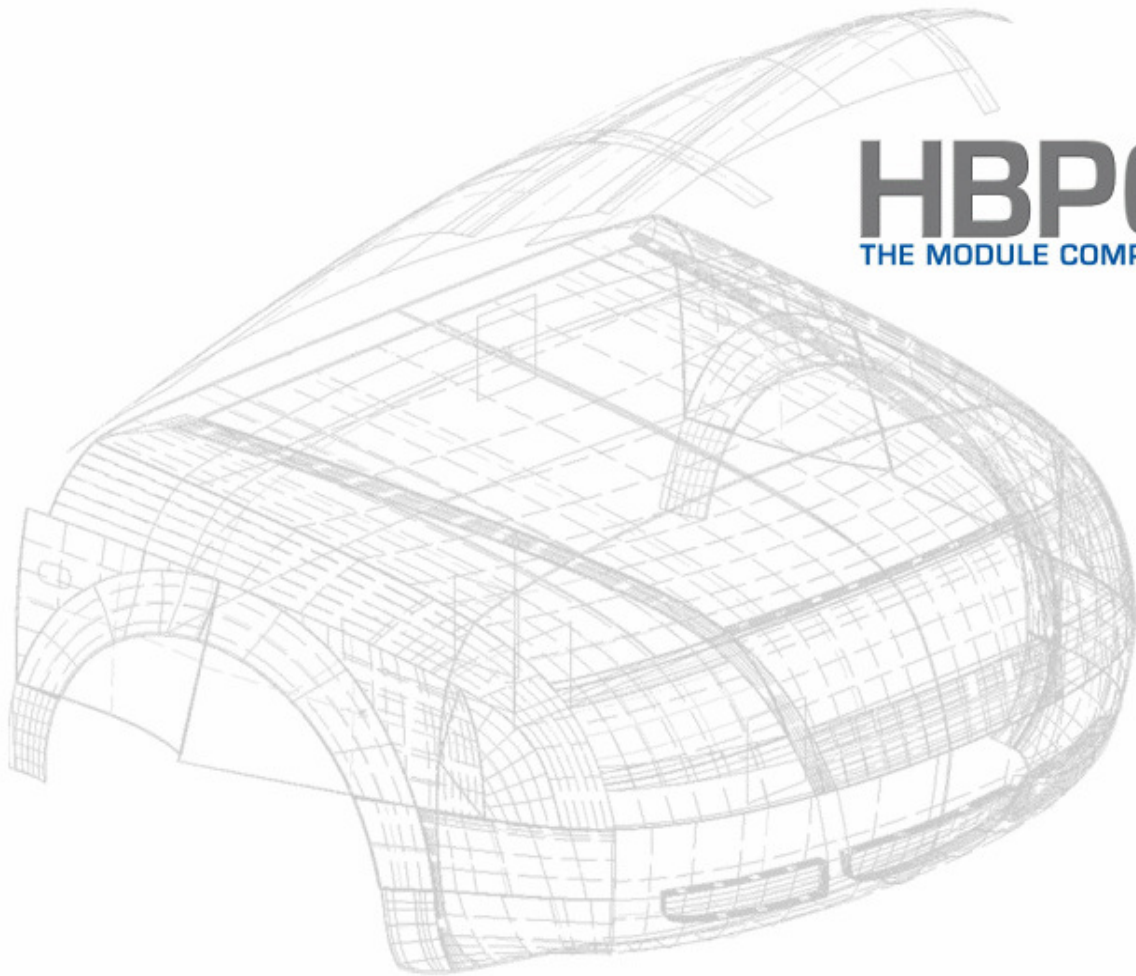


Specification sheet special containers

Valid for the HBPO GmbH including all daughter companies



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2. In general

2.1 Scope of application

This specification sheet applies for the development and manufacturing of special containers. This carrier is not defined over his size and shows the following characteristics:

- developed for a component, which can not be packed quality-conserving in general charge carriers, due to its size, height, geometry and the required transport protection
- specific for a component themed component-family of a project

The specification-sheet special containers has validity for the whole HBPO-group. The regulations defined in this specification-sheet apply for the developmental partner as well as for the container-supplier and his sub-suppliers, which by order of HBPO develop and product special containers.

The purpose of this document is to develop a standardized and constructive design of a logistical optimizing potential (raster, stash-ability, volume-reduction). Among the function, to protect the parts for transport and storage, an optimal utilization of stock- and transport – room is to achieve.

2.2 Operational requirements

The production plant must fulfil the requirements accordant to the DIN ISO 9000 ff. 2000.

The project manager is responsible for the adherence to (delivery-)dates and has to attend all acceptances of HBPO. In case of modifications, the project leader is able to provide information, concerning the extra- and reduced costs as well as the schedule.

The developer is expected to insert his technical knowledge in the development of special containers suitable for series production.

The production plant as a qualified expertise plant inputs his Know-How in the sample- and serial production of containers. Methods of resolution for a cheaper production are to be presented.

3. Materials and material requisition

The material names of the single materials are to be quoted in the parts list, not binding for the offer and production. In the redevelopment of special containers the following underpoints with their norms and regulations are to be taken into consideration. The utilization of other materials requires at any rate the agreement of HBPO. The contractor bears the responsibility that the production plant receives all subsequent norms in written form. In case of replacement of German Norms into EU-Norms, the latest status is always valid.

The subsequently mentioned material-requests are valid, if not deviating from the request-documents.

3.1 Steel

For flat- and long products/manufactures as well as for semi-finished products out from general construction steel the DIN EN 10025 is valid. For steel-pipes (round) out from general construction steel the DIN 2458 is valid (welded steel-pipes). For hollow-sections (quadratic, oblong) out from general construction steel cold produced welded profiles are to be used accordant to the DIN EN 10219. For rustless steel the DIN 17 440 is valid, for blank sheets, bar steel as well as flat-products and the DIN 17445 for welded pipes. All arises are to deburr themed round off.

Hollow and open profiles are to be provided with black rush-boring \varnothing 10 mm or notches.

3.2 Plastics

Deep-drawing films are not allowed to lose their mould und fixity or show cracks in case of variations in temperature of - 20 °C till + 80 °C. Water drain holes have to be considered.

At plasticizing of steel-components the plastic film has to cling on fixedly on the underground as well as be firm and tear proof. The surface has to be flush and is not allowed to show varnish runs. The plasticizing makes up a protection of the parts to transport.

A capacitance of the plastics accordant to the ramp-test with 4 g must be guaranteed by the manufacturer.

For the subsequent reutilization the plastic-parts are to be marked with the material-label, manufacturer and date of manufacture.

3.2.1 EPP-foam

The following norms are to be met:

• tensile strength	DIN 53 571
• elongation at break	DIN 53 571
• compressive strength	DIN 53 421
• compression set	DIN 53 572
• crush elasticity	DIN 53 512
• bush hardness	DIN 53 577
• pad factor C	ISO 4651
• specific energy consumption	ISO 4651
• stat. surface load	ISO 7850
• heat form stability after 4 days at 110° C	< 2
• thermal conductivity at 10°C	DIN 52 612
• water absorption	DIN 52 428
• surface resistance	DIN / DE 0303

Additionally the following characteristics have to be guaranteed:

- eco friendly (CFC-free)
- free of fuel gas and other chemical blowing agents
- for electrical components the EPP-foam containers have to be manufactured accordant to the DIN EN 100015.
- The manufacturer guarantees: volume-conductibility and operational reliability also at surface-damages. Accessory a guarantee of 10 years is demanded.

3.2.2 Lightweight building board (e.g. Con-Pearl)

The following characteristics have to exist:

- eco friendly
- waterproof
- chemical resistant
- rotting firm
- olfactory neutral
- physiological unimportant
- precipitation-free
- lightweight
- recyclable
- breakable: fold-chamfers can be often moved
- printable: screen-or flex printing
- deformable: thermal bi- or three-dimensional through deep-pulling edges or *Prägen*
- stable: crush-, form- and burst firm according to geometry also buckling-pressure resistant
- weld-able: with high-frequency, ultrasonic, impulse-heat-air, heat-air or through friction
- flush: no rough surface
- modifiable: with colours, through divers/different foils
- flame protection existing
- antistatic
- insensitive to light against UV-rays

Tolerances:

- thickness: +/-0,2 mm
- length: +/-0,4 mm
- substance : till 500 g/m²: +/- 30 g/m²
till 1000 g/m²: +/- 50 g/m²
till 2000 g/m²: +/- 50-70 g/m²

3.2.3 Hollow chamber board

Hollow chamber boards have to show the following characteristics:

- eco friendly
- waterproof
- chemical resistant
- rotting resistant
- unscented
- physiological harmless
- precipitation-free
- lightweight
- recyclable
- bendable : fold-flutes can be moved several 1000 times
- printable: screen process or flex printing
- deformable: thermal bi- or three-dimensional through deep-drawing, angles or embossing
- stable: shock-, twist-, and burst proof, according to geometry also/even buckling pressure resistant

- weld-able: with high-frequency, ultrasonic, heat impulse, heat-air or through friction
- flush: no rough surface
- modifiable: with colours, through divers/different foils
- flame / reverberatory protection existing
- antistatic
- insensitive to light against UV- against UV-rays

Tolerances:

- thickness: +/- 0,1 mm
- length: +/- 0,2 mm
- substance: till 500 g/m²: +/- 30 g/m²
till 1000 g/m²: +/- 50 g/m²

4. Building groups and construction

4.1 Base frame

The following binding free-size tolerances apply for the base frame according to the DIN 7168:

Nominal size area over [mm]	till [mm]	Tolerances [mm]
0,5	3	0,1
3	6	0,1
6	30	0,2
30	120	0,3
120	400	0,5
400	1000	0,8
1000	2000	1,2
2000	4000	2,0
4000	8000	3,0
8000	12000	4,0
12000	16000	5,0
16000	20000	6,0

Hollow sections of construction steel are cool produced, welded profiles accordant to the DIN EN 10219. Profiles cut into pieces are not allowed to be inserted. Hollow profiles generally are to be provided with water-drain-holes at each end. These are to position so that the black rush is guaranteed in the standing container.

Water-drain-holes can be notched, punched or drilled (\varnothing 10 mm or notch 10 mm * 15 mm).

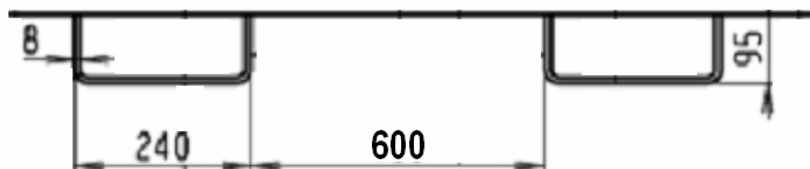
4.2 Feet

In general the under-ride-height of the container of 110 mm is not allowed to under-run. Exceptions are to be agreed with HBPO.

4.3 Retainers for forklifts

Two retainers for forklifts have to be fixed at leastwise two diagonally arranged container sides. In case that the container does not obtain a bottom, the retainers for forklifts are to be arranged as rectangular pipes at the complete container-side themed length.

The retainers for forklifts are to dimension as follows (indications in mm):



The distance between the retainers for forklifts has to be 600 mm.

4.4 Corner pillars

The corner pillars are to be implemented as hollow profiles with a minimum wall-thickness of 3 mm. Profiles cut into pieces are not allowed to be inserted. For the dynamic strain the corner pillars are to be implemented with junction plates in sufficient quantity and dimensioning. Exceptions are to be agreed with HBPO in written form.

4.5 Stash frame

If a stash-frame is intended to be, it is to be manufactured out from angles 50 mm * 50 mm * 5 mm or, only after arrangement with HBPO, with the special dimension of 40 mm * 40 mm * 5 mm. Weld seams in support of the feet are to be levelled (especially in the corners).

4.6 Welded connections

All welded connections are as per DIN 18800-7 to be carried out by proved welders with the qualifying certificate according to the DIN EN 287-1 themed DIN EN 287-2.

For the rest applies the DIN EN 29692.

The plant has to supply the small verification of suitability accordant to the DIN 18800 T7 6.3. Before the submittal of quotation, an evidence (copy of a valid certificate of competence and a verification of suitability) is to be submitted to HBPO. Without the devices mentioned above a technical okay will not be given.

The max. deviations of the unsteadiness for the perspective assessment groups are collected in the DIN EN 25817. These are strictly to adhere. In case of no other agreements, it is to weld accordant to the assessment group B.

Only accepted welding procedures are to utilize accordant to the DIN EN 288-1-2-3. In order to ensure the performance of the welding works, the DIN EN 719 is to be adhered. Therefore it is necessary to name a weld-supervisor accordant to the DIN EN 719.

For welding works at rustless steels the accepted regulations acc. to the DIN 8553, DIN 8562 and SEW 400 are to be kept. In case of black/white-connections special importance is to be attached to the weld-seam-protection against corrosion (up heating). Clear VA-welded connections are to be cleaned after welding, in order to maintain the corrosion-resistance of the scales-layers and tarnishes. Welding of aluminium requires extra demands according to the DIN EN 30042 concerning the performance and design.

4.7 Screw connections

Screw connections generally are to be carried out in minimum quality 8.8 with galvanized or rustless materials and to provide with self-locking nuts, whereas at least 3 convolutions must be visible.

At movable parts the track for the protection of convolutions always has to be provided with a distance bush. These distance bushes protrude respectively 1 mm – 2 mm over the moved profile and can be mould in or welded in. At rotating parts flat washers shall be provided at the contact areas. Screw connections are not allowed to be lacquered.

4.8 Adhesive connections

All inserted adhesives have to be predetermined constructively and are not allowed to lose their form nor toughness or show cracks in the range of temperature from - 20 °C till + 80 °C.

4.9 Purchased parts

The supplier of containers bears the responsibility for purchasing on schedule as well as the control of quality, performance and dimensional accuracy of bought-in parts. During the project the supplier of containers takes over the guarantee for the supplementary materials. The installation of defective parts and resultant failure-functions or part-rejects is for the account of the container-supplier.

4.9.1 Patent-Parts

Patent-parts are not allowed to be used without the acceptance of HBPO. HBPO does not bear licence-fees for used patents.

4.9.2 Plastic internals

Container-fixtures can be bonded blanks, sprocket fillets, collets, end caps and latch guidances. In either case, HBPO has to release their implementation. They are to be construed as they do not show any relevant signs of wear during the whole project-duration (at least 8 years).

Particularly it is to guarantee that the utilized material:

- Is not embrittled or hardens subsequently,
- retains his form,
- looses not from the carrier-material or breaks down,

- is not hygroscopic,
- is to decontaminate eco-friendly,
- maintains his slip-characteristics,
- is sufficiently firm when utilized for sheet metal components,
- is resistant against extraction and corrosion protective oils,
- is solvent free,
- is UV-resistant and
- silicone-free and free of substances which disturb the lacquer-moistening.

The carrier blank sheet for the plastics-internals must be galvanized. The tool-costs for the container-internals are to be featured separately.

4.9.3 Stretch grid / Step elements

Stretch grids are to be designed according to the requirements. As standard-sizes meshes of 62 mm * 23 mm * 7 mm * 3 mm (middle-mesh) come into question. A constant support (plate) and connection to the base-frame is to ensure through supporting profiles at the angles. Thread safety is to be guaranteed. At the borders every second catwalk and on the stringers every 100 mm is to be welded.

4.9.4 Clamping plates

2 VDA-clamping plates are to be tagged at every transport container. In general, the configuration is to be made frontal top left. Deviations of position are only acceptable with the agreement of HBPO. The clamping plates are to position at the frame with sufficiently long steel-rivets on a carrier-blank-sheet.

4.9.5 Locking mechanisms and dampers/plates

All movable parts have to obtain a limit-stop and be stackable in open and close state.

It is to consider, that utilized spring-bolts are weatherproof and smooth-running operationable on long term. Therefore, principally only galvanized spring-bolts should be used. When welding, it is to consider that the grease inside the spring-bolt will not be burned.

4.9.6 Rollers

If rollers are intended to be, only guide- themed fixed rollers for heavy loads from Blickle® are allowed to be used.

5. Colouring and surface

5.1 Presets of lacquering

The lacquering has to be free from varnish runs, cords, drops and fouling and must be failure-free in appearance. In order to guarantee a faultless lacquering the coating areas have to be free from oil, residual grease and loose scales themed rust. Consequently as a basic principle the transport containers are to be degreased and pre-painted before lacquering takes place. The coating areas must be dry before lacquering. The floor-group must be lacquered in dipping process.

The lacquering must have a minimum layer thickness of 45 µm. The layer thickness of the dry film must be uniformly 45 µm - 70 µm . Further predeterminations are: grid-cutting-test according to the DIN ISO 2409, gloss level: 80 %.

The part-retainings, plastic internals as well as galvanized parts are to be inserted un-lacquered. Mounting parts with surface protection (spring-bolts, screws, nuts) are to be masked and kept free of paint before lacquering.

All movable parts like dampers, rods, interlocks etc. are to lacquer in „blood orange“ acc. to RAL 2002.

For the durability as well as the quality of the lacquering the specifications acc. to the norm EN ISO 2409 are generally valid.

The container labelling must be contrast-rich to the container-colour.

If lacquered containers and stainless steel retainers are worked on after completion, they are to be cleaned basically from swarf.

5.2 Presets of colours

In principle the colour-types listed in the following table are to be used for the lacquering of metal containers and for the colouring of elements. :

Type of container / element	colour	denomination
Special container	grey	RAL 7035
EPP foams	black	RAL 5005
Hollow chamber plates and Con-Pearl	grey	RAL 7001
Depp drawing film	black	RAL 5005
Plies	grey or black	
Movable parts	blood orange	RAL 2002

The utilization of other tones is to agree with HBPO.

6. Labelling

6.1 Type label

On each transport rack a type-label of light metal with the measures 180 mm * 40 mm * 1 mm is to rivet preferentially on the inside of an existing corner pillar.

It has to contain the following information in good visible script (type size minimum 6mm) and in English:

- manufacturer
- inventory number
- serial number
- order number
- drawing number
- year of manufacture
- net weight
- load-carrying capacity
- stash factor

6.2 Further labelling (templating)

The further labelling (templating) has to take place in agreement with HBPO and if intended to contain the following information in a good visible type size of at least 40mm:

- proprietors
- drawing number
- net weight
- denomination of parts
- stash factor
- serial number
- max. extra load (static)
- max. filling weight

The labelling has to be contrast-rich to the container-colour and tagged in the English language.

7. Basic predeterminations

7.1 Raster / outside dimensions / height

As the external dimensions of the floor-group determine also the footprint of the carrier, these are to standardize. The container dimensions which are geared to the inside parameters of the lorry (and railway) have to follow the subsequent raster:

length [mm]	width [mm]
600 - 4.000	1.200
800 - 3.000	800
800 - 2.600	600

A maximum stash-height of 2.900 mm derives from the legally determined lorry-height of 4 m. Resultant the following container-heights arise:

absolute heights [mm]
565
710
955
1450

Deviations principally require a special acceptance. For the acceptance a process-cost-analysis including freight-cost-calculation, for the standard size compared to the special size is to provide from the developer / manufacturer as a support for decision.

The gross weight of the container is not allowed to pass over 1.000 kg.

7.2 Tolerances

The following vacuity tolerances are valid for all not tolerated nominal sizes:

Nominal-size-area over [mm]	till [mm]	tolerances [mm]
0,5	6	0,1
6	30	0,2
30	120	0,3
120	400	0,5
400	1.000	0,8
1.000	2.000	1,2
2.000	4.000	2,0
4.000	8.000	3,0
8.000	12.000	4,0
12.000	16.000	5,0
16.000	20.000	6,0

7.3 Stash-ability

It applies in general that the containers are to design stash- and align-able. Components are not allowed to stick out from the container measurements.

The maximum stash-factor will be calculated as follows for the purpose of adherence of the steadiness: $6 \times B/H$ (B = most narrow container side, H = container height).

The containers are to be checked on all steadiness-demands resulting from the maximum stash-ability. Permanent deformations themed deviations in the dimensional accuracy are not allowed to incur at the maximum extra load (incl. actual load and tare)

7.4 Transponder -ability (optional)

In principle, the containers should be prepared for a future application of transponders for the container-trace. The transponder-ability is optional and will only be required by special request of HBPO. If intended, it is to consider that the transponders can be affixed damage-free. For this, non-metallic fixing-points shall be provided at the container-frame so that the transponders do not protrude over the container. Furthermore the transponder is not allowed to be covered by metallic items.

7.5 Filing degree / optimized packing density

Basically containers are to design the way so that an optimal container-filing-degree is guaranteed. Proposals for the optimization of the container-filing-degree are to agree by the developer / container-manufacturer with HBPO.

7.6 Reducibility of volume for empties

In order to realize a high utilization of volume for empties, transport containers are preferred to be provided with a flap- or fold mechanism on prevailing economy.

7.7 Ergonomics / part filing and extraction

Containers are subject to the management of transport, of storage and of the filing- and extraction work places. The following points are to be guaranteed under ergonomical aspects:

The arrangement of the parts inside the container has to lie in the range of the optimal reaching area of the hands. The parts must be taken up in the container, so that turning at the extraction place will be avoided.

In case of close-surrounded containers at heights of > 770 mm an extraction flap is to be planned, which carries a container-height of minimum 33%.

If need by, the container has to be walkable. Appropriate step-elements are to be planned.

7.8 Wash-ability / water drain

The washability is to be ensured basically considering the operational reliability and ability for identification of the container.

The water drain is to be guaranteed. All hollow sections and sections open up are to be provided with water-drain-borings of Ø 10 mm or notches. In case of vertical arrangement an aperture shall be provided beneath. In case of horizontal arrangement apertures shall be provided beneath on both sides. At deep-drawing films it is essential to provide a water drain at the deepest points of the perspective part-retainer-cavities.

7.9 Reparability

In general, container building-groups vulnerable to repair, especially movable parts, have to be constructed the way so that a cheap repair would be possible (e.g. through modular features).

7.10 Work-safety / delivery assurance / legal restraints

The legal restraints for work-safety of the perspective countries and states, in which the special charge carriers are utilized, are to be adhered strictly .

Furthermore a faultless cargo-securing of the parts to transport is to be guaranteed. The cargo-securing has to be effected according to the national and international regulations. The cargo-securing is to be carried out according to the route of transport and the type of load.

7.11 Recyclability / environmental impact / protection of resources

Aspects of recycling and the protection of resources are to be considered at the development of special charge carriers. This applies especially for utilized plastics and toxic materials for which exist the obligation to produce supporting documents. The developer has to execute an appropriate declaration for the recyclability and environmental compatibility. Furthermore a recycling-appropriate disassembly, especially the separation of the single materials, is to consider in the construction.

8. Documentation

8.1 Drawings

The exchange of data takes place in data-format CATIA V5. 3-D-models as well as 2-D-drawings including parts-list have to be handed over to HBPO.

The contractor is obliged to keep documentations not handed over to HBPO for 10 years.

The drawings to be created have to contain the following information:

- Constructive design (presentation of the connectors in cuttings/slices)
- Location of the part to be packed as contour in the container
- Operating material and material-thickness of all parts presented in the drawing
- Welding symbols
- Indications of all necessary manufacturing and mounting tolerances
- Indications of all necessary operation- and inspection measures
- Parts list of all included single-parts (denomination, part-No., suppliers)
- Documentation of modification

8.2 Data-sheet / technical basic data

The following technical container-data are subject of the documentation:

- Carrier No.
- Drawing No.
- Denomination (with naming of the component to be transported)
- Type of carrier
- Inside measurements [mm]
- Outside measurements [mm]
- Container weight net / tare [kg]
- max. filling weight [kg]
- max. filling quantity [unit]
- container weight gross
- stash-factor
- fold-height outside [mm]
- max. extra load [kg]
- ability to override
- override-height [mm]
- type of material container
- year of manufacture 1. serial container
- manufacturer / supplier
- developer

The attached data-sheet is to be filled in and handed over to HBPO

9. Course and date

9.1 Dates

The development-partner themed supplier of containers creates a schedule, containing the necessary milestones for the development and manufacturing of a special charge carrier and ensures adequate

capacities for the adherence of this schedule. The scheduling takes place in agreement with HBPO. The schedule is binding, conceptual or technical modifications, which justify a delay are to be agreed immediately with HBPO.

The development partner themed supplier of containers has to provide a current schedule in regular intervals (2-weeks-cycle) without extra demand of HBPO containing all milestones relevant for development, qualification and manufacturing,

9.2 Acceptance and release

The acceptance of the special charge carriers takes place in 2 levels:

- Prototype-container-acceptance

- Serial-container-acceptance

For release of the prototype-container a successful transport-test is necessary which is to agree separately between the manufacturer and HBPO. After release of the prototype-container through HBPO, this container serves as a reference-container for the production of serial containers.

Before delivery of serial containers will be carried out, an acceptance of serial containers takes place additionally. After successful release, the serial containers are to be delivered according to the agreed schedule.

9.3 Guarantee

The guarantee ends with the conclusion of 36 months since delivery of the special charge carriers to HBPO. Deviations hereof are to be agreed in written form between the contracting parties. The guarantee includes the durably function- and quality appropriate handling of the special charge carriers as well as the part-protection and the guarantee for the construction of the weld seams, screw-connections and lacquering.

For the rest apply the points concerning the guarantee mentioned in the general HBPO-purchasing conditions.

10. Further applicable documents

- HBPO general specification book for movable investment goods
- HBPO general purchasing conditions
- HBPO data-sheet containers
- DIN EN ISO 9000 ff: Quality Management Systems
- DIN EN 10025: hot-rolled manufacture from unalloyed construction steel
- DIN 2458: welded steel pipes
- DIN EN 10219: cold-manufactured hollow sections for the steel-manufacture from unalloyed construction steels and fine grained steel
- DIN 17440: rustless steel
- DIN 17445: welded pipes
- DIN 53571: tensile strength, elongation at break
- DIN 53421: compression strength
- DIN 53572: compression set
- DIN 53512: inspection of rubber and elastomers
- DIN 53577: Polymere materials, mild elastic foamed material
- DIN ISO 4651: pad factor, energy consumption
- DIN ISO 7850: Stat. surface load
- DIN 52612: heat-protection technical inspections
- DIN 52428: water absorption
- DIN / DE 0303: test method for electric insulating material, specific volume resistance and specific surface resistance of firm, electric insulating operating materials
- DIN EN 100015: protection of electronic components against electrostatic phenomena
- DIN 7168: general tolerances, linear- and angular dimension, form and position
- DIN 18800-7: steel constructions - Part 7: construction and qualifying of manufacturer
- DIN EN 287-1 / 287-2: inspection of welders – fusion weld
- DIN EN 29692: welded connections
- DIN EN 25817: max. deviations of the irregularities
- DIN EN 288-1 / 288-2 / 288-3: demands and acceptance of welding methods for metallic materials
- DIN EN 729-3: technical welding quality requirements – fusion weld of metallic materials
- DIN EN 719: weld supervision

- DIN 8553: welding works at rustless steels
- DIN 8562: welding in the container construction; containers of metallic materials, technical welding basics
- SEW 400: welding works at rustless steels
- DIN EN 30042: arc welded connection at aluminium and its alloys adaptable for welding
- DIN EN ISO 2409: Lacquers and types of paint – grid cutting test
- DIN EN 10204: metallic manufactures – types of verification certificates
- DIN EN 10283: corrosion resistant cast steel
- DIN EN 61340-5-2: Electrostatics - Part 5-2: Protection of electronic components against electrostatic phenomenons; manual
- DIN EN ISO 898-1: mechanical characteristics of joining elements of carbon steel and alloyed steel - Part 1: screws