

ZFFCN 包装标准手册

ZFFCN Packaging Standard Manual

ZF Foxconn Chassis Modules (China)
Version 1.1.0

1 包装标准和规范手册

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II 缩写和专用名词列表 List of Abbreviations and Specialized terms.

缩写 Abbreviations

PDS: 包装信息表 Package Data Sheet

RFQ: 报价邀请函 Request for Quotation

专用名词列表 Specialized terms

一次性包装: One way packaging

循环包装: Returnable packaging

纸箱包装: Carton Box / Cardboard Box

重型纸箱: Heavy Duty Carton Box

普通纸箱: Common Carton Box

吸塑盘: Blister/Foam tray

塑料托盘: Plastic Pallet

包装材料: Packaging Material

辅助包材: Auxiliary Packaging Material

备件: Spare Parts

内衬: Insert

包装单元: Unit Load

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1 前言 Foreword

ZFFCN负责此手册的控制，如有争议，以中文版本为准。

本手册替代了《ZF 包装标准和规范手册 Version 0.1.0》主要变化如下：
ZFFCN is responsible for the control of this manual. In case of any dispute, please take Chinese version as standard. This manual replaces the “ZF Packaging Standards and Specifications Manual Version 0.1.0”. The main changes are as follows:

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2 总则 General

在保证零件品质的前提下，推动进厂包装标准化、规范化，提高包装质量，降低物流成本，提升生产效率。

On the premise of ensuring the quality of components, the goal of this manual is to promote the standardization and normalization of inbound packaging, improve packaging quality, reduce logistics costs, and enhance production efficiency.

3 目的及范围 Purpose & Scope

本手册旨在规范ZFFCN CYC工厂所能接受的入厂包装容器，包括循环包装和一次性包装。

This manual aims to standardize the incoming packaging for all ZFFCN CYC plants, including returnable packaging and one way packaging.”

在满足国家法律法规的前提下，规范ZFFCN CYC工厂零部件供应商包装标准和包装供应商的技术标准。

On the premise of complying national laws and regulations, this manual aim to standardize the packaging standards for components’ suppliers and packaging suppliers of ZFFCN CYC Plants.

4 包装设计通用原则 General principles

包装开发设计应满足以下基本要求：

Packaging’s development and design should satisfy the following basic requirements:

- 4.1 安全要求：必须保证零件操作者和零件的安全,所有种类的包装在正式投入之前必须经过有EHS工程师参与的评审。

Safety Requirements: The safety of operators and components must be ensured. All types of packaging must be reviewed with the participation of EHS engineers before official investments.

- 4.2 质量要求：包材本身在装入零件前后不应该存不可接受的品质和外形变化。

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Quality Requirements: Before and after operator put component into packaging, the packaging material itself should not have unacceptable quality and shape changes.

4.2 成本要求: 追求包材成本综合最低（含维修成本），追求最大的收容数，优先选择偶数，包装的尺寸要和货车车厢相匹配，以有效利用货车空间。

Cost Requirements: Pursue the lowest overall packaging material cost (including maintenance costs), pursue the maximum density, prioritize even numbers, and ensure that the packaging dimensions can match the truck space effectively.

4.3 环保要求: 尽可能选择可回收利用，环保的包装材料，避免重复包装和过度包装，追求环境友好。

Environmental Requirements: Choose recyclable and environmental packaging materials as much as possible, avoid repetitive and excessive packaging way, and strive for environmental friendliness.

4.4 标准化要求: 使用VDA标准包装，使用专用包装需要充足的内部评审和讨论。

Standardization Requirements: Use VDA standard packaging. The use of specialized packaging needs to be discuss and review internally."

4.5 标签要求: 参照ZFFCN PDS中关于标签的格式、数量、粘贴位置要求。

Label Requirements: Refer to the label requirements in ZFFCN PDS, Main factors are the label format, label quantity, and paste position.

4.6 ZFFCN负责包装方案的最终释放，并有权在有出现更低成本的包装形式或出现质量问题时要求供应商优化包装。

ZFFCN is responsible for the final approval of the packaging concept. ZFFCN has the right to require suppliers to optimize packaging if a lower-cost packaging concept appears or if quality issues occurred.

5 包装开发流程 **Process of Packaging Development**

5.1 包装概念方案由ZFFCN F04团队发起，经长期合作的包装供应商确认可行并与Tier2确认之后，作为概念方案；

The packaging concept is initiated by ZFFCN F04 team. After getting the feasible confirmation from long-term cooperative packaging suppliers and Tier 2, it can be served as the concept."

5.2 概念方案经过与工厂物流、质量、生产（工艺），Tier2相关人员讨论确定后作为设计方案；

Through the discussion and get confirmation from plant logistics, quality, production (process), the concept will be finalized as the design version.

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5.3 在设计方案的基础上制作RFQ，输出给采购部门，进行包装样件采购，并组织路试评审，同时签署Checklist，作为包装方案认可的依据；

Based on the design concept, prepare the RFQ and send it to the NPM department to purchase sample bin. Organize road test reviews meeting and sign the Checklist, archive it as the reference file for following packaging approval.”

5.4 路试评审通过后，准备批量生产；包装样件评审不通过则修改包装样件，直到通过。

5.4 If the road test result is passed, series production can be started. If the review result is not passed, modify the packaging sample until it is approved.”

6 包装种类和优选顺序 Packaging Category and Priority.

6.1 ZFFCN CYC工厂包装种类分为一次性包装和循环包装：

The category of packaging at the ZFFCN CYC plants are divided into one way packaging and returnable packaging:

一次性包装指纸箱包装或纸木结合包装

One way packaging means carton box or carton-wooden combined packaging.

循环包装指VDA标准KLT通用塑料箱、GLT通用卡板箱、围板箱、通用金属箱（铁皮箱，网格箱）、吸塑盘、专用EVA内衬、专用金属料架。

Returnable packaging means VDA KLT standard box, GLT cardboard box, plastic boarding box, metal box (tin box, mesh box), foam tray, specialized EVA supporter, and specialized metal rack.

6.2 国产零件结合距离远近、防护要求等因素选择使用循环包装或一次性纸包装。

一般遵循如下优选顺序：

For domestic suppliers, the packaging category is determined by some factors such as distance and protection requirements.

In General, the priority as below:

KLT通用塑料箱/GLT通用卡板箱>围板箱>通用金属箱>专用吸塑盘/专用EVA内衬>专用金属料架>一次性包装

VDA KLT standard carton/GLT cardboard box>plastic boarding box> metal box> specialized foam tray/specialized EVA supporter>specialized metal rack>One Way packaging.

7 一次性包装类型 One Way Packaging

供单次使用的包装，定义为一次性包装，材质通常由纸制品和木材组合而成。

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常见的组合形式如下：

Packaging which only use one time, defined as one way packaging. The one way packaging is made by paper and wood. Common one-way packaging are as follows:

7.1 重型纸箱配木托盘 Heavy Duty Carton Box with Wooden Pallet

重型纸箱长宽高推荐尺寸如下表，如不符合需与ZFFCN CYC沟通确认。

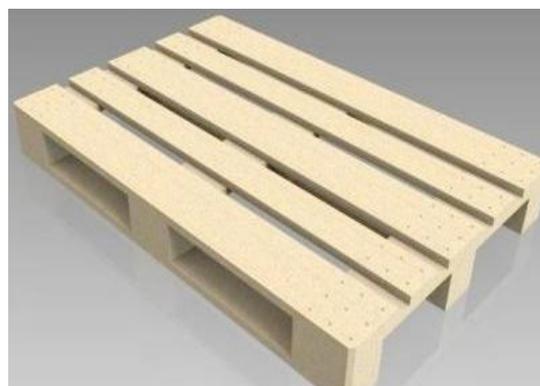
Suggested dimensions for heavy-duty cartons are listed in the table below. If the packaging cannot meet the requirements, please communicate with ZFFCN CYC for confirmation.

名称 Descript	长 * 宽 L×W (mm)	高 含托盘 Height with pallet	托盘高度 Pallet height
重型纸箱配木托盘 Heavy Duty Carton Box with Wooden Pallet	1200*1000	≤1200	≤150
	1200*800	≤800	



重型纸箱示例

Heavy Duty Carton Box Example



木托盘示例

Wooden Pallet Example

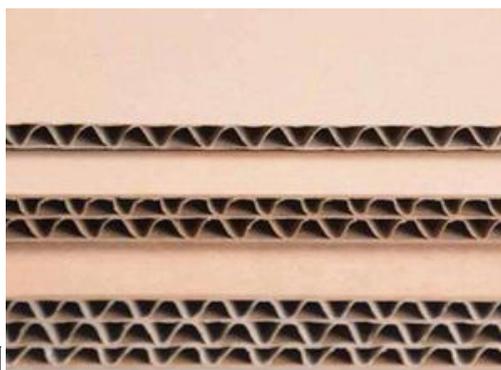
7.1.1 木托盘长宽尺寸与重型纸箱长宽尺寸一致或略大，四向进叉，优选实木。

The length and width of the wooden pallet should be same as or slightly larger than the heavy-duty carton. It should allow for four-way forklift entry. Solid wood is preferred.

7.1.2 重型纸箱围板和上下盖材质至少为5层瓦楞纸板，其中围板面纸应为A级纸或以上，克重不低于150g，产品较重（≥300KG）或有较高防护要求时，需要使用7层瓦楞纸板，内部限位可以选择3层或5层瓦楞纸板。

The material of the heavy-duty carton's side panels and covers should be at least 5-layer corrugated cardboard. The surface paper of the side panels should be grading A or higher, with a weight of no less than 150g. For heavy products (≥300KG) or those parts with high protection requirements, 7-layer corrugated cardboard should be used. Inner fixtures can choose 3-layer or 5-layer corrugated cardboard.

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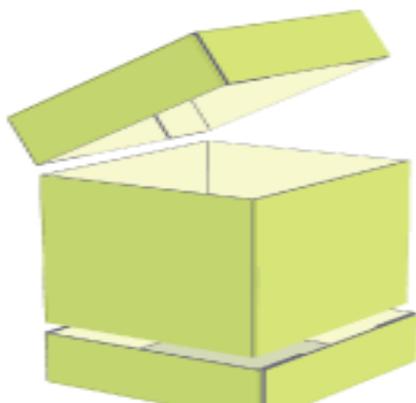


从上到

From top to bottom, they are 3-layer, 5-layer, and 7-layer corrugated cardboard.

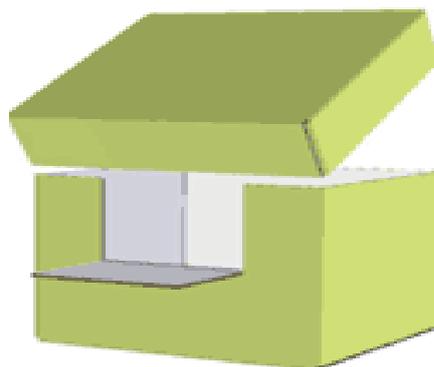
7.1.3 常用重型纸箱为0310和0312A型，总高度较低时首选0310型，包装高度较高时首选0312A型，以便于拿取零件。

Common heavy-duty cartons are type 0310 and 0312A. When the packaging height is low, type 0310 is preferred. When the packaging height is higher, type 0312A is preferred to pick up parts conveniently.



型

Type 0310



0312A

Type 0312A

7.1.4 包装完成后需要至少在长度方向使用两道打包带固定。

After finish packaging, at least two straps should be used to secure it in the length direction.

7.1.5 堆码层数需要标记在外箱左上角处，对角两处印刷。

The stacking factors needs to be marked on the upper left corner of the outer box and printed on two opposite corners.

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7.2 普通纸箱配木托盘 Common Carton Box with Wooden Pallet



0312 型

Type 0312



0201 型

Type 0201

常用普通纸箱为0312（鞋盒型）和0201（摇盖型）型，最为常见的是0201型，考虑线边实际需求推荐使用0312型，长宽高推荐尺寸如下表，如不符合需与ZFFCN CYC F04沟通确认。

Standard cartons are 0312 type (shoe box type) and 0201 type (flap type), The most common type is 0201. Considering the actual needs at the production line, it is suggested to use the 0312 type. The dimensions are shown in the table below. If these dimensions do not meet the requirements, please communicate with ZFFCN CYC F04 for confirmation.

箱型 Type	纸箱外尺寸 dimension (L×W×H) mm	材质 Material
优选 0312 型, 其次 0201 型 0312 Priority 1 0201 Priority 2	400×300×120	三层瓦楞纸板/五层瓦楞纸板 3-layer/5-layer corrugated cardboard
	400×300×230	
	600×400×120	
	600×400×230	
	600×400×340	

7.2.1 普通纸箱配套的托盘与重型纸箱配套托盘要求一致，高度≤150mm，需满足四向进叉，优先选择实木。

The pallets used for standard cartons should meet the same requirements as those pallets for heavy-duty cartons. The pallet height should be ≤150mm, and they must allow for four-way forklift entry. Solid wood is preferred."

7.2.2 普通纸箱材质一般为3层瓦楞纸板，产品较重或有较高防护要求时，需要使用5层瓦楞纸板，内部隔板根据情况选择3层瓦楞纸板。

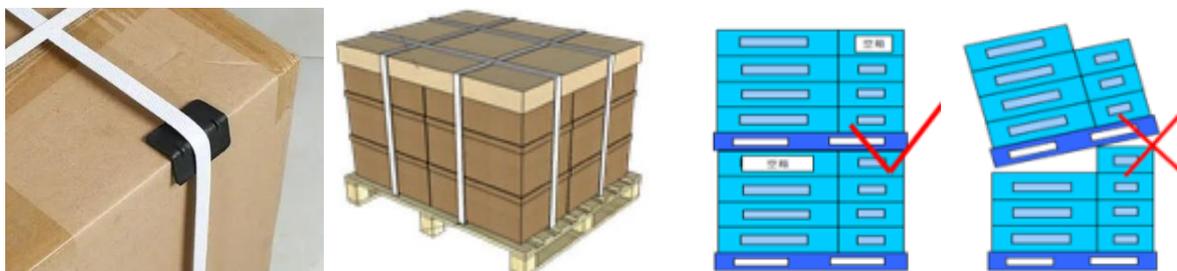
Standard cartons are generally using 3-layers corrugated cardboard. For heavy components or those components which requiring high protection, 5-layers corrugated cardboard should be used. Inner dividers should use 3-layer corrugated cardboard based on the situation.

7.2.3 纸箱包装完成后，按照规则码放整齐并与托盘使用打包带打包。建议在打包带和纸箱之间放置护角。不能满足整层时用同规格空箱填充，空箱放置于整托的上层，并

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注明“空箱”字样，粘贴在空箱醒目位置。

The cartons should be regular stacked secured to the pallet with straps. It is suggested to place corner protectors between the straps and the cartons. If a full layer cannot be realized, use the same empty cartons to fill the gaps, and put it on top layer. Paste the 'Empty Carton' label in a prominent position.



护角及整体打包
protectors and straps

包装箱空箱填充示意图 Corner
Empty cartons example

7.2.4 普通纸箱强度在满足载重的前提下需要满足摞层，提高装集装箱或货车的利用率，如不满足，需要与 F04 沟通确认。

In order to improve the utilization rate of containers or trucks, the strength of standard cartons must not only meet the load requirement itself but also can meet the stacking factor requirements. If this cannot be satisfied, please communicate with F04 for confirmation.

8 循环周转包装 Returnable Packaging

供循环多次使用的包装，我们都定义为循环包装。正常使用寿命5年以上，常见种类如下：

Packaging used for multiple cycles is defined as returnable packaging. The normal lifetime is over 5 years, and the usual types are as follows:

8.1 KLT VDA标准塑料箱 KLT VDA standard plastic box

8.1.1 KLT VDA标准塑料箱使用注塑工艺生产，底部需要使用加强底结构（KLT-R），根据需求确定是否带盖，推荐使用尺寸如下。

KLT VDA standard plastic box is produced by injection molding technology. The bottom needs to use reinforced bottom structure (KLT-R). Based on actual situation, the lid can be chosen or not. The recommended dimensions are as follows.

型号 Type	外尺寸 mm Outside Dimension	内尺寸 mm Inside Dimension	重量 KG Weight	载重 KG Loading bearing	Max.Load weight 最高负荷 KG	Nest height 嵌套高度 mm
R-KLT4315	400*300*147	346*265*109	1.29	20	600	15

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R-KLT4322	400*300*213	346*265*175	1.61	20	600	15
R-KLT4329	400*300*280	346*265*242	1.85	20	600	15
R-KLT6415	600*400*147	544*364*109	2.1	20	600	15

8.1.2 KLT箱材质及其他技术标准如下:

The material and technical standards for KLT box are as follows:

material 材料:	100%全新 PP(聚丙烯) 100% new PP (Polypropylene)
color 颜色:	常见为蓝色(RAL5005), 中灰色(RAL7001) blue (RAL5005), medium gray (RAL7001)
Production process 制作工艺:	注塑成型 Injection molding

注1: CSB目前习惯使用蓝色(RAL5005), 不带盖子的形式; LAS3目前习惯使用中灰色(RAL7001), 带盖子的形式。

Note 1: CSB currently prefers to use blue (RAL5005) without lids; LAS3 currently prefers to use medium gray (RAL7001) with lids.

注2: 着色材料必须是无毒性颜料(禁止使用含有害重金属的无机颜料)

Note 2: Coloring materials must be non-toxic pigments (it's prohibited to use the inorganic pigments containing harmful heavy metals).

8.1.3 KLT箱实物图片 KLT box picture



蓝色(RAL5005), 不带盖子 加强底结构KLT-R
(盖子从中间向两边翻)

中灰色(RAL7001), 带盖子

gray (RAL7001) with lid

Blue (RAL5005), without lid.

KLT-R with Reinforced bottom structure

8.1.4 KLT防静电箱均为黑色, 防静电性能持久稳定, 防静电指数为 $10^8\Omega \sim 10^9\Omega$ 。

KLT anti-static box's color is black. The anti-static performance is long-lasting and stable, with an anti-static index of $10^8\Omega$ to $10^9\Omega$.



KLT 防静电箱
Anti-static KLT

8.2塑料托盘及托盘盖 Plastic Pallet and Lid

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8.2.1 塑料托盘常用规格及要求如下:

The common specifications and requirements for plastic pallets are as follows:

名称 Name	外部长*宽*高 (L*W*H) mm	工艺 Process	材质 Material	自重 Dead WT	静载 Kg Static load weight	动载 Kg Dynamic load weight
托盘 Pallet	1200*1000*150 川	Injection 注塑 工艺	PP+PE	≥18	≥5000	≥1500
	1200*800*150 川			≥15	≥5000	≥1500
盖子 Lid	1250*1050*85 川	Thermoforming		7.5	--	--
	1250*850*85 川	吸塑工艺		6	--	--

托盘底部需要加强方管，方管规格为：20方管或40*20矩形管，壁厚1.5或2.0，增加的数量和规格根据实际订单确认，但至少保证使用3根1.5厚20方管。

The bottom of the pallet needs to be reinforced with square tubes. The tube specifications are: 20 square tubes or 40*20 rectangular tubes, with a wall thickness of 1.5 or 2.0. The quantity and specifications should refer to actual order, but at least use three 1.5-thick "20 square" tubes.

KLT塑料托盘四周带挡条翻边，防止KLT箱在托盘上掉落，首选“川”字型托盘。颜色要求为蓝色(RAL5005)，其次为灰色(RAL7001)或黑色(RAL9005)。

KLT plastic pallets should have raised edges around the perimeter to prevent KLT boxes from falling off. The suggested type is the 'Chuan' (川) shaped pallet. The preferred color is blue (RAL5005), secondly color is gray (RAL7001) or black (RAL9005)."

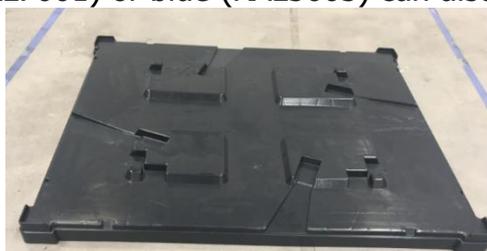


KLT 托 盘
KLT Pallet

8.2.2 托盘盖 Cover

KLT塑料托盘盖比托盘尺寸大35-50mm。颜色首选为黑色(RAL9005)，也可选择灰色(RAL7001)或蓝色(RAL5005)。

KLT covers are 35-50mm larger than the pallet size. The preferred color is black (RAL9005), gray (RAL7001) or blue (RAL5005) can also be chosen.



KLT 托盘盖
KLT Lid

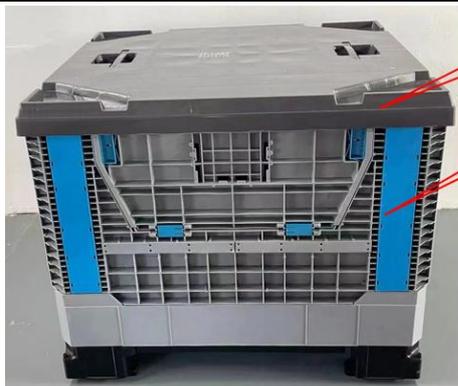
8.3 GLT卡板箱 GLT cardboard box

8.3.1 常见尺寸为1200*1000*1050/975，实际使用中以975高度为多。

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The usual dimensions are 1200*1000*1050/975, actually the 975 height is more frequently used.

名称 Name	外部长*宽*高 EX (L*W*H) mm	内部长*宽*高 IN (L*W*H) mm	材质 Material	自重 Dead WT KG	工艺 Processes	折叠高度 Fold height	静载 static load KG	动载 Dynamic load KG
GLT 卡板箱	1200*1000*975	1110*910*820	HDPE	48	Injection 注塑工艺	410	≥3000	≥1000
GLT 卡板箱盖	1210*1010*95	1204*1004*90	PP	6.5		--	--	--



1. 顶盖 lid
2. 箱体 Body

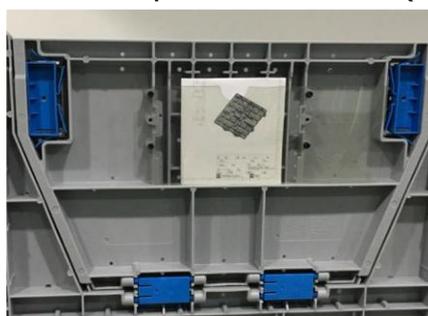


卡板箱使用状态
GLT cardboard box using status

卡板箱折叠状态
GLT cardboard box folding status

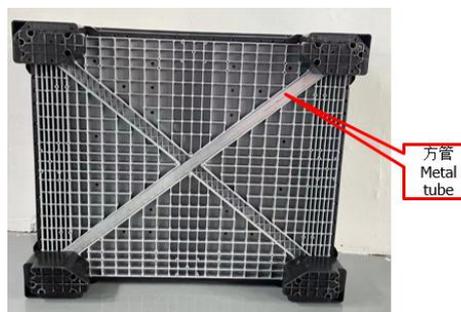
8.3.2 主体颜色为灰色 (RAL7001)，底脚颜色为黑色 (RAL7021)，结构件颜色为蓝色 (RAL5012)。

The main color is gray (RAL7001), the foot color is black (RAL7021), and the structural components are blue (RAL5012).



使用螺栓+防松螺母固定底脚

At least two directions need the label holders



至少2个方向均要有标签夹

底部斜角使用方管
Use bolts and lock nuts to fix pallet foot
Use square tubes for the bottom bevel

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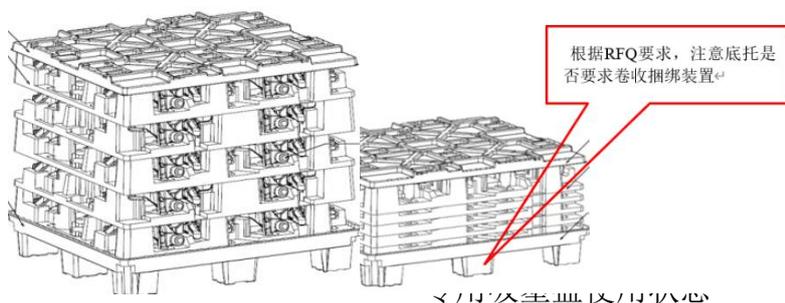
8.4 专用吸塑盘配托盘 Special foam trays with pallet

8.4.1 专用吸塑盘专门为某一种或几种（通用）零件使用，一般要求返空时可以嵌套，以节约回收空间。吸塑盘的锋利的边缘尤其把手位置需要处理成圆弧，防止划伤。吸塑盘重量与标准样件重量偏差 $\leq 5\%$ 。

Special foam trays are designed for one or several (universal) parts. They need to be nestable when return empty trays. The sharp edges of the foam trays need to be rounded to prevent scratches, , especially at the handle position. The weight gap between series foam tray and sample tray should be $\leq 5\%$.

由于包装为专门设计，所以长宽高调节范围较大。为了便于管理，常见尺寸如下：Since the packaging is specially designed, the range of length, width and height is large. For ease of management, the common dimensions are as follows:

名称 Descrip	长 *宽 Length *Width	材质 Material	高 Height 含托盘 With pallet	Pallet height
专用吸塑盘 Special blister	1200*1000 1200*800	HDPE	≤ 1150 ≤ 750	≤ 150



时状态

Specialized foam tray using status

Specialized foam tray collection status

专用吸塑盘回收

8.4.2 专用吸塑在动载荷 $\leq 400\text{kg}$ 情况下，托盘板材厚度建议为 6-8 mm。

托盘在运输状态最大载荷 $> 800\text{ kg}$ 情况下，在托盘结构设计上增加补强式结构，采用钢结构嵌套式结构设计，托盘板材厚度建议 $> 8\text{ mm}$ ，顶盖板材厚度建议 $> 6\text{ mm}$

For special foam trays with a dynamic load weight $\leq 400\text{kg}$, the pallet board thickness is recommended to be 6-8 mm.

For pallet with a maximum load weight $> 800\text{ kg}$ during transportation, it is recommended to add a reinforced structure in the pallet design, using a steel nested structure. The pallet board thickness is recommended to be $> 8\text{ mm}$, and the top cover board thickness is recommended to be $> 6\text{ mm}$.

8.4.3 零件与吸塑盘的配合 The match-up between parts and blister trays

吸塑盘能有效对零件进行限位，重点位置有相应的防护或避空；留有拿取部件的空间，方便操作员取放零件，原则上零件不能受力。

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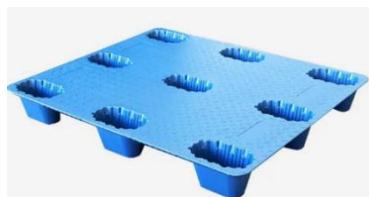
Blister trays can effectively limit the position of parts, with corresponding protection or clearance at key positions. There should be space for picking up parts, making it convenient for operators to handle them. In principle, parts should not be subjected to force.



8.4.4 专用吸塑盘托盘和盖子 Special foam tray's pallet and Lid

专用吸塑盘托盘和盖子与专用吸塑盘的材质和技术要求一致，与专用吸塑盘匹配，且便于安装拉紧装置（根据RFQ，如需安装拉紧装置，则选择九脚结构托盘）。

The pallet and lid's material should be as same as the foam, and material should meet the technical requirements. The pallet and lid should match the blister and convenient to install tensioning device (according to RFQ, if tensioning devices need to be installed, choose nine-foot structure pallets)



Foam Tray pallet Example

吸塑托盘示例

注意底托结构需要与盖子结构匹配，以便于摞层。且盖子结构需要考虑防止最上层零件大幅度跳起，导致零件相互磕碰。

The structure of pallet should match with the lid structure, to facilitate stacking. Additionally, the lid structure should be designed to prevent the top layer parts jumping during transportation, which will cause parts' quality risk.

8.5 金属箱 Metal Box

8.5.1 用于一些重量较重，防护要求较高产品的包装，可以配合专用吸塑盘使用，也可单独使用，金属箱为定制产品，长宽高可任意调节，但基本结构不变，所以在此我们只谈论标准尺寸金属箱，如需其他尺寸金属箱，在此基础上调整即可。

Metal Box is used for packaging some heavy products with high protection requirements. It can be used together with a special blister tray or independently by metal box itself. The metal box is a customized packaging with adjustable length, width and height, but the basic structure remains unchanged. Therefore, we only discuss standard size metal boxes here. If other sizes of metal boxes are needed, adjustments can be made based on this.

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名称 Descript	长*宽*高 L*W *H EX	长*宽*高 L*W *H IN	材质 Material	折叠后高度 height stacked
金属箱 Metal Box	1200*1000*1050	1085*900*850	Q235	400



此1, 2处位置焊接标识盒, 大小装入A5纸, 侧面插入。结构参考下页。此要求只对沈阳工厂料架, 北京工厂无此要求。

金

属箱整体效果图

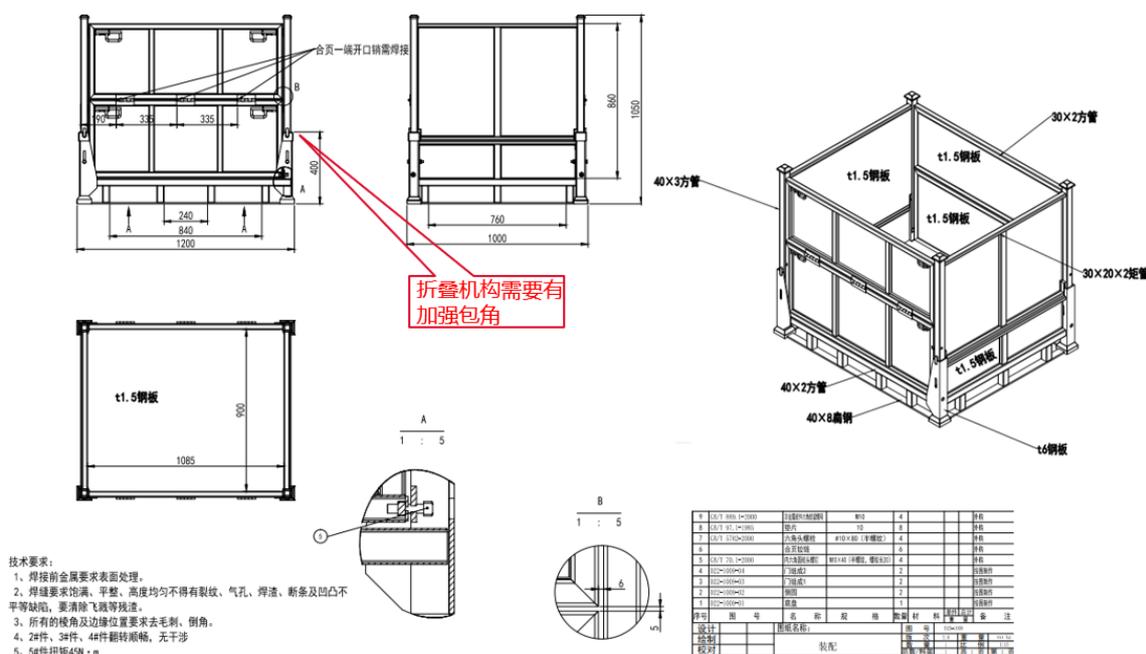
金属箱折叠状态图

Metal Box picture

Metal Box stacked picture

8.5.2金属箱使用材料和规格较多, 明确如下:

The metal box uses variety of materials and specifications, details as below:

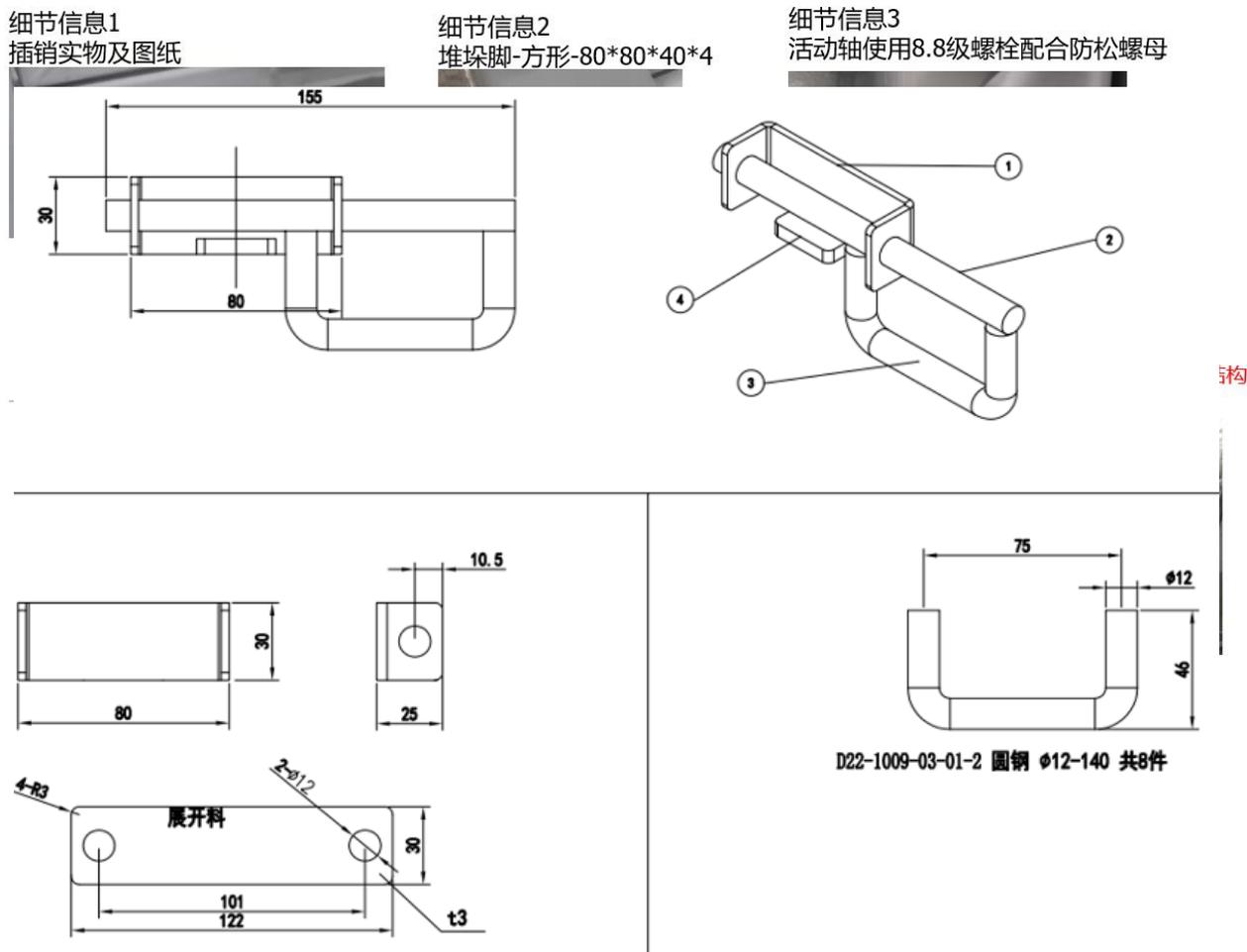


标准金属箱基本要求
Standard Metal Box Basic Requirement

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8.5.3 由于金属箱定制生产，不同供应商制作容易产生较大差异，故对以下细节做出规范。

Due to the customized production of metal boxes, different suppliers' packaging may exist difference. Therefore, the following details are standardized.



金属箱细节信息及插销放大图纸

8.5.3除此之外还有一种特特殊情况，即金属网格箱，与标准金属箱不一致的点明确如下。

Additionally, there is a special case name as the metal grid box. The points where it differs from the standard metal box are specified below.

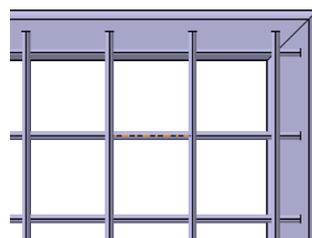
8.5.3.1围板材质不用，标准金属使用 $t=1.5$ 钢板焊接，金属网格箱使用 $50*50*5$ 金属网格代替铁板。

The material of the side panels is different. The standard metal box uses $t=1.5$ steel plates welded together, while the metal grid box uses $50*50*5$ metal grids instead of steel plates.

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3D diagram of metal mesh box



金属网格箱3D图

金属网与框架的连接

Connection between the metal mesh and frame

8.5.3.2 由于金属网格自身的结构特点，与框架焊接时需要增加“L”型连接件或焊接在框架内测，以保证强度。

Due to the special structural characteristics of the metal grid, it is necessary to add 'L'-shaped connectors or weld them to the inner side of the frame to ensure strength.

8.5.4 其他工艺要求 Other process requirements

8.5.4.1 材料要求 Material requirements

- 材料为Q235-A 管材、钢板、扁钢等，要求符合Q235-A 的理化性能；
The materials include Q235-A pipes, steel plates, flat steel, etc., and must meet the physical and chemical properties of Q235-A
- 所有材料无拼接、裂缝、缺损等缺陷；
All materials must be No splicing, No cracks, No defects, etc
- 材料壁厚为设计厚度 $\pm 10\%$ （按照GB/T709-2006 规定折算）；重量要求为标定重量 $\pm 10\%$ 。
The material wall thickness should be within $\pm 10\%$ of the design thickness (calculated according to GB/T709-2006); the weight requirement is within $\pm 10\%$ of the specified weight.

8.5.4.2 焊接要求 Welding requirements

- 焊接距离要均匀，焊缝要平整，无焊瘤、夹渣、咬边、气孔、裂缝、虚焊、漏焊、焊穿等缺陷；
- The welding distance must be uniform, and the weld seam must be smooth, without defects such as weld spatter, slag inclusion, undercut, porosity, cracks, incomplete fusion, missed welds, or burn-through.
- 钢板与方管的焊接距离要求均匀，且不应大于150mm，每段焊道长度不低于20mm；除钢板与方管连接之外，其余部位均要求满焊。
The welding distance between the steel plate and the square tube must be uniform and should not exceed 150mm. Each weld bead segment should be at least 20mm in length. Except for the connection between the steel plate and the square tube, all other areas require full welding.

8.5.4.3 外观要求 Appearance requirements

- 无缺料、多料；包脚折弯处无开裂变形；封板表面平整、光滑，无明显凹、凸痕，单边间隙不大于5mm，封板与边框焊接平整度不大于5mm。
No missing or excess material; no cracking or deformation at the bent corners; the surface of the sealing plate should be flat and smooth, without obvious dents or protrusions. The single-side gap should not exceed 5mm, and the flatness of the weld between the sealing plate and the frame should not exceed

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5mm.

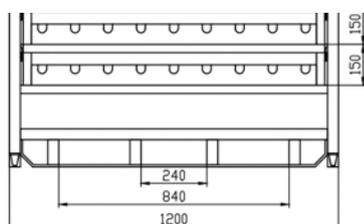
8.5.4.4功能要求 Functional requirements

- 翻转机构转动灵活，无卡滞现象；
The flipping mechanism should rotate smoothly without any jamming.
- 插销：门关闭时插销销轴能灵活插入立柱插销孔；
Latch: When the door is closed, the latch pin should be able to flexibly insert into the hole.
- 螺栓：螺栓装配时加弹簧垫圈，装配后无松动；
Bolt: When assembling the bolt, add a spring washer, and there should be no looseness after assembly.

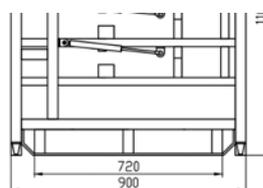
8.5.4.5喷漆(喷塑)要求 Painting (Spraying) Requirements

- 制作工艺顺序为预处理（除锈、去油等）→打磨→防锈漆→面漆；
The production process sequence is pre-treatment (rust removal, degreasing, etc.) → grinding → anti-rust paint → topcoat.
- 漆膜总厚度：150 (μm)。
Total paint film thickness: 150 μm;
- 面漆应平整、光滑、均匀，无挂流、气泡漆瘤和剥皮等缺陷。
The topcoat should be flat, smooth, and uniform, without sagging, bubbles, paint lumps, or peeling defects.
- 金属器具整体喷塑处理主体颜色：海灰色（RAL7035）；喷涂信息颜色：黑色（RAL9011）。
The overall color of the metal packaging after spraying: sea gray (RAL7035); the color of the sprayed information: black (RAL9011).

8.5.4.5叉车脚距离 Forklift foot distance



长度方向叉车孔



宽度方向叉车孔

Forklift

holes in the length direction

Forklift holes in the width direction

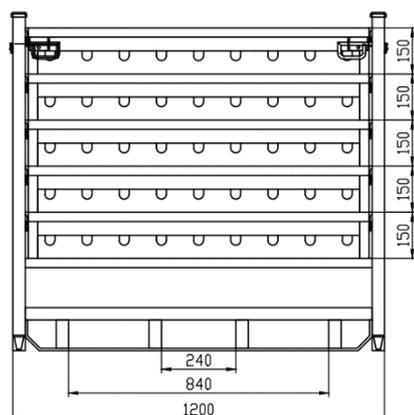
8.6专用金属料架 Special Metal Racks

专用金属料架由于不能折叠，物流费用较高，加工费用较高，不作为重点推荐。且需要严格图纸审核，样件制作评审过程，在实际使用中要逐一与F04和工厂包装工程师确认。但需要注意底部结构需要满足叉车装卸。

Special metal rack is not suggested as a high priority packaging type because they are inability to fold, and in higher logistics and processing costs.

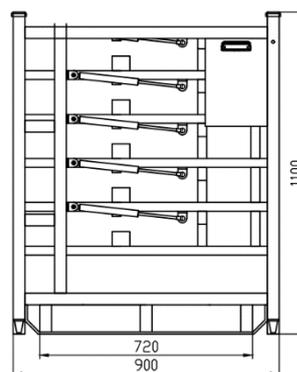
The drawing and sample production evaluation review is needed. This packaging approval needs to be confirmed one by one with F04 and plant packaging engineers. The bottom structure need meets forklift loading requirements.

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车孔

Forklift holes in the length direction



长度方向叉车孔

宽度方向叉

Forklift holes in the width direction

9 辅料 Accessories

9.1 紧固材料 Fastening materials

9.1.1 最常见的紧固材料为螺栓螺母，要求螺栓强度不低于8.8级，螺母强度不低于8级，且螺母为防松螺母。螺栓一般为六角头螺栓，根据适用环境也可以选择其他螺栓，但要求防锈处理。

The most common fastening materials are bolts and nuts. The bolt strength must be at least grade 8.8, and the nut strength must be at least grade 8, with the nuts being lock nuts. Bolts are generally hex head bolts. Based on the actual environment, other types of bolts can be chosen, Rust-proof treatment is required.

镀锌尼龙防松螺母
galvanized nylon lock nut六角头螺栓
Hex head bolt沉头内六角螺栓
countersunk hex
socket bolt圆头内六角螺栓
round head hex
socket bolt

9.2 缓冲材料 Cushioning Materials

缓冲材料使用量较大，主要有纸板（片）、气泡膜(PE)、珍珠棉(EPE)，拉伸膜。纸板不再赘述，气泡膜性价比较高，但是珍珠棉厚度可调节，可以做成复杂结构。一般防震可以适用单层或多层气泡膜，但对漆面要求很高时紧贴漆面的材料最好选择珍珠棉，另外珍珠棉强度有方向性，可以通过覆PE膜来改良，需要注意。拉伸膜（缠绕膜）主要起到防水防潮和紧固的作用，也有一定的缓冲作用。

Cushioning materials are used in large quantities, mainly including cardboard (sheets), bubble wrap (PE), pearl cotton (EPE), and stretch film. Bubble wrap is cost-effective, the thickness of pearl cotton can be adjusted and can be made into complex structures. Generally, single or multiple layers of bubble wrap can be used for shock absorption, but when high requirements are placed on the paint surface, it is best to choose pearl cotton as packaging materials in close contact with the paint surface. Additionally, the strength of pearl cotton is directional and can be improved by pasting PE films. Stretch film (wrap film) mainly serves the purpose of

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waterproofing, moisture-proofing and fastening, and also has a certain cushioning effect.



气泡膜

Air bubble film



珍珠棉

EPE Foam



珍珠棉块

EPE Foam Block

9.3 防锈材料 Anti-rust Materials

考虑我司产品的特殊性，一般情况只允许使用VCI进行防锈，常见有有VCI防锈袋（一般为浅蓝色或浅黄色），VCI防锈纸（VCI附着在牛皮纸上），VCI防锈需要在一个密闭空间内发挥作用，最好配合干燥剂适用。不建议使用VCI防锈油。

Considering the special nature of component, in general only VCI (Vapor Corrosion Inhibitor) is allowed for rust prevention. Common types include VCI anti-rust bags (light blue or light yellow) and VCI anti-rust paper (VCI attached to kraft paper). VCI rust prevention needs to work in a closed space, preferably used together with desiccants. The use of VCI anti-rust oil is not recommended.



进口传动轴防锈
防锈纸也同时有缓冲的作用

方式：整体套防锈袋，中间

Anti-rust method for imported drive shafts: The entire shaft is wrapped in an anti-rust bag, and anti-rust paper in the middle also serves as a buffer.

10 包装追索信息 Packaging Index Message

见附件《ZFFCN Packaging index message 包装标识信息》

See attachment "ZFFCN Packaging index message "

11 使用年限，售后 Service life, After sales

11.1 对于一次性包装材料，必须保证能正常装卸、上货架，上线开包后包装无开裂、溃缩等现象，零件和纸板无严重摩擦痕迹。

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For one way packaging materials, it must be ensured that they can be loaded and unloaded, GR into Rack, and line-feeding without cracking or collapsing. There should be no serious scratch on parts and cardboard.

11.2 对于循环周转包装正常使用的情况下，塑料箱/GLT 使用寿命不小于 5 年，金属箱/架使用寿命不小于 6 年，可循环内衬使用年限不小于 3 年。

For returnable packaging under normal usage conditions, the lifetime of plastic boxes/GLT should be no less than 5 years, metal boxes/racks no less than 6 years, and recyclable trays no less than 3 years.

11.3 在使用年限内发生批量损坏，且经第三方确认为原材料问题的，供应商应免费维修或更换，并支付第三方检测费用。

If a batch quantity of damage occurs within the lifetime, and reason is due to raw material issue which confirmed by third party, the supplier should repair or replace the packaging with free of charge and cover the third-party inspection costs.

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12 常用包装的 SAP 编码 SAP code of packaging

后续如果申领包装物料号请先确认在以下列表中有，如果有请使用现有包装物料号，不要重复申请。

If there are packaging number application in the future, please first check whether the packages type is already included in the following list or not. If yes, please use the existing packaging number and do not apply for duplicates.

SN	包装形式 Packaging type	规格 Size	包装物料号 Packaging Material No.
1	NA	通用/临时/一次性 Common/Temporary/One-Way	91.140.577
2	1210 卡板箱 1210 cardboard box	卡板箱: 1200*1000*975,51kg Cardboard box: 1200*1000*975,51kg	91.216.770
		盖子: 1210*1005*97,7kg Lid: 1210*1005*97,7kg	91.216.771
3	6415KLT (有盖) 6415KLT (Lid)	600*400*150mm,	91.216.876
4	6428KLT (有盖) 6428KLT (Lid)	600*400*280mm,	91.216.877
5	6415KLT (无盖) 6415KLT (Without lid)	600*400*150mm,	91.192.122
6	6428KLT (无盖) 6428KLT (Without Lid)	600*400*280mm,	91.198.260
7	6434KLT (无盖) 6434KLT (Without Lid)	600*400*340mm,	91.229.460
8	4315KLT (无盖) 4315KLT (Without Lid)	400*300*150mm,	91.198.259
9	4328KLT (无盖) 4328KLT (Without Lid)	400*300*280mm,	91.198.260
10	KLT 塑料托盘/盖 KLT plastic pallet/Lid	托盘 1200*1000*180 (160) mm, Pallet 1200*1000*180(160)mm	91.192.122
		盖 1250*1050*70mm Lid 1250*1050*70mm	91.000.005
11	标准金属箱 Standard metal box.	1200*1000*1050	91.229.262
12			

13 附件 Appendix

13.1 ZFFCN Packaging index message 包装标识信息