

Regional Packaging Guideline

**MAHLE Behr Asia Pacific
(Applied for JVs)**

Table of Contents

1	General Requirements	1
1.1	Standard Dimensions	1
1.2	Ergonomics	2
1.3	Product Protection	2
1.4	Closure	2
1.5	Labeling	3
2	Returnable packaging systems	3
2.1	Large container	3
2.2	Small container	4
2.3	Special Packaging	4
3	Expendable Packaging Systems	4
4	Overseas Packaging Systems	5
5	Management of Empties	5
6	Hazardous Material	5
7	Environment / Recycling / Waste Prevention	6
8	Abbreviations	6

1 General Requirements

“Regional Packaging Guideline” is key factor which is compliance with the Global Logistic Guideline and other quality standards of the MAHLE Behr Group.

“Regional Packaging Guideline” is the basic regulation for oversea suppliers as well as domestic suppliers who are being nominated to supply components to Asian plants (joint ventures included).

Suppliers must correspond with “Regional Packaging Guideline” and are also responsible for continuous improvement either best practices implementation or package quality concerns.

From global logistic as well as regional level, this guideline is mandatory to all regional plants and be applied also for joint ventures if they refer to this guideline.

Common worldwide standards for IPPC regulations and COUNTRY OF ORIGIN are valid. For details see chapter 7 (IPPC) and section 1.5 (COUNTRY OF ORIGIN).

1.1 Standard Dimensions

Pallet footprint is the key factor in transportation which especially defines pack density in sea container. Moreover, considering space utilization in warehouse as well as production area in regional plants, below pallet footprints are required which is applicable for returnable as well as non-returnable type:

Length	Width
1200	1000
1200	800
1240	835
1140	790
1140	900
1140	980
1140	1140

The selection of pallet height depends on the payload of pack unit and material of pallet as well as space utilization of sea container or in-land truck. In general, 134/144mm are the universal height of oversea transport pallet and 150mm is the height of plastic pallet.

For any unique pallet dimension that are not presented in above table, it must be agreed with plant packaging contacts before usage.

“Global Logistic Guideline” and quality standard of “GN.AR01240 & GN.AR06150” must be taken into account before pallet production and please contact with responsible plant package contacts for more specifics.

In general, IPPC marking is the mandatory requirement to all oversea transport pallets (solid wooden packaging only).

1.2 Ergonomics

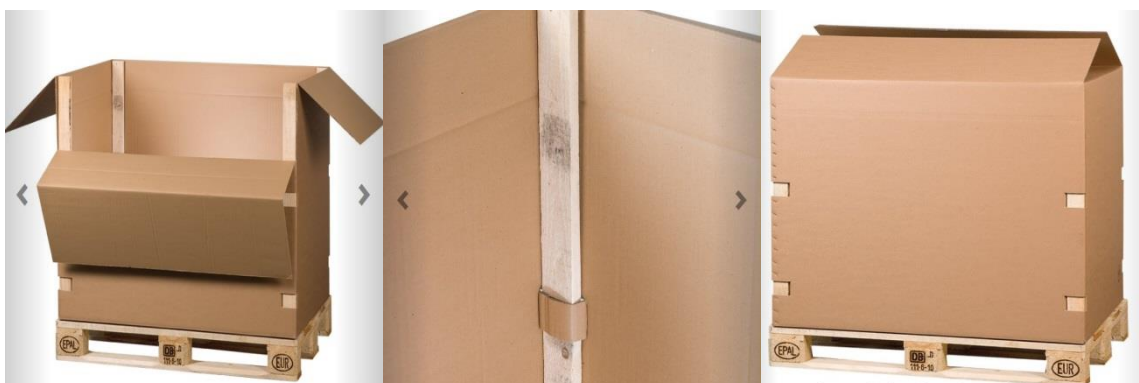
Ergonomics is the purpose which is required to avoid excessive workload for production due to inappropriate package concept. Common description must be taken into account:

- Max. weight
Generally, G.W: 15 kg is the acceptable and maximum weight for plants.
20 kg can be considered if it would be agreed by receiving plant.
- Maximum manual handling dimension
Generally, packaging dimension should not exceed 800 x 400 x (≤ 350) mm which can be conveniently removed and transported by plants operator.
- Holding position
Generally, holding option (e.g. grip hole) is not mandatory if the dimension is smaller or fitting with operator's physical movements. Grip hole is preferable if supplier is using expendable package.

1.3 Product Protection

Protection measurements depends on product features (e.g. materials, fragility, sensitivity etc.) Therefore package development should take below points into account:

- Transportation Environment
Impact factors: temperature, humidity, etc.
Desiccant with plastic bag/film, VCI can be taken into account.
- Handling Process
Impact factors: vibration, shock, payload, etc.
Cushion foam (e.g. PE, PU) and angle protector can be taken into account.
- Strength Enhancement
Generally, angle protector is being used for strength enhancement purpose but not limited to use other solutions such as below pictures:



If above enhancement is implemented for oversea transportation, IPPC marking is a must to be displayed on the wooden material. The marking should be visible from outside if it is possible.

1.4 Closure

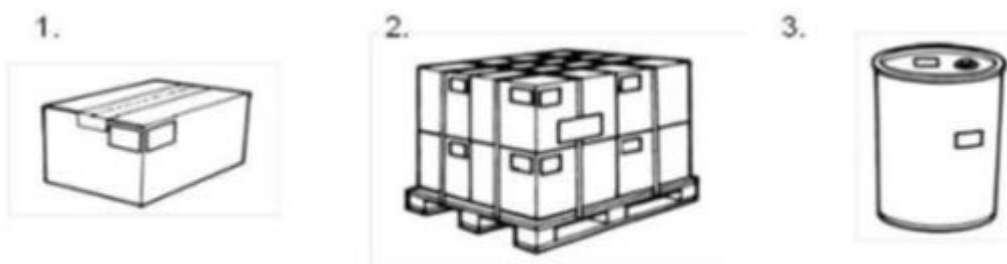
Generally, strapping is a common closure measurement of pack unit, unless special requirements: e.g. stretch packaging is specifically defined by plant. Other securing measurements should not be implemented.

1.5 Labeling

Labeling requirements refers to Global Logistic Guideline unless is specified by plant. Generally, suppliers are allowed to implement self-adhesive label which are being pasted on expendable containers. They must always be placed on the adjacent sides of the box in a clearly visible location as shown below.

WebEDI label is the designated format which has been implemented both for domestic and oversea package. Suppliers are not allowed to use their own labels instead.

Regarding of labeling position, unless plant has individually pre-defined, following paste position should be respectively taken into account:



1. Box or Carton: Identical labels should be located on two adjacent sides (wrap around label acceptable). The upper edges of the labels should be as high as possible up to 500mm from the bottom of the carton.

2. Cartons on Pallet: Each carton should be individually labeled as described above. One master label may be used as described above or one mixed load label.

3. Drums, Barrels, or Cylindrical Containers: Identical labels should be located on the top and near the center of the side

For oversea shipment, besides WebEDI label, suppliers are required to paste additional label: COO marking which can be clearly displayed the original production site per customs mandatory request. This information will affect the rate of duty and its entitlement to special duty or trade preference programs and anti-dumping.

The original production country which is displayed in the COO label must be correspondent with the country that is displayed in invoice; otherwise, it will trigger customs inspection during the clearance process.

2 Returnable Packaging Systems

2.1 Large container

There are two types of large container which are being defined and recommended by regional logistic as below table shows. Either plants or supplier should be encouraged to proactively take care of empties management if there is any circulation flow between suppliers and plants.

Length	Width	Height
--------	-------	--------

1200	800	950
1200	1000	975

Any special request about large container should be agreed by plant packaging engineering department.

More container pool system information, please see Global Logistic Guideline.

2.2 Small container

Suppliers are encouraged to implement the container types as below table shows. Considering the easy management, we do not encourage both parties to implement the returnable inserts fitting with small container unless there will be typical requirement from receiving plants.

Length	Width	Height
300	200	120
400	300	120/170/220
600	400	120/170/220
800	400	200
800	600	120/220/320

2.3 Special Packaging

In case of special needs or cost driven purpose, some special packaging concept might be considered for inbound package, e.g. slip sheet, Goodpack, etc. Each plant will have designated persons (normally packaging engineer) who is responsible for development. Once development request is initiated by plant, suppliers are responsible for prototype development and pre-investment. Packaging engineer will verify the package feasibility, if approval or not and cost comparison for purchasing negotiation and procurement with suppliers. If some concepts require facility investment, supplier should be absorbed and plant also need to consider break even point whether it is worth to implement.

For long distant oversea transportation, especially for trade lane between Europe and Asia Pacific as well as US & Mexico and Asia Pacific, we encourage suppliers to consider returnable container systems if available. For more details please directly contact the regional MAHLE BU3 Logistic responsible.

We also encourage suppliers to pro-actively come up with best practice which can bring the benefits no matter commercials or ergonomics.

3 Expendable Packaging Systems

Package safety and density should always be firstly taken into account no matter it will be applied to domestic or overseas transportation. Normally, specific requirements of expendable packaging have been already presented in Global Logistics Guideline which is the same significance for suppliers to design their own package concept.

Suppliers are required to submit the packaging proposal to receiving plants for confirmation before it is officially being implemented on series delivery, otherwise supplier should bear with additional rework or repair cost, etc.

Suppliers are fully responsible for package quality and continuous improvement after damage has been occurred.

We require suppliers to develop the expendable packaging system which based on below shown pallet dimensions:

Length	Width	Height
1200	800	134
1200	1000	134
1240	835	134
1140	790	134
1140	900	134
1140	980	134
1140	1140	134

Either supplier, who would like to develop other types of foot print of pallet, please refer to Global Logistic Guideline first. In addition, the Regional Packaging Guideline should also be taken into account especially for oversea transportation.

4 Overseas Packaging Systems

Regarding overseas packaging, see Global Logistic Guideline.

Pallet footprint, please refer to the dimension table in Chapter 3.

Suppliers have to be aware of solid wooden packaging import regulations which is mandatory being heat treated.

Presswood pallets (INKA pallets) are not allowed to be implemented for package materials due to the strength which can not satisfy long distance transportation as well as the requirements of shelf storage.

Dimension of overseas packaging should be compliant with general requirements (section 1.1) and expendable packaging systems (chapter 3).

5 Management of Empties

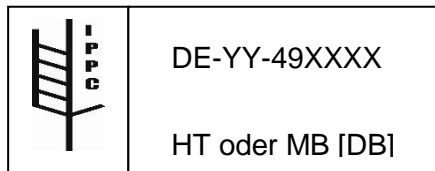
We encourage suppliers to manage empties in and out by implementing ERP system. For details please see Global Logistic Guideline, unless specified by regional plant if other concepts are required by plants based on their special needs.

6 Hazardous Material

See Global Logistic Guideline, unless specified by regional country law.

7 Environment / Recycling / Waste Prevention

General regulations see Global Logistic Guideline, unless specified by regional country law. Considering solid wooden packaging materials have been necessarily implemented during oversea transportation, for any type of wooden material (except: presswood, OSB, plywood), the IPPC logo should be visibly marked on the surface as following:



8 Abbreviations

COO	Country of origin
G.W.	Gross weight
IPPC	International Plant Protection Convention
OSB	Oriented Strand Board
PE	Polythene
PU	Polyurethane
VCI	Volatile Corrosion Inhibitor