BUP
Manual

The contents of this document must be taken into account (per BUP declaration by the shipper/forwarder) when ULDs build-up by shippers/forwarders.

The information contained therein corresponds to all safety-related rules of Lufthansa Cargo. The document must be accessible to the personnel responsible for build-up the ULDs.

Table of Contents:

1. Ground Operations Manual

Introduction

Every day hundreds of Lufthansa aircrafts take off and land. They carry thousands of passengers, tons of mail and even more tons of cargo to almost all corners of the world.

Our **customers** rely on Lufthansa Cargo to transport their cargo and mail without undue delay or damage.

Our **passengers** rely on Lufthansa to transport them and their baggage in order that they reach their destination safely.

Our **crews** rely on the correct and safe loading of the cargo in our aircraft.

All of them expect that whatever has been loaded inside the aircraft has been done so according to the regulations.

With this manual, you will get to know the safety factors involved when building up ULD, as well as **YOUR responsibility** towards your/our customers, our passengers, crew and aircraft.

These guidelines are based on the LCAG rules from the
GOM (Ground Operations Manual) and CHM (Cargo Handling Manual)

2. General Requirements

1. Shipper Built ULDs (BUP, MMB, SMU) shall not contain any of the following items:

- All weapons, weapons parts and ammunition (SWP)
- Cargo subject to special security measures, e.g. valuable cargo (VAL), as example gold and precious stones, as well as vulnerable goods (VUN), as example cellular phones and silver
- Perishable goods (PER)
- Live Animals (AVI), except AVP or day-old-chicken (AVX)
- Dangerous goods, except the items and articles as per Dangerous Goods Regulations IATA-DGR 9.1.4.1
- Cargo exceeding the base dimensions of the ULD (Overhang); F-contours may be built only with the BUP500+ qualification
- Metal sheets and metal plates; plates made out of other materials with individual weight of more than 20 kg
- Metal pipes and metal bars; pipes and bars made out of other material are allowed as per loading requirements stated in the Training Manual
- Unsecured cargo from unknown sources which would require security control at acceptance by LCAG
- Intermediate Bulk Container (IBC)
- Cargo loaded on wheels

2. All packages containing Lithium ion, sodium ion or lithium metal cells and batteries meeting the provisions of Section II
   of Packing Instructions 966, 967, 969, 970, 977, 978
   must be loaded in units with lower deck contour.
3. Only transparent plastic foil shall be used for pallets to allow visual inspection upon acceptance by LCAG.
   Exceptions: Passive Temp Support (PAS) and Perishables (PER)
   - see chapter: “Build-up of Active Temp Control or Passive Temp Support”.
4. It is not permitted to use air or gas filled dunnage bags to secure the load inside a ULD.

Build-up must be done according to the specific requirements in this manual.

Air Waybill completion

It must be secured by the shipper/forwarding agent that the required details in the Air Waybill are correct and complete according to IATA TACT Rules

- Chapter 6 – The Air Waybill
- Chapter 8 – Carriers Special Regulations
  - 8.3 Lufthansa - Information by Carrier

- **No. of pieces**

  - BUP: The MAWB must show the number of R4C built ULDs.
    Exceptions, where the actual number of pieces is required, as per country-specific customs regulations.
    The list can be requested at the local LCAG Sales or Handling office.

  - MMB, SMU: The MAWB must show the total number of pieces.

- **SLAC (Shipper Loads and Counts) in BUP**

  For BUPs it is required that the actual number of pieces contained in each unit is given in the Air Waybill.

  This information can be transmitted

  - in the structured fields of the FWB

  OR

  - in the Nature of Goods field

    e.g. SLAC - PMC12345LH – 47 pieces
    SLAC – AKE12345LH – 20 pieces

Qualification Requirements for Build-Up staff

Staff responsible for the **ULD build-up** must be qualified according to the weight limits per single piece:

weight limitation	required qualification for Build-up
BUP500 (up to 500kg)	1. Valid DG license IATA 7.4 or CBTA equivalent. 2. A sufficient number of employees, who control and supervise the ULD build-up and sign the ULD-tag, must hold a valid BUP500 Qualification ("BUP 500 Standard" WBT available online resp. "BUP500 Specials" WBT for Special Loads)
BUP500+ (501kg up to 9500kg)	1. Valid DG license IATA 7.4 or CBTA equivalent. 2. A sufficient number of employees, who control and supervise the ULD build-up and sign the ULD-tag, must hold a valid BUP500+ Qualification ("BUP500+" Class Room Training)
BUP500+ (501kg up to 9500kg) for BU1/2 qualified staff	1. Valid DG license IATA 7.4 or CBTA equivalent. 2. Build-Up training recognized by LCAG. 3. A sufficient number of employees, who control and supervise the ULD build-up and sign the ULD-tag, must hold a valid BUP500+ Qualification ("BUP500+ for BU staff" WBT available online)

Refresher course must be done latest every 24 months.

The Qualification to build Shipper Built ULDs is **always** applicable to the participant, not the forwarding agent/shipper.

Required documents and additional information can be obtained from the local Lufthansa Cargo AG office.

Qualification Requirements of staff not entrusted with Build-Up activities

- Personnel involved in the Acceptance of dangerous goods including dry ice must hold a valid DG license IATA 7.3 or CBTA equivalent.

- Personnel involved in the Acceptance of general cargo or mail must hold a valid DG license IATA 7.2 or CBTA equivalent.

Qualification Requirements of staff entrusted with combined activities

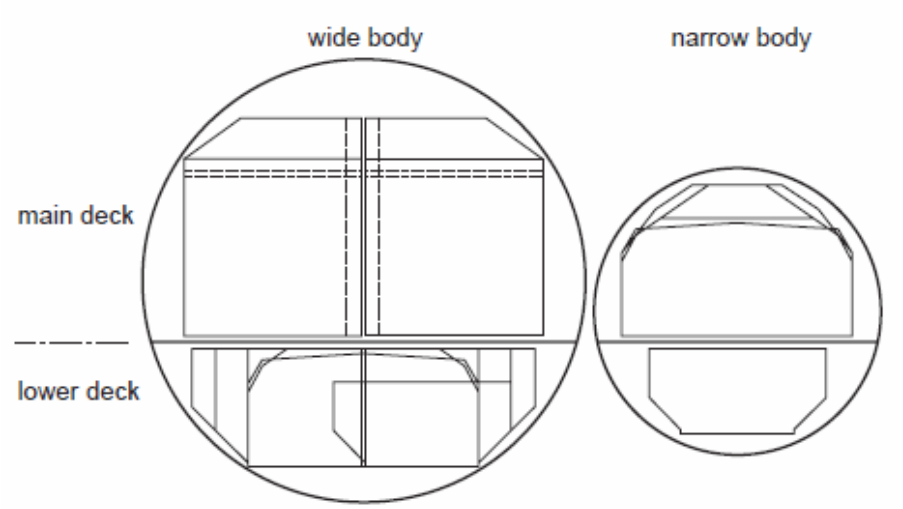
Personnel entrusted with Acceptance activities as well as Build-up activities must hold valid DG licenses as per CBTA for both activities.

Example: IATA 7.2 and IATA 7.4 or both CBTA equivalents.

3. Aircraft Terminology

Aircraft can be divided up into several categories:

- wide body and narrow body
- passenger aircraft (carrying passengers and cargo) and freighter aircraft (carrying only cargo)



Examples of narrow body aircraft, that hold ULDs, are the A320, A321 and A321F.

Examples of wide body aircraft are: A330, A340, A350, B747, B787 and B777F

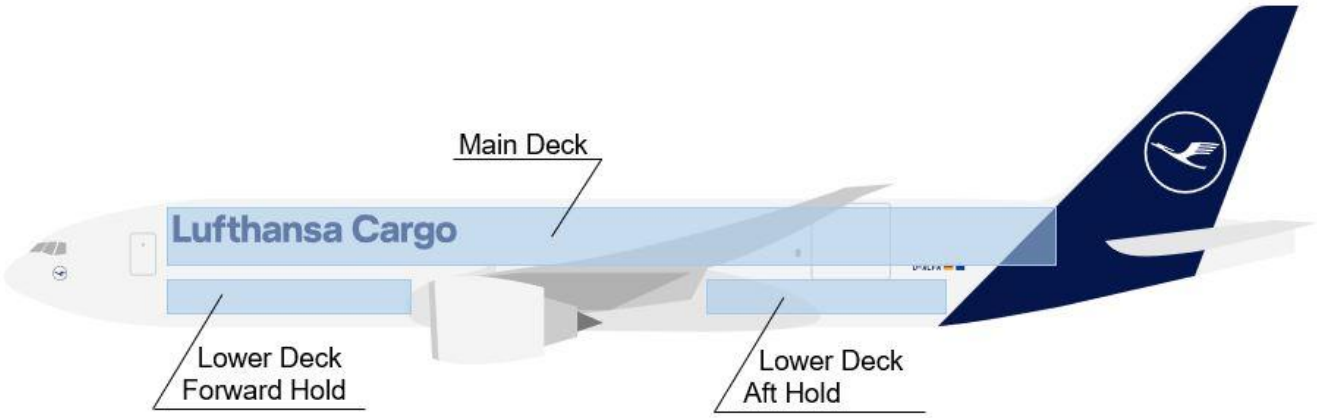
Every aircraft is divided into 2 sections: Main Deck and Lower Deck

In a passenger aircraft, the passenger cabin is located on the Main Deck. For the freighter aircraft, the Main Deck is a cargo hold.

The Lower Deck on both the passenger and freighter aircraft is broken into 2 holds: Forward and Aft hold.

The Forward and Aft hold are broken down further into compartments, which may be numerically different depending on the aircraft type.

Here is an example of a freighter aircraft:



4. ULDs, Fleet, and Contours

ULDs and Contour for narrow body aircrafts:

A320/A321/A321F

Containers

Code: **AKH / AKW**

Base dimension:	153 x 156cm / 60,4 x 61,5in
Height:	114cm/45in
Max Gross Weight	1000kg

Pallet

Code: **PKC**

Base dimension:	153 x 156cm / 60,4 x 61,5in
Height:	114cm/45in (including base of pallet)
Max Gross Weight	1000kg

For all ULD´s with permanent fixed nets: please do not try to remove, cut or exchange the nets.
A damaged permfix-net equals a damaged pallet. Consequently, mark the ULD with a damage tag and file a damage report.
Please make sure to keep distance between the pallets when building a pallet stack by using wood or bars.

Narrow Body Freighter A321F Main Deck

Pallet

Code: **PAJ**

Base dimension: 224 x 318cm / 88 x 125in

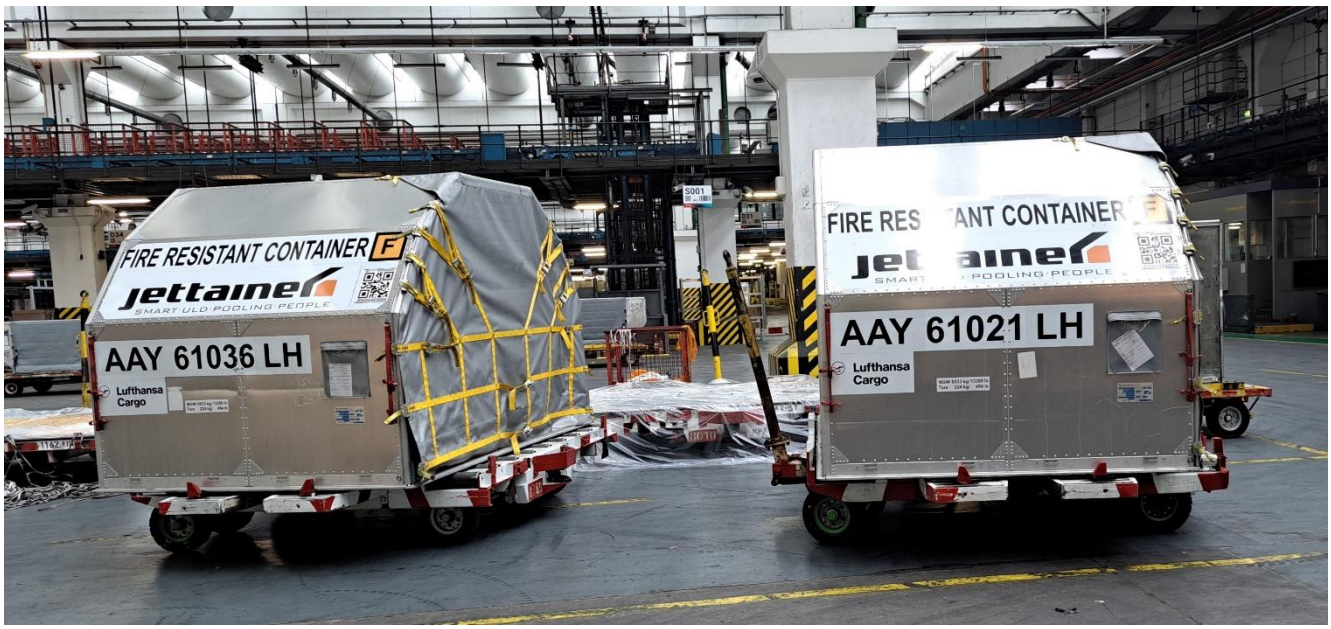
Height	Contour	Maximum Gross Weight	Aircraft
208cm	Y	1800kg	Main Deck A321F

For all ULD´s with permanent fixed nets: please do not try to remove, cut or exchange the nets.
A damaged permfix-net equals a damaged pallet. Consequently, mark the ULD with a damage tag and file a damage report.
Gradually all PAJ and more pallets will be equipped with permanently fixed nets.
Please make sure to keep distance between the pallets when building a pallet stack by using wood or bars.

Narrow Body Freighter A321F Main Deck

Container

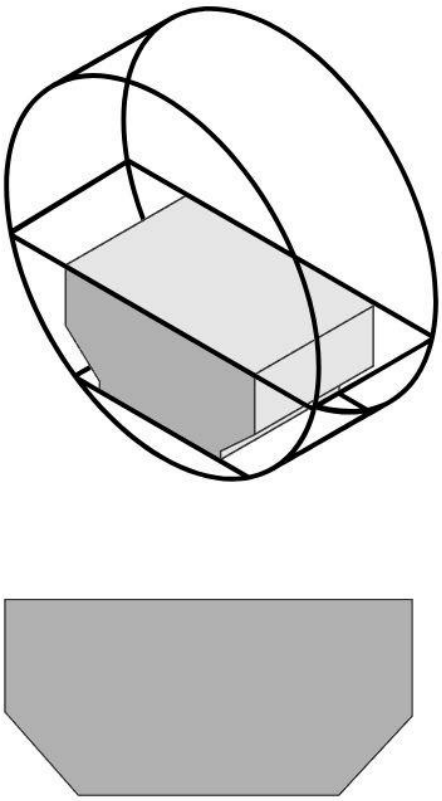
Code:	**AAY**
Base dimension:	224 x 318cm 88 x 125in
Height:	208cm/88in
Max. Gross weight:	1800kg

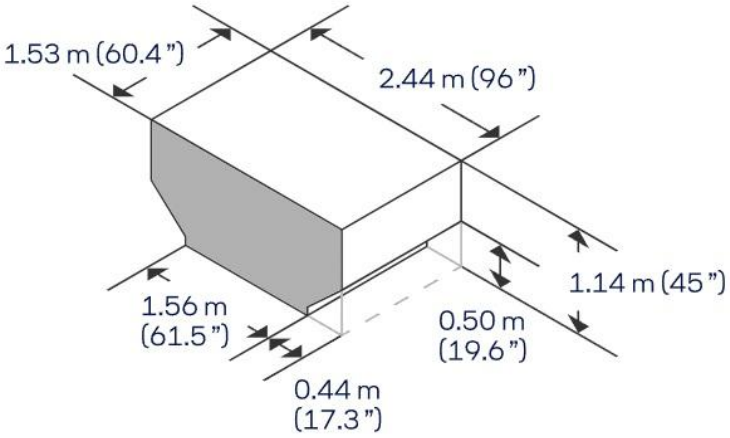


Loadable only in Main Deck A321F

Maximum Contour A320/A321/A321F Lower Deck

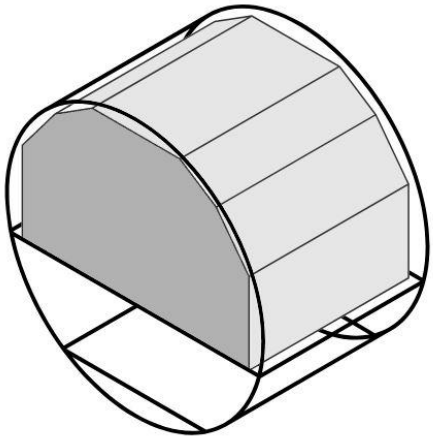
The H contour is the maximum contour on the lower dec of all A320/A321/A321F.

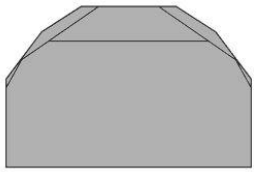


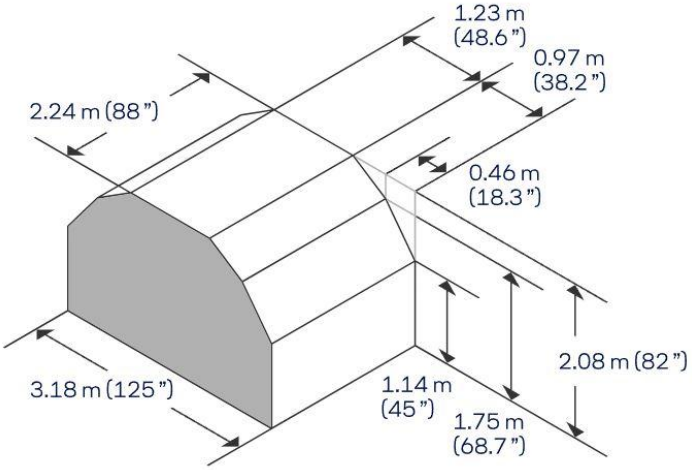


Maximum Contour A321F Main Deck

The Y contour is the maximum contour on the main deck of the A321F.







Unlike on wide body freighters such as the B777F or B747F, there is no useable walkway on the A321 Freighter.

The Fuselage accommodates only properly built Y contours. Even the smallest overlap of cargo onto the rim of the pallet and beyond the Y contour will cause the ULD to be offloaded.

ULDs for wide body Aircrafts:

Container

Code: **AKE (LD3)**

Base Dimension:	153 x 156cm / 60,4 x 61,5in
Height:	163cm/64in
Max Gross Weight:	1500kg

Container

Code: **AMP**

Base Dimension:	244 x 318cm / 96 x 125in
Height:	163cm/64in
Max Gross Weight:	5000kg

Loadable in the Lower Deck of all wide body aircrafts

Container

Code: **AMJ**

Base dimension: 244 x 318cm / 96 x 125in

Height: 244 cm/96in

Max. Gross weight: 5800kg

Loadable only in Main Deck of the B777F

Pallet

Code: **PAJ**

Base dimension: 224 x 318cm / 88 x 125in

Height	Contour	Maximum Gross Weight	Aircraft
163cm/64in	P or F	4000kg	Lower Deck wide body Aircraft
300cm/118in	J4	5000kg	Main Deck B777F

Loadable in the Lower Deck and Main Deck of all wide body aircrafts, depending on the contour built

Pallet

Code: **PMC**

Base dimension: 244 x 318cm / 96 x 125in

Height	Contour	Maximum Gross Weight	Aircraft
163cm/64in	P or F	5000kg	Lower Deck wide body Aircraft
300cm/118in	J4	5800kg	Main Deck B777F

Loadable in the Lower Deck and Main Deck of all wide body aircrafts, depending on the contour built

Pallet

Code: **PLW/PLA**

Base dimension : 153 x 318cm / 60,4 x 125in

Contour: P or F

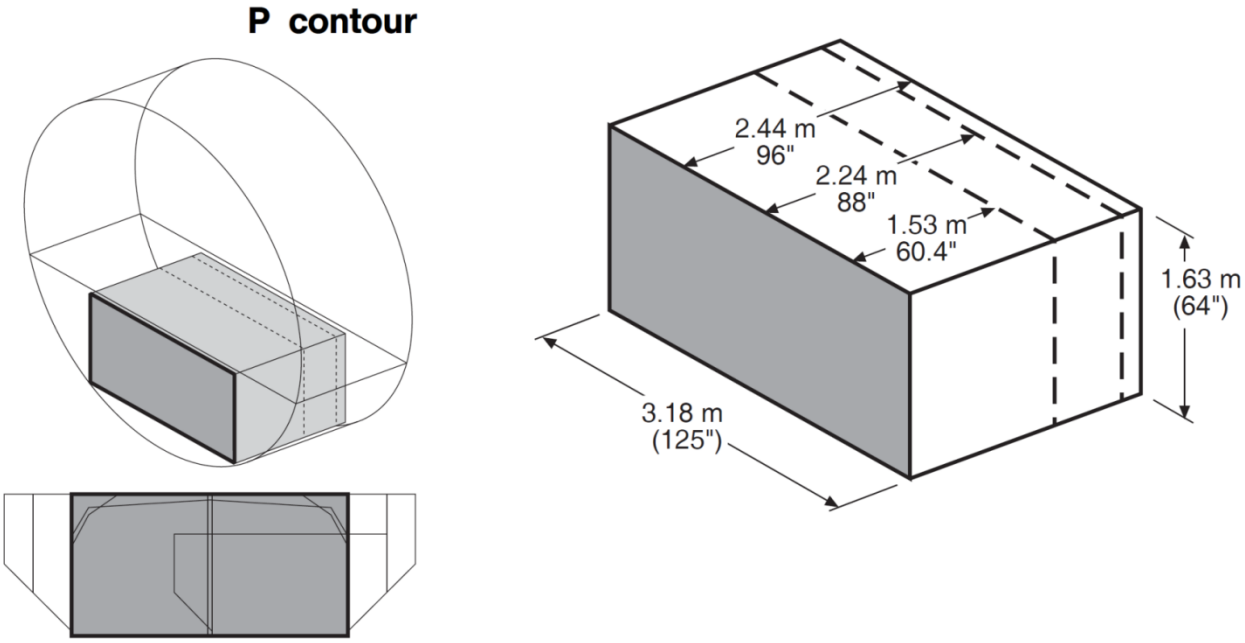
Capacity per extension: 350kg (only PLW)

Max Gross Weight: 3000kg

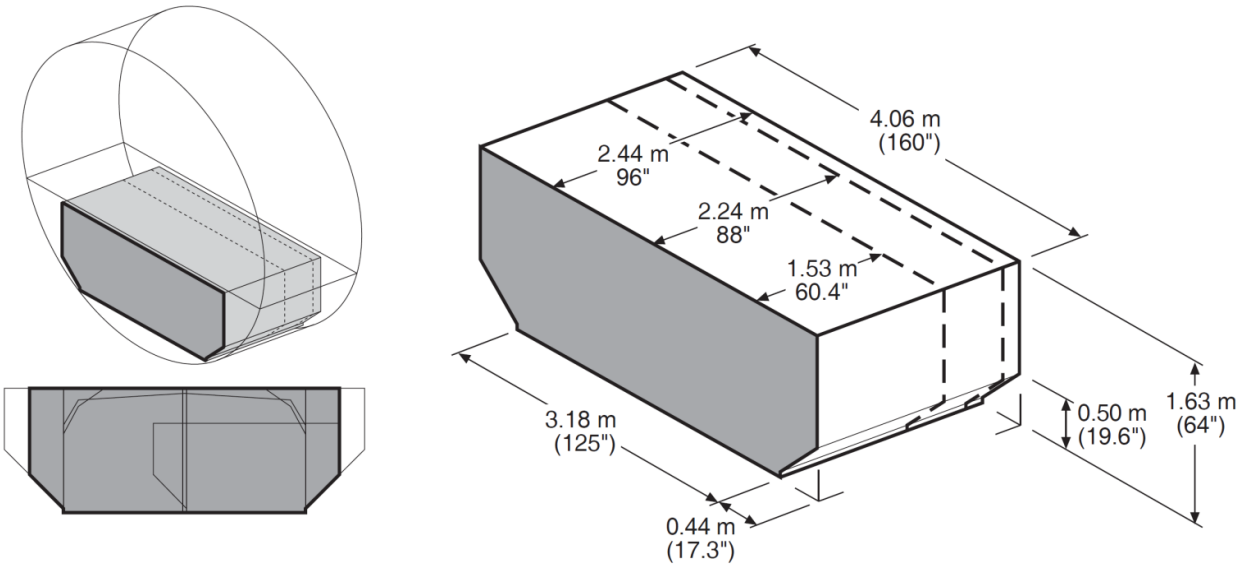
Loadable in the Lower Deck of all wide body aircrafts, depending on the contour built (except Freighters)

PLA: pallet without side extensions

Lower Deck Contour wide body aircraft



F contour


4.06 m
(160")
2.44 m
96"
2.24 m
88"
1.53 m
60.4"
3.18 m
(125")
0.44 m
(17.3")
0.50 m
(19.6")
1.63 m
(64")


NOTAUS
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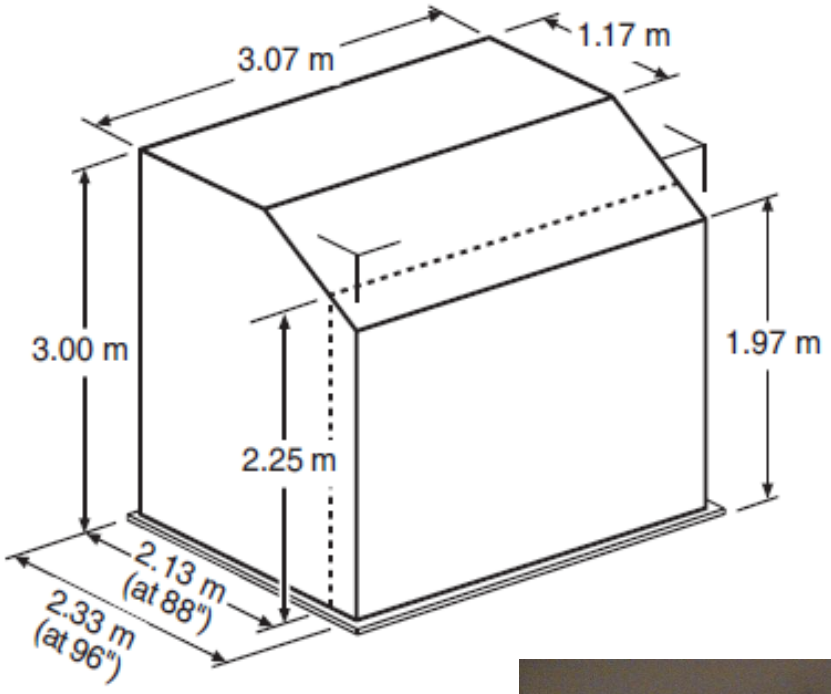
1104 KG
KPA
2360

Maximum Main Deck Contours Freighter aircraft B777F



J4
(B777F)

16ft Pallets
Code: **PZA**
Base Dimension: 244 x 498cm / 96 x 196in
Max. Gross weight: 10000kg

20ft Pallets
Code: **PGE**
Base dimension: 244 x 606cm / 96 x 238,5in
Max. Gross weight: 10000kg

Loadable in Main Deck B777F

ULDs and Fleet Summary Sheet

Lufthansa Cargo ULDS

Pallets

Code	Base Dimensions	Net Type	Notes
PAJ	224 x 318cm 88 x 125"	NME	Lower Deck or Main Deck wide body aircraft
PMC	244 x 318cm 96 x 125"	NME	Lower Deck or Main Deck wide body aircraft
PLW/PLA	153 x 318cm 60.4 x 125"	NLA	350kg maximum per side extension Lower Deck all wide body passenger aircrafts
PKC	153 x 156cm 60,4 x 61,5	NKA	Lower Deck narrow body aircrafts
PZA	244 x 498cm 96 x 196"	NGE	Main Deck for freighter only
PGE	244 x 606cm 96 x 238,5"	NGE	Main Deck for freighter only

Containers

Code	Base Dimensions	Height	Notes
AKE	153 x 156cm 60,4 x 61,5"	163cm 64"	Lower Deck wide body aircraft Also called a LD3
RKN	153 x 156cm 60,4 x 61,5"	163cm 64"	Maximum Dry Ice: 120kg Cool Unit LD3
AKW/AKH	153 x 156cm 60,4 x 61,5"	114cm 45"	A320/A321 only
AMP	244 x 318cm 96 x 125"	163cm 64"	Lower Deck/Main Deck all wide body aircrafts
RAP	224 x 318cm 88 x 125"	163cm 64"	Maximum Dry Ice: 320kg (Unicooler) N/A for Opticooler
AMJ (AMX)	244 x 318cm 96 x 125"	244cm (300cm) 96" (118")	Main Deck for freighter only
AAY	224 x 318cm 88 x 125"	208cm 82"	Fire Resistant Container for A321F
RLP	153 x 318cm 60,4 x 125"	163cm	Cool Unit

ULDs, Fleet & Contours Summary Sheet

Passenger	Loadable ULDs & Maximum Gross Weight				
	PKC	AKH, AKW	Maximum Contour	Maximum Height	
A320	1000	1000	H	114cm	
A321	1000	1000	H	114cm	

Passenger	Loadable ULDs & Maximum Gross Weight					
	88"	96"	LD3	PLW/PLA	Possible Contour	Maximum Height
A330-300	4000	5000	1500	3000	P or F	163cm
A340-300	4000	5000	1500	3000	P or F	163cm
A350-900	4000	5000	1500	3000	P or F	163cm
A380-800	4000	5000	1500	3000	P or F	163cm
B747-8	4000	5000	1500	3000	P or F	163cm
B787-9	4000	5000	1500	3000	P or F	163cm

Freighter	Loadable ULDs & Maximum Gross Weights					
Lower Deck	88"	96"	LD3	60,4x61,5" A321F	Maximum Contour	Maximum Height
A321F	--	--	--	1000	H	114cm
B777F	4000	5000	1500	--	P	163cm

Freighter	Loadable ULDs & Maximum Gross Weights					
Main Deck	88"	96"	PZA/PGE	Maximum Contour	Maximum Height	
A321F	1800	--	--	Y	208cm	
B777F	5000	5800	10000	J4	300cm	

All ULDs/Contours, which are not mentioned in Chapter 4 had to be approved by LCAG before delivery.

5. Serviceability, Storage and Transportation

LCAG checks ULDs prior to their release to an Agent/Customer. Nevertheless, you must double check any ULD for their serviceability before loading.

Any damages to ULDs, making it unserviceable, can potentially affect the security and safety of the cargo loaded within the ULD, as well as the aircraft on which it is loaded on.

These pictures show a selection of repair events that happen every year and the approximate cost for such repairs.

All regulations of this subsection are also valid for ULDs and tie-down material provided by other airlines when transported in Lufthansa or Lufthansa Cargo aircrafts, if there are no deviating regulations in specific paragraphs

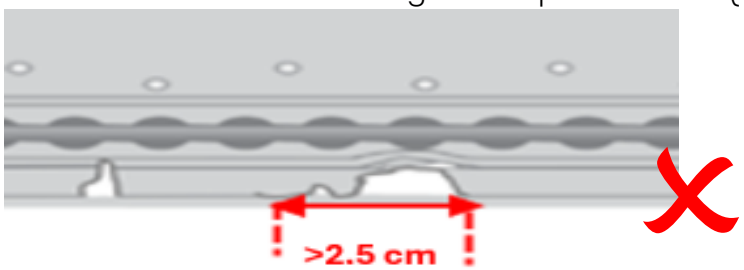
Basic Rules of all ULDs

Certification: Type label or type markings must be fixed or engraved **and** readable as proof of certification. All ULDs must be certified by either ETSO (JTSO) or TSO.

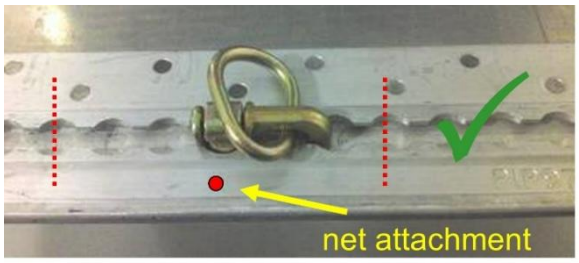
(pallets have a base plate and edge profile, which are constructed in the same way as containers. The serviceability limits for these parts are the same)

Edge Profiles of the ULD Base

✓ Max. 1 deformation up to 2.5 cm (1 in) per 1 m (3 ft 3 in), or
Max. 3 deformations together up to 2.5 cm (1 in) per 2 m (6 ft 6 in).



✓ Min. 3 undamaged pairs of tie-down track lips on each side of the net attachment point.



✓ Max. 2 missing fasteners (rivets) per each edge profile.

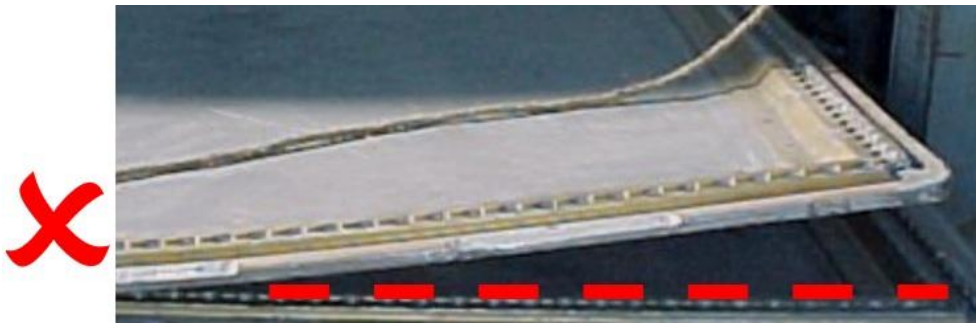
✓ Fasteners at the corner must not be missing.

Container / Pallet corners

All ULDs with damaged or missing pallet corners are to be considered unserviceable.

Base Plate:

✓ No deformation larger than 2.5 cm (1 in);
this includes the lower outbord panel of an AKE and AKH
(following the F- resp H-contour)
✓ No deformation that prevents any lock being raised properly over the ULD edge.



✓ No holes or cracks in the ULD base.
5 small holes are drilled into pallets, this is intended and for water drainage.

Panels (walls, roof):

✓ No crack or hole larger than 10 cm (4 in).

✓ No more than 2 holes or cracks less than 30 cm (12 in) apart from each other.

Serviceability requirements for wall and roof panels are also applicable for all light weight containers

Gussets

✓ No gusset is missing, loose, bent or broken.

Container Extrusion (Frame Profile)

✓ No hole larger than 2 cm (0.8 in) per each frame profile, AND

✓ No crack or deformation longer than 8 cm (3 in) in the longitudinal direction of the frame profiles (extrusions)

✓ No crack or deformation longer than 0.5 cm (0.2 in) in the transverse direction of frame profiles (extrusions)

Container Roof

✓ No cracks in the upper extrusion (frame)

✓ No deformation of the roof panel greater than 5 cm (2 in)

Container Base

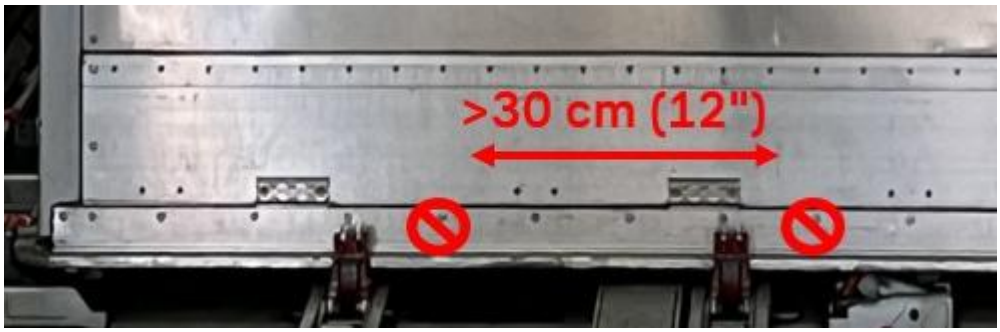
✓ No crack longer than 8 cm (3 in), AND

✓ No hole greater than than 2 cm (0.8 in) in diameter

Base Fasteners / Rivets (Containers)

✓ No more than 2 missing or damaged fasteners (rivets) are found per side.

The distance between the two must be greater than 30 cm / (12 in)



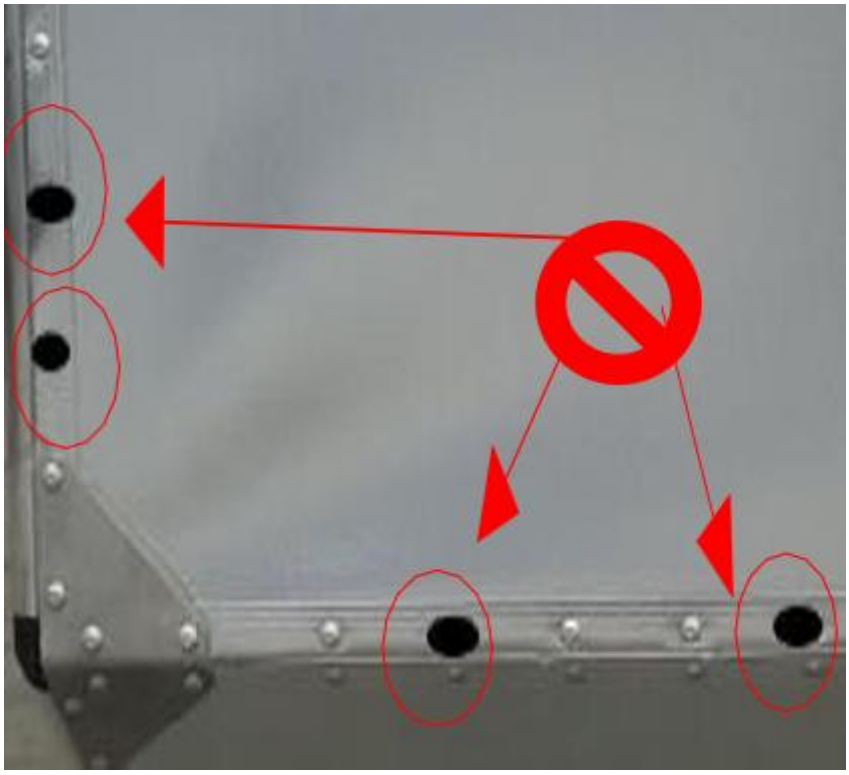
Panel Fasteners / Rivets (Containers)

Lightweight and Aluminum:

✓ Max 1 fastener (rivet) per extrusion (frame profile) is missing or damaged.

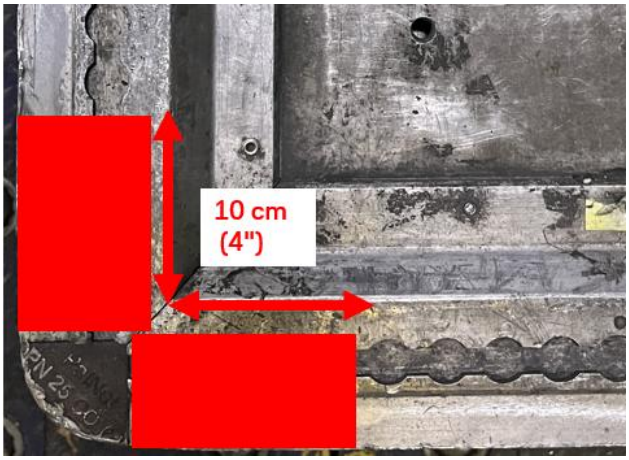
Aluminum only:

✓ No missing or damaged fastener on the roof



No Damage Zones:

✓ No damage within 10 cm (4 in) from the corner of the edge rail



✓ No damage within 10 cm (4 in) of fastener line (rivet line)

✓ No damage within 5 cm (2 in) on curtain edge and locking

Door Tarpaulins:

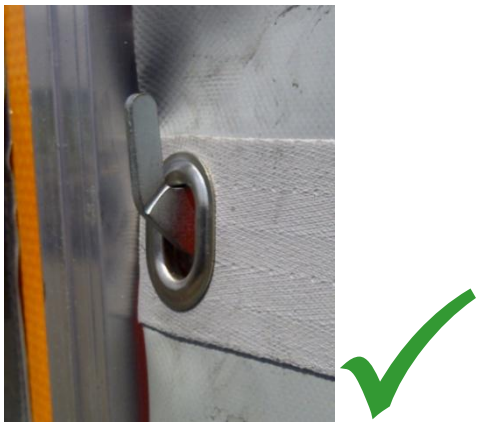
Containers equipped with a door strap net remain serviceable even if the tarpaulin is damaged.

Only for containers where the tarpaulin serves the securing of the load:

✓ Max. two holes or cracks up to 10 cm (4 in) with a min. distance of 50 cm (19.5 in).

✓ All door hooks/tarpaulin eyes must be in place. Deflections of the door hooks are allowed, if the door can still be locked properly at all hooks.

✗ Velcro or other straps used to lock the doors on containers must not be damaged or worn out.



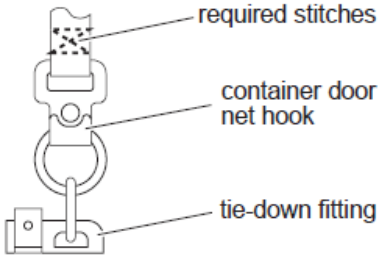
Door strap nets:

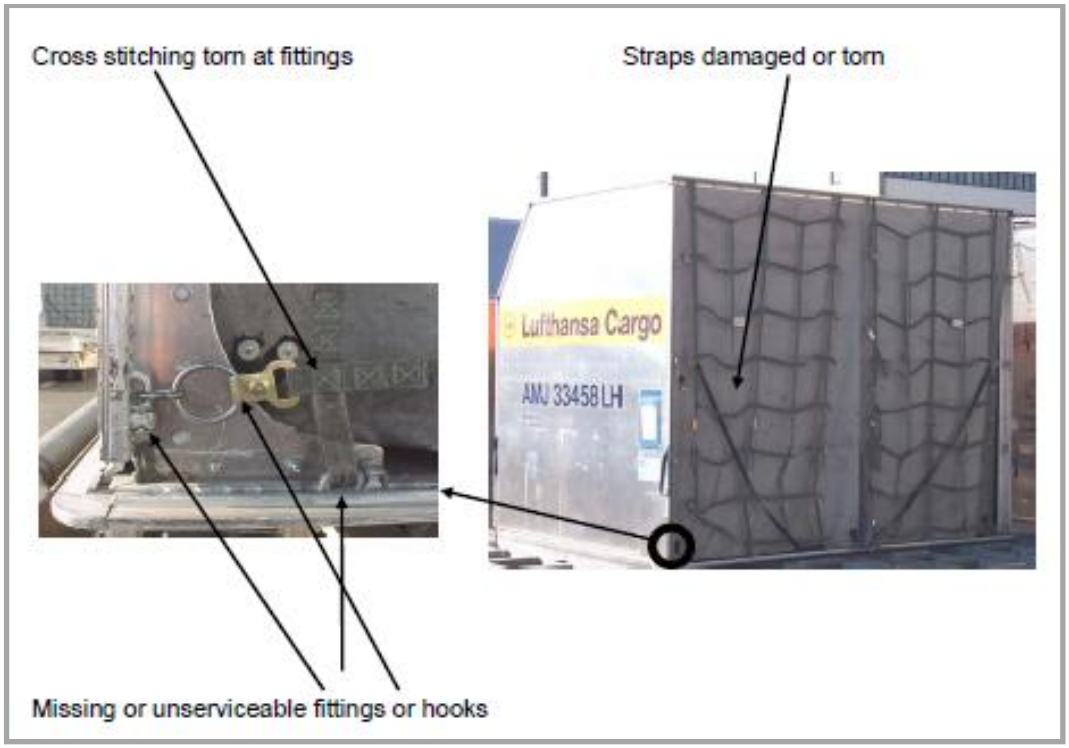
✓ No strap is torn or cut, AND

✓ no tie-down fitting or hook is missing, damaged or distorted, AND

✓ no stitches at strap connecting fittings are torn or missing.

Note: only the stitches at the connecting fittings as shown in the picture are relevant. Stitches which connect the crossing horizontal and vertical straps are only for stabilization to avoid tangling when folding and unfolding the net.

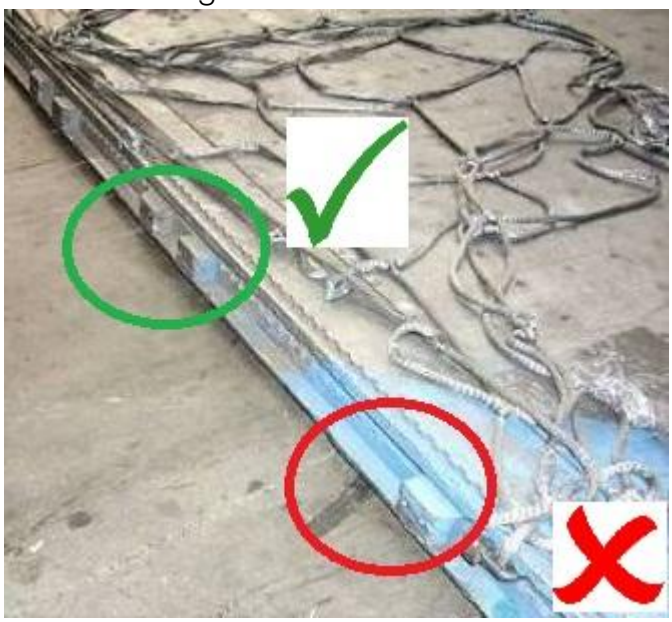




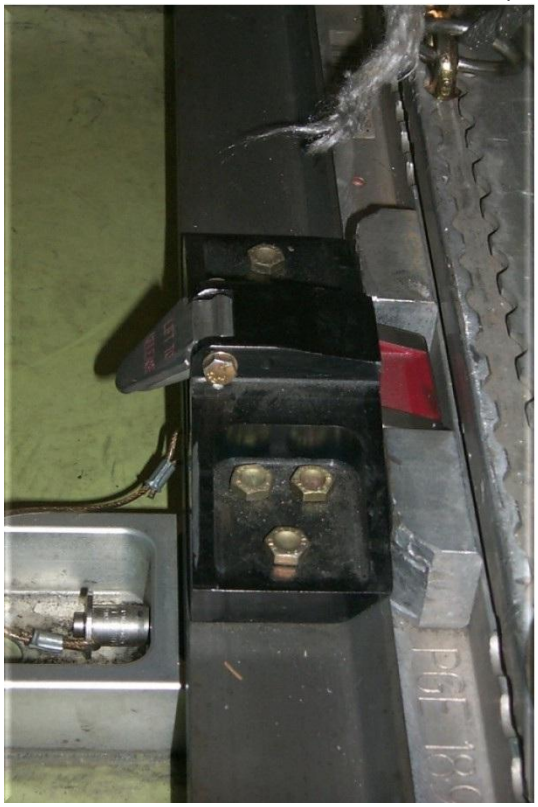
Serviceability of 16/20ft ULD (PZA/PGE):

✓ No holes or cracks
✓ No delaminations of more than 25% of the surface
✓ No loose or missing rivets in the edge rail area

✓ No missing restraint block



These restraint blocks are required to secure a PGE / PZA in the aircraft:



ULD Repairs:

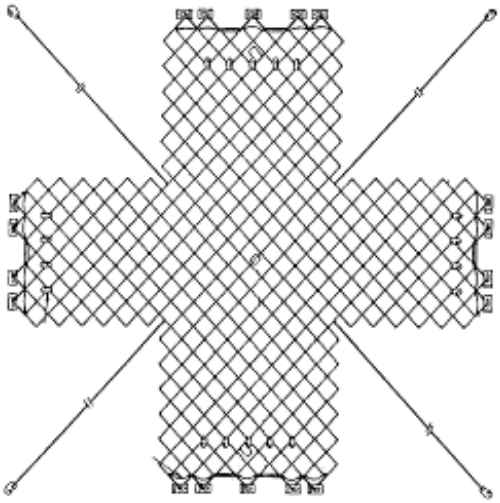
Any repairs must be performed professionally according to the manufacturer's manuals by certified repair shops. Provisional repairs, for example closing of holes by tape, are not allowed.

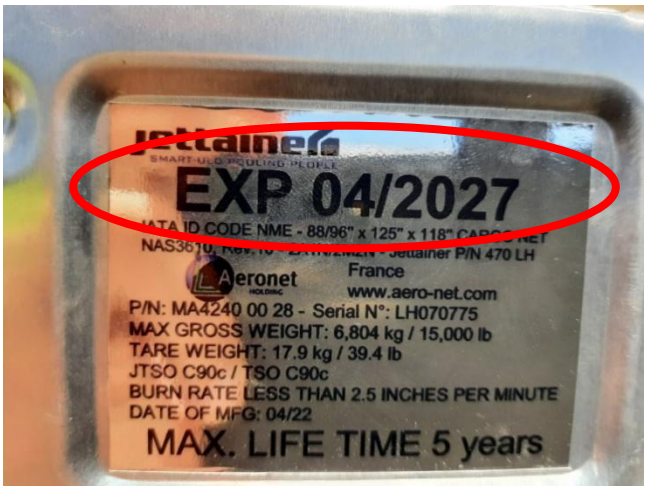
For ULDs that are unserviceable, do not load cargo onto/into the ULD and return the damage unit to Lufthansa Cargo.

Pallet Nets

✓ A pallet net is serviceable, if

- the expiry date ("EXP") is not exceeded, which means the net is not older than 5 years, AND
- min **one** type label is fixed and readable, AND
- **all** net fittings and **all** net hooks are attached and undamaged, AND
- **all** corner lashing lines are attached and undamaged, AND
- **no** mesh is torn.





If a corner lashing line is damaged or too short (less than 3.7 m, 145 in) it may be replaced by a serviceable red-and-white lashing line from LCAG.

Weight Limitations apply for nets with minor damages:

- 2 minor damages are acceptable.

Please refer to below table for details and the applicable weight limitation.

- **Preferrably use an undamaged net!**

Net Type	used Studs for Net Type	# missing / damaged ...	... Studs / Meshes	... Hooks (*)
NME (PMC/PAJ)	double studs	1	3400 kg	unchanged
		2	2310 kg	5780 kg
NKA (PKC)	single studs	1	790 kg	unchanged
		2	539 kg	1110 kg
NLA (PLA/PLW)	single studs	1	1580 kg	unchanged
		2	1079 kg	2698 kg
NGE (PGE/PZA)	double studs	1	6800 kg	unchanged
		2	4625 kg	12510 kg

(*) As long as the net can still be secured tightly.

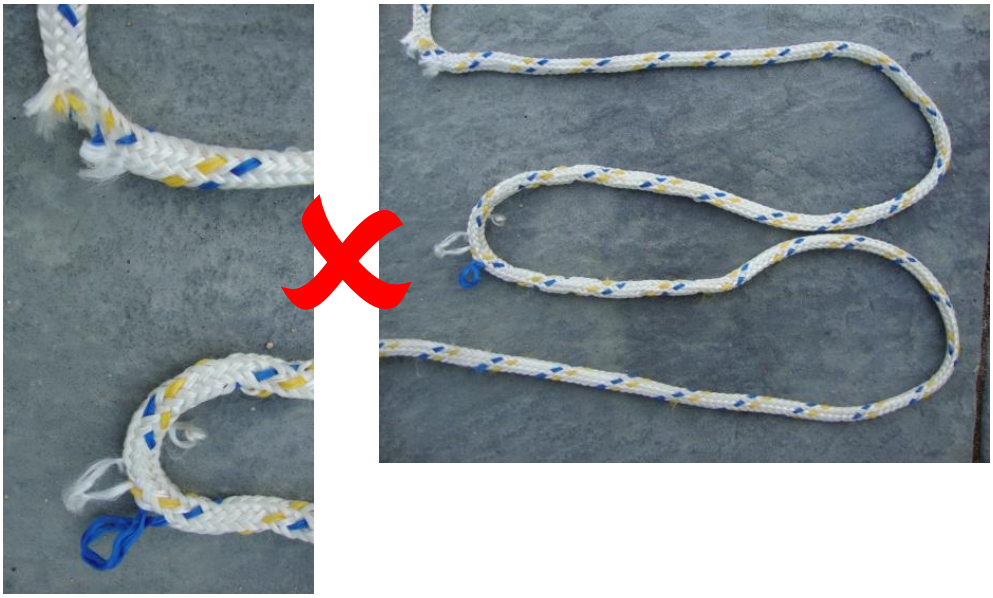
The same above mentioned rules apply for nets of other airlines.
Additionally:

- Nets of other airlines must not be older than 3 years starting from the Date of Manufacturing (DATE OF MFG).
- Min. one type label must be fixed for proof of certification, and the label must show markings that it fulfils NAS 3610 or JTSO C90 or TSO C90.

- The weight limit when using OAL nets is 3000 kg.
  If the cargo is heavier, either use a second net or use a net from LCAG.

Tie-down Ropes (PN040):

✗ Tie-down ropes are not serviceable, if
- they are torn or cut or
- have torn fibres



Tie-down Rings, Tie-down fittings (PN001):

✗ Tie-down rings or tie-down fittings are not serviceable, if
- they are damaged or distorted or
- parts of the ring are missing or
- the ring is open

Tie-down straps (PN035 or OAL):

Tie-down straps show either the date of manufacture printed on the strap or the expiry date printed on an attached label. Furthermore, they must be certified (ETSO or TSOC172). Do not combine double-stud tie-down straps (PN035) with single stud tie-down fittings.

✗ Tie-down straps are not serviceable, if
- straps are torn or cut, or
- stitches are torn or missing, or
- tie-down rings are missing, damaged or distorted, or
- the expiry date is exceeded, or
- no expiry date is present / legible.

Storage and Transportation of ULD and Nets:

To avoid damages of ULD, the following procedures are in effect and have to be strictly adhered to.

Storage of empty containers:

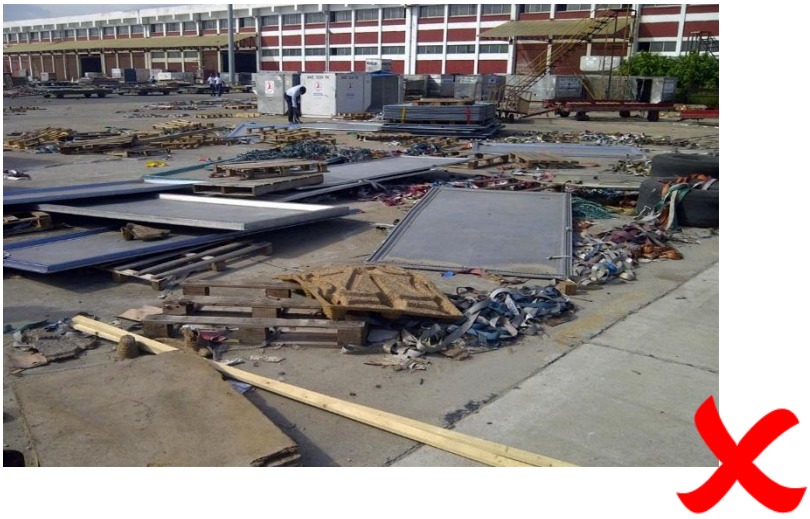
- Preferably on roller racks or ball mats
- **On ground**:
  - Only allowed if 2 spacers are used underneath; spacers consist of either plastic foam material or wooden planks/skids
- **Stacking:**
  - On ground up to 2 is allowed (except AMJ/AMH) using spacers underneath and in between
  - In a rack up to 4 allowed using spacers
  - Protection against strong winds is mandatory
  - Container doors (tarpaulin or metal) must be closed to avoid damages of the doors


AKE 50551 LH
AKE 50508 LH


AKH
39135
LH

Storage of empty pallets:

- for alignment of pallets, a pallet rack (funnel) is mandatory
- storage of up to maximum 20 pallets piled up on a shelf
- to avoid excessive bending of wing pallets spacers must be used after every 5th pallet.



Storage of serviceable nets may be done in two ways:

- Serviceable nets may be kept attached to the pallet on one of the long sides: position the net on the pallet surface and ensure that no part of the net is hanging outside the pallet edge.

  OR

- Serviceable nets may be packed in a net bag (PN115, one net per sack) and be stored in dry rooms.

- Unserviceable nets must be collected in a separate container (packed in TN0115) and be returned to Lufthansa Cargo.

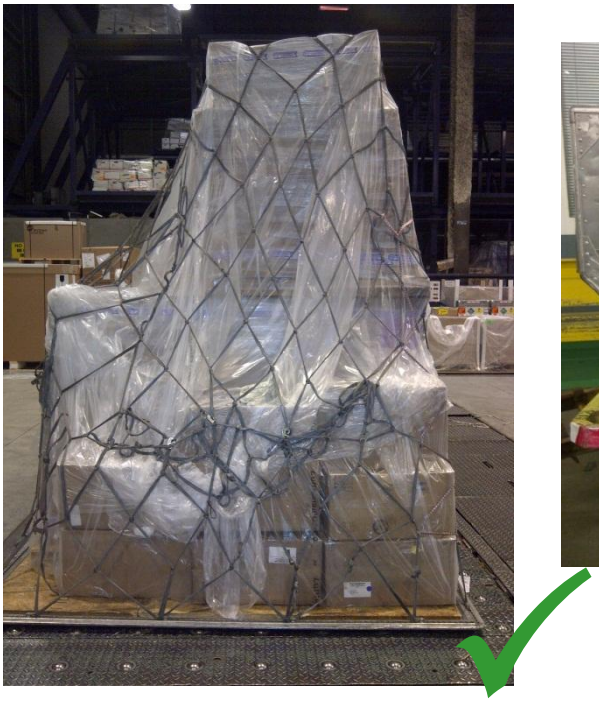
Never cut off nets that are **permanently** fixed to a pallet!

Keep them attached to the pallet as descibed above also for the return to Lufthansa Cargo.

They are marked with several red signs.

Storage of loaded containers/pallets:

- must only be stored on slave pallets or roller racks, ball point mats or dollies
- no storage on ground allowed (not even on spacers)!
- never use forklift for moving of loaded containers/pallets!



Transportation of empty containers:

- preferably on dollies, slave pallets etc. but allowed by forklift
- on trucks spacers must be used underneath if no roller beds or similar exist
- on trucks stacking up of maximum two allowed (except AMJ/AMH) using spacers underneath and in between

Transportation of empty pallets:

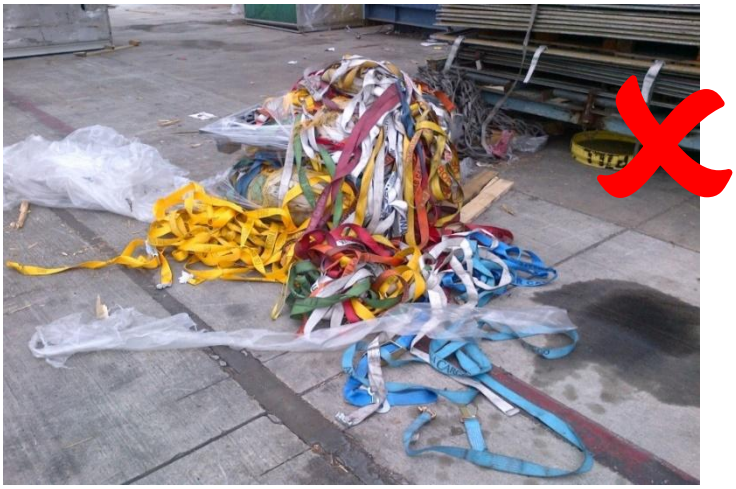
- a stack of maximum 40 pallets using slave pallets or dollies only

Transportation of loaded containers/pallets:

- on dollies allowed only
- never by forklift unless a slave pallet is used
- on trucks/trailers slave pallets, roller beds or ball point mats are mandatory

Returning empty ULDs and loading material (nets, straps, etc.):

- Pallets and containers must be returned principally cleaned.
- Straps have to be rolled up for return.
- Nets that are not permanently fixed to a pallet must be packed into net sacks for return. One net per sack is allowed.



Security Check

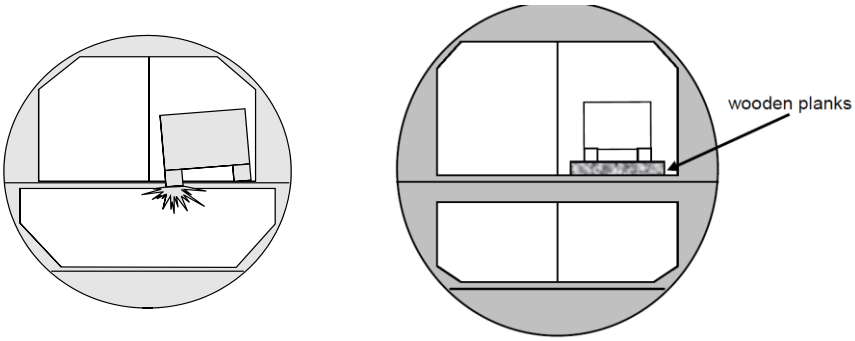
- All ULDs must be checked for hidden objects, which might wrongly be identified as integral parts of a ULD (e.g. double floor).
  By doing this we increase security.

6. Maximum Floor Load Limit

What do we mean by maximum floor load limit?
This expression is used to determine the structural limit of weight pressure per square metre on any one floor area of an aircraft or ULD.

Why do we need to know about maximum floor load limit?
We must protect the floor area from being overloaded in order to avoid structural damage to the aircraft. We do this by spreading the weight over a larger **contact area.** It's the same as an alpine skier putting on skis to avoid falling through the snow; he has enlarged his contact area meaning his weight has been distributed over a larger area.

To avoid exceeding the maximum floor load limit we must not load more than **the Maximum Flooload Limit per ULD Type** when we are building up ULDs.



If we do not adhere to the above rules, we are endangering the safety of the aircraft!

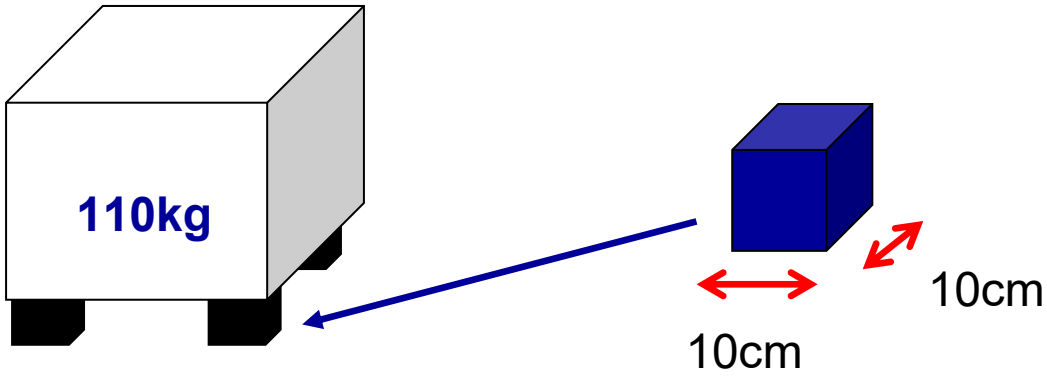
Depending on the type of ULD used, it must be checked whether the weight of a freight item must be distributed over the largest possible contact area.
The following load distribution table is required for the different floor load limits (depending on the ULD type).

ULD	Loading Position	ULD Type	Maximum Floorload Limit [kg/m²]
Pallet	Lower Deck	PKC	488
Pallet	Lower Deck	PAJ/PMC PLA/PLW	659
Pallet	Main Deck **(J4 contour)**	PAJ/PMC PZA/PGE	1464
Pallet/Container	Main Deck **(Y contour)**	PAJ/AAY	1033
Container	Lower Deck	AKH/AKW	488
Container	Lower Deck	AKE/AMP RAP/RKN/RLP	659
Container	Main Deck	AMJ	1464

How do we know whether the limits have been exceeded or not?

To know whether the maximum floor load limit has been exceeded or not, we must first calculate the actual contact area of our cargo. That means the area of the box which is actually touching the floor. In order to make the correct decision, the cargo should be weighed off for an accurate weight.

Example:



Step 1: Calculate the actual contact area

Area = Length x Width

= (0,1m x 0,1m) x 4 chocks

= 0,04m²

(*hint*: to change centimeters (cm) to meters (m) divide by 100)

Step 2: Calculate the Floorload Limit

Floorload limit = Area x ULD Floorload Limit

(example) = Area x ULD Floorload Limit of a PKC

0,04m² x 488kg/m² = 19,52kg

Step 3: Compare the maximum Floor Load weight with the actual weight

ULD (PKC): 19,52kg (max allowed weight) vs **110kg (actual weight)**

The actual weight of the crate exceeds (>) the maximum allowed weight based on the actual contact area – **therefore it is an overload!**

Structural damage is possible e.g. damaged base plate of an ULD.

Step 4: If the Maximum Floorload Limit has been exceeded, the contact area of the cargo must be enlarged.

We can do this by using supporting material over a larger area

Supporting Planks					
PN	Length	Width	Thickness	Area	Tare Weight
PN050	100cm	15cm	2,7cm	0,15m²	2,2kg
PN051	150cm	15cm	2,7cm	0,225m²	3,0kg
Supporting Platforms					
PN061	125cm	75cm	2,7cm	0,9375m²	15,0kg
PN062	200cm	75cm	2,7cm	1,5m²	23,0kg

Other planks will do, if they have a minimum of 2,7cm thickness and are made of good quality timber.

Wooden support platforms designated for very heavy single pieces (which are used instead of multiple planks) may be ordered from Lufthansa Cargo.

Approach: The contact area of the cargo must be spread out over a larger area.

With single large/heavy pieces exceeding the maximum floor load limit, supporting material must be laid down offset to each other on the ULD, in order to distribute the weight pressure over the largest possible area on and to the edge profile on all four sides of the pallet/container.

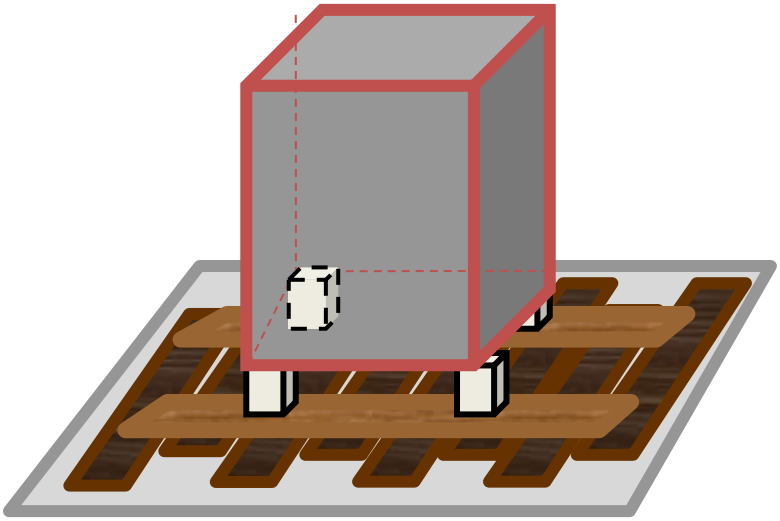
If the piece of cargo has a small contact area, and our supporting material bends, you will need to use a second layer of supporting material.

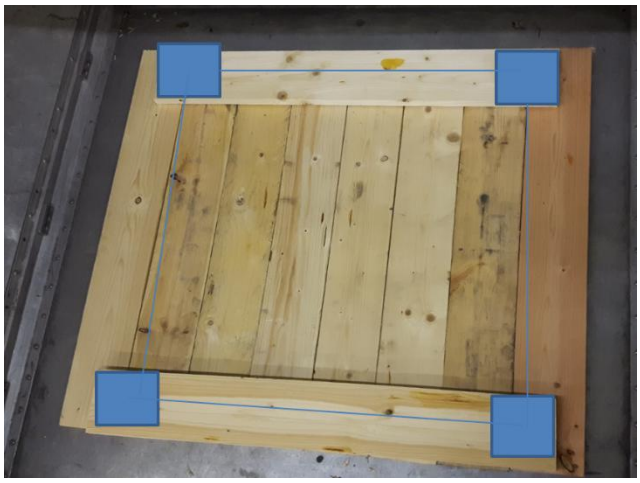
For a PKC/AKH/AKW/AKE/RKN you can use a combination on PN050 and PN061.

For a PMC/PAJ/AMJ you can use 4 PN062 offset.

Some examples:

PKC, AKH, AKE etc.



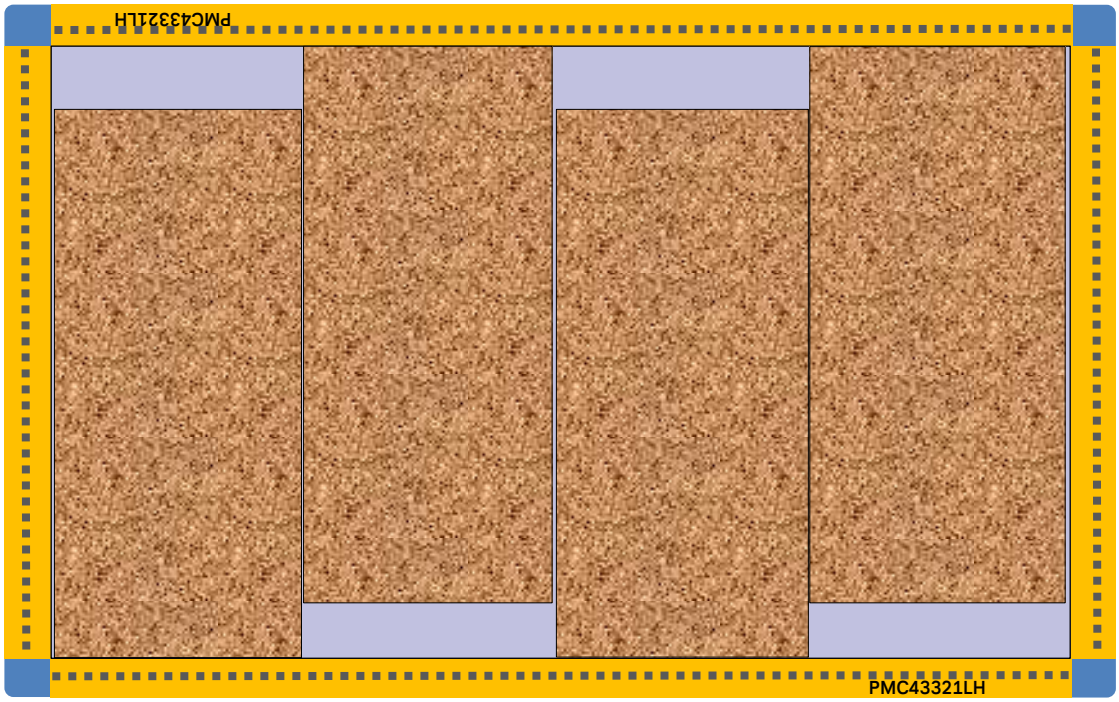


8 x PN050, and to distribute the load pressure on the boards, + 2 x PN050.

or…

Example for PMC, AMP, AMJ etc.

Offset



With drums or barrels it is *not* easy to calculate the area, so as a golden rule:

Always use planks or supports!

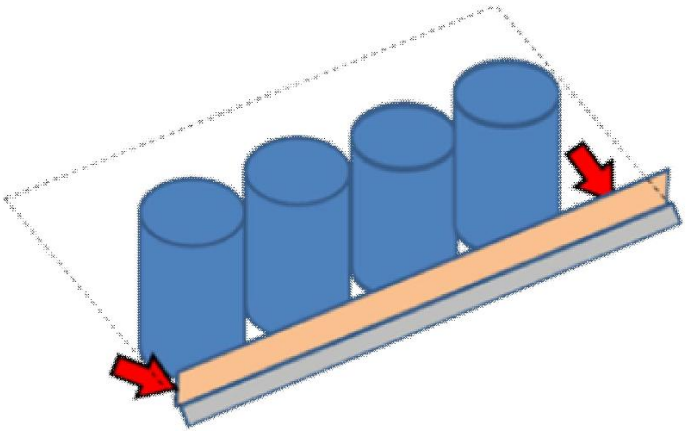
Securing of Barrels and Jerry Cans:

If possible use supporting planks (PN050/051) between the tie-down track (net) and the barrels or jerry cans to prevent them from sliding onto the tie-down track.

If possible use anti-skid mats (PN099) to prevent cargo from sliding.

Load steel barrels always on supporting platforms.

Stacking of steel barrels is only permitted if the lower layer is sufficiently stable.
If necessary use supporting platforms or planks between the layers



Attention!

The marking of wooden packaging and supporting material:

IPPC-Symbol

DE = ISP country code e.g. DE for Germany

XX = Regulatory authority

49XXXX = Registration number of the treatment company

HT/MB = Treatment method HT (heat treatment) MB (Methyl bromide)

DB = Symbol for "Debarked" (required by some countries)

To be considered for all types of wood used:

Pest Contamination (which is not declared as manifested cargo):

- Animals, insects, invertbrates (alive or dead)
- Organic material of animal origin (blood, bones, hair, flesh)
- Plant or plant products (fruit, seeds, leaves, twigs, roots)
- Organic material (fungi, soil, water)

Wood with pest infestation is prohibited for transportation!

Use of SquAir Timber support material Cargo build-up
CHM 3.3.6.5

SquAir Timber may only be used when raising up cargo for the build-up of a contour. It may not be used to spread the weight of cargo due to a floorload limit.

The description explains the buildup and usage of SquAir Timber support material. The material can be used instead of wooden pallets (Euro pallets)

This SquAir Timber material can be used to build high stacks of pallets or for certain contours. e.g. to load 8 Euro pallets onto a PMC

This material is available in 3 different lengths:

PN064	1,5m
PN065	2,2m
PN066	3,0m

The SquAir Timber material is not to be used for invreasing the floor contact area in case the cargo load exceeds the respective maximum floor load limits

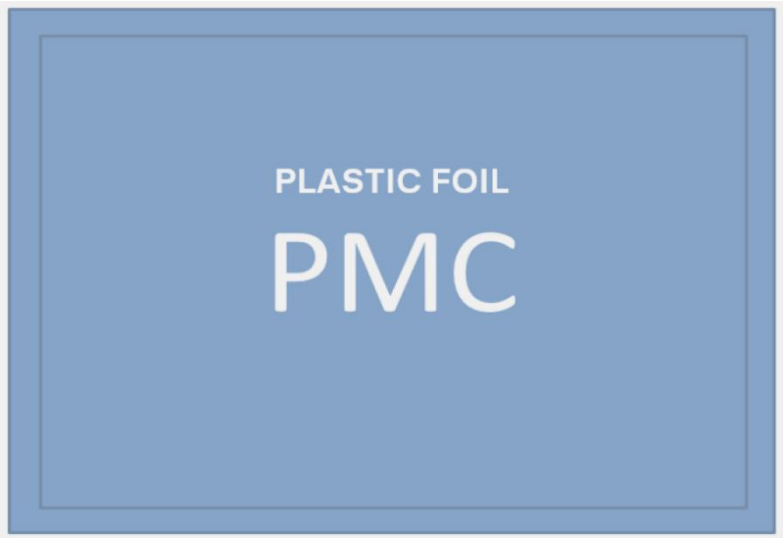
Use plastic foil PN 110 LH. The SquAir Timber material must be placed into the plastic foil to avoid that water gets in contact with the material.

The correct amount of support material must be used for the construction. The following applies:

Weight of cargo < 3 t = min. 4 beams lengthwise + 2 across
Weight of cargo > 3 t = min. 6 beams lengthwise + 2 across

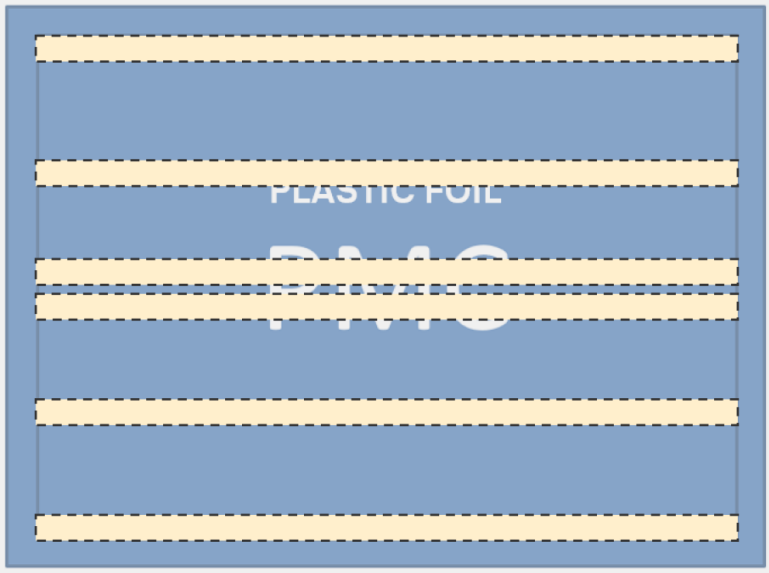
The structure of a PMC with 8 Euro pallets is shown on the following pages. 6 bars lengthways + 2 bars across are used:

Place plastic foil on the PMC

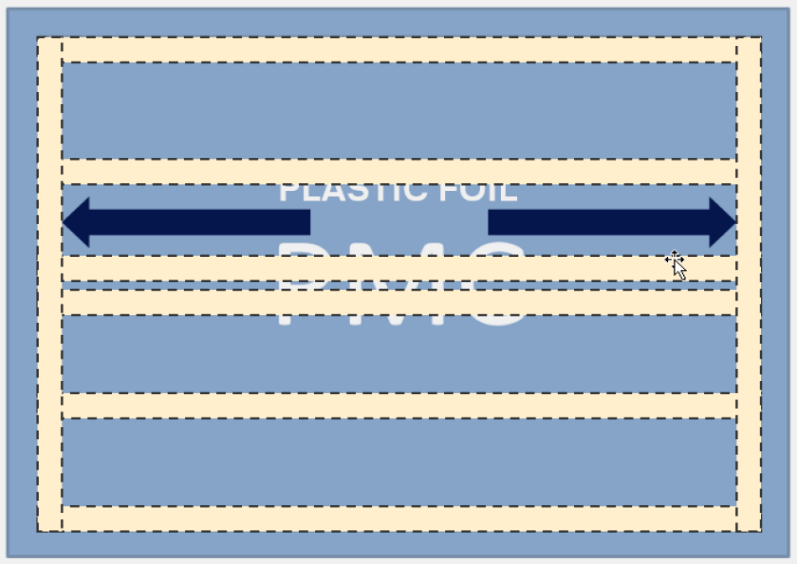


Distribute 6x PN066 evenly on the PMC.

Important! There must be two bars next to each other in the middle

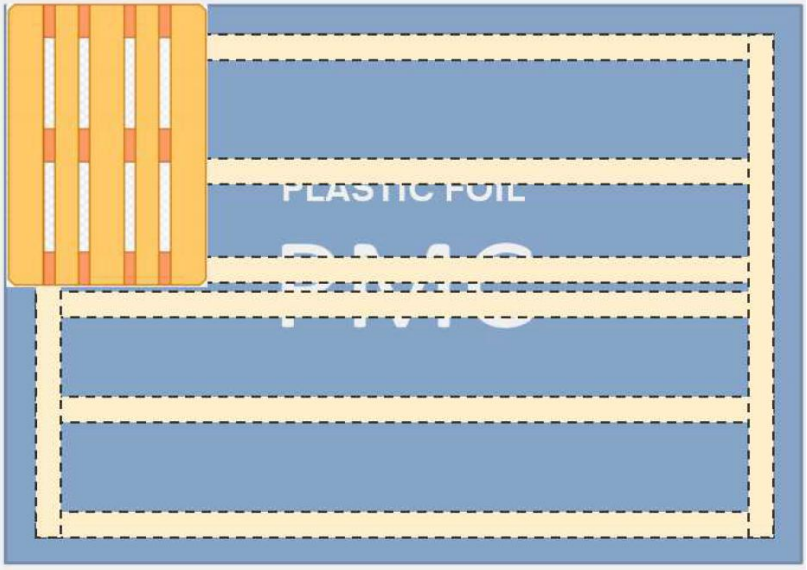


Place 2x PN065 crossways at the ends of the long beams

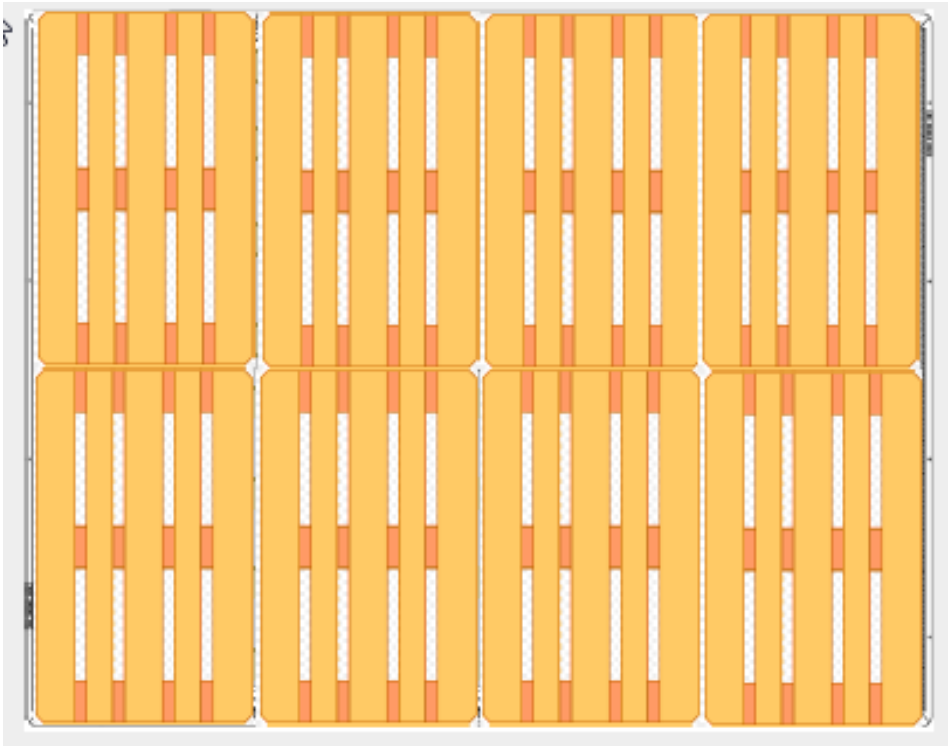


Load the Euro pallets flush with the PMC on the right and left. The outer bars of the Euro pallet hang in the air, but inside they rest on the PN065.

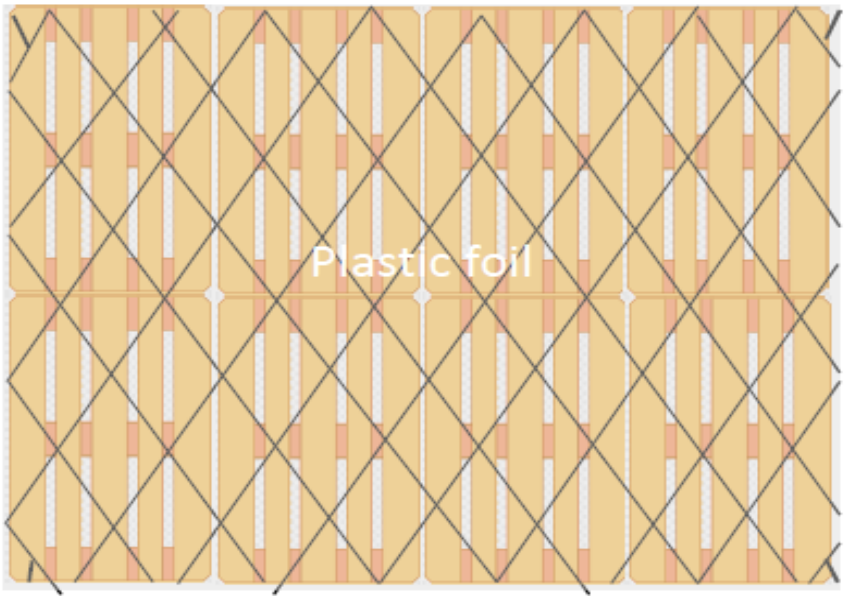
See next picture



Load all 8 Euro pallets onto the PMC

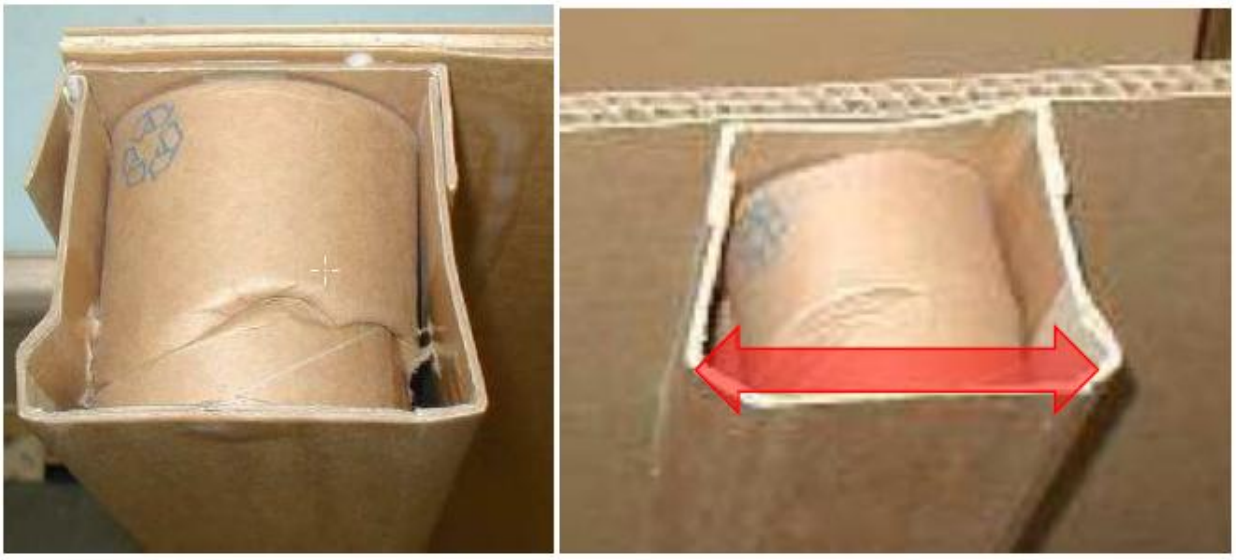


Close the cargo with plastic foil and lash the PMC with a net



Before use, check the material for damage

The material is damaged if the inner rollers are crushed, the width of the bars increases, or the material has gotten wet ..
- Do not use the material if it is damaged! -

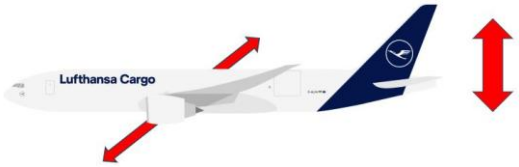


Dispose of unserviceable material locally!

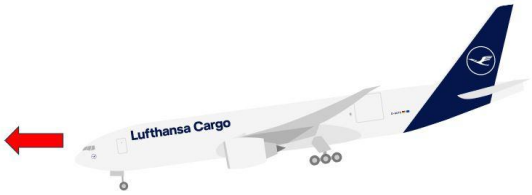
7. Lashing

During take-off and climb the aircraft will experience a backward force.

During flight the aircraft may experience turbulence. These are the Up and Down and Lateral forces.



During decent and landing a forward force appears.



Primary Lashing versus Standard Lashing

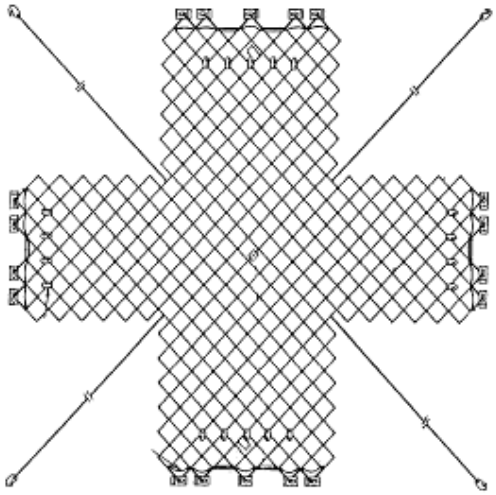
For Primary Lashing on a pallet a pallet net must be used.
If the shape of the cargo does not allow the usage of a net, please contact Lufthansa Cargo for further information.

Only use Standard Lashing with straps or ropes:

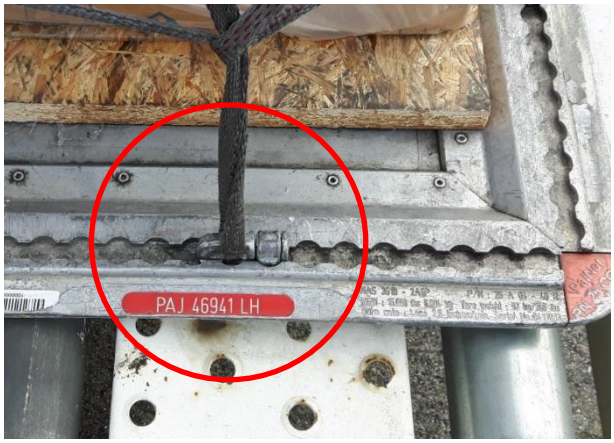
- under a net on a pallet if the pallet base is not fully used
- in a container

Primary Lashing on a pallet

All pallets with the appropriate net will be provided by Lufthansa Cargo.



Preferably Lufthansa Cargo nets are to be used on Lufthansa Cargo pallets. If you use a pallet net from other airlines, please refer to the regulations in chapter 5, epsecially the weight limitation up to 3000 kg.



On the pallet edge net attachment points are located. These markings tell where the net has to be fixed to the pallet, 5 fittings on the long side and 4 fittings on the shorter side of the LCAG 88/96” pallets. All net fittings must be utilised.

All 4 corner lashing lines have to be available (not missing or damaged).

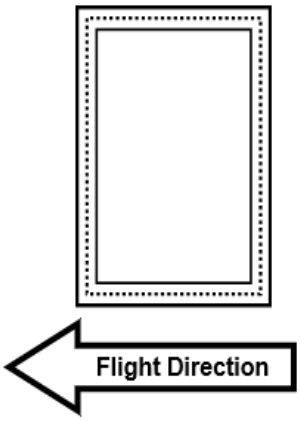
It is not allowed to increase the length or repair the nets with ropes or straps.

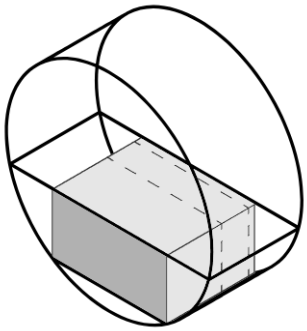
Standard Lashing under a pallet net or in a container

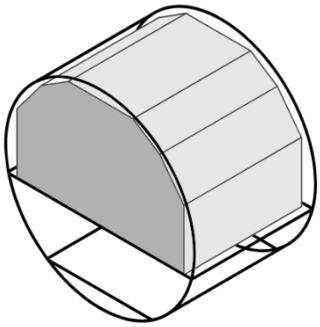
Standard lashing with straps or ropes is used on a pallet under the net or within a container to avoid cargo from shifting, e.g. if the pallet base is not fully used or if the container is not fully loaded (less than ¾ of its height).

For standard lashing it is essential that you consider the flight direction.

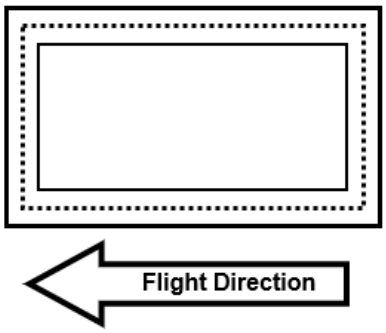
Lower Deck (all aircraft) and Main Deck A321F:
ULDs are loaded **laterally** to flight direction.

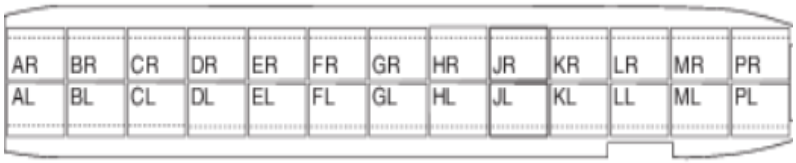






Main Deck B777F:
ULDs are loaded **longitudinally** in flight direction.





For Standard Lashing (under a pallet net or in a container) use:

- 4 tie-down rings (PN001) with 4 tie-down ropes (PN040)

OR

- 4 tie-down straps (PN035 or OAL)

AND

- 1 safety rope (PN040 or OAL)

In either case use:

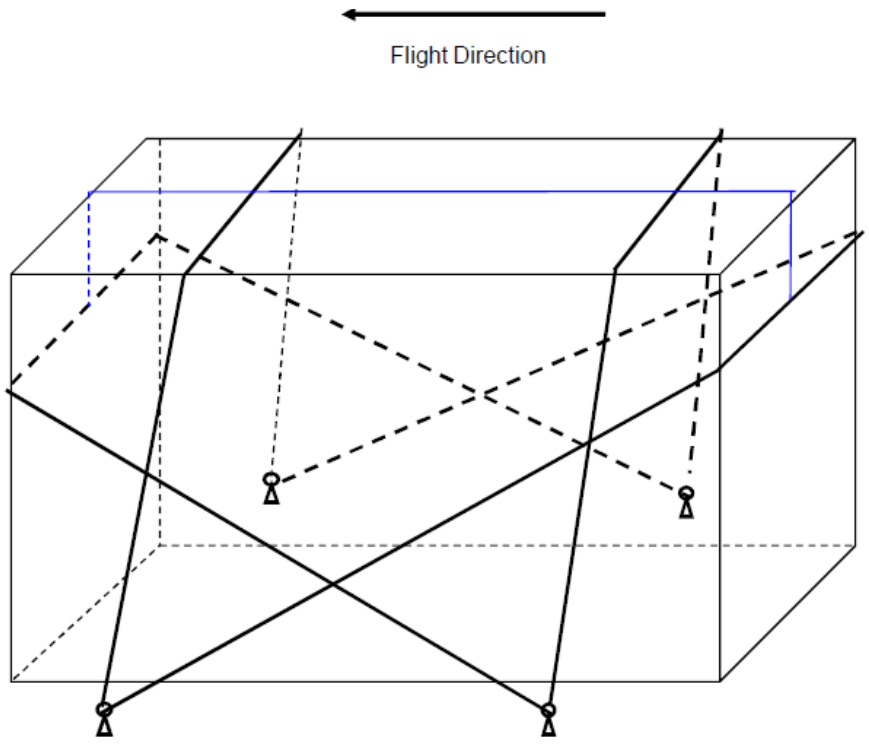
2 against upward forces

1 against forward forces

1 against backward forces

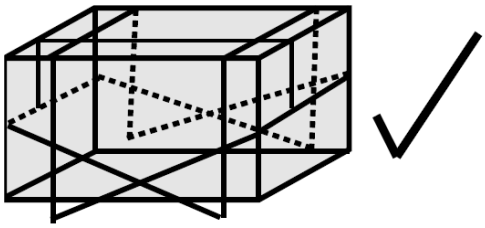
Lateral forces are not considered here, these are secured by the net resp. the container walls.

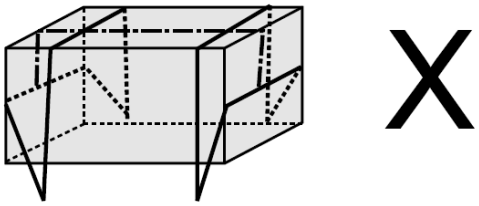
To prevent any carefully positioned lashing material from slipping down the sides we must use an additional rope which is called the safety rope.



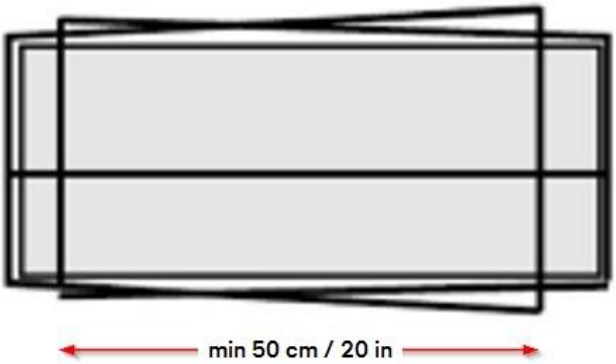
Principles of the standard lashing:

- Always lash the longest way around

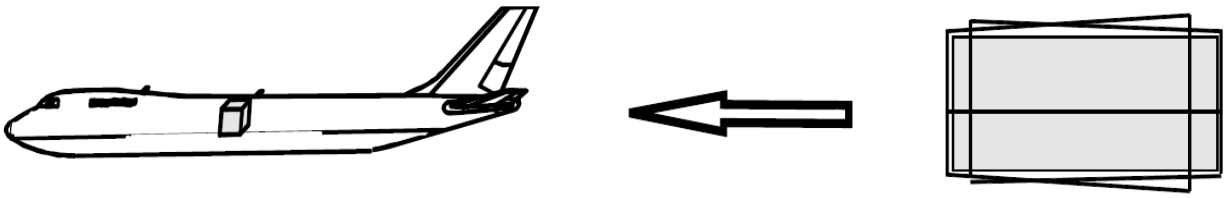




- Keep a minimum distance of 50cm (20 in) between tie down fittings pulling in the same direction.



- The safety rope must always point in flight direction.



When lashing material with an additional hook is used, the hook must always be hooked into the strap or the pallet net to avoid damage to the Cargo Loading System of the aircraft.

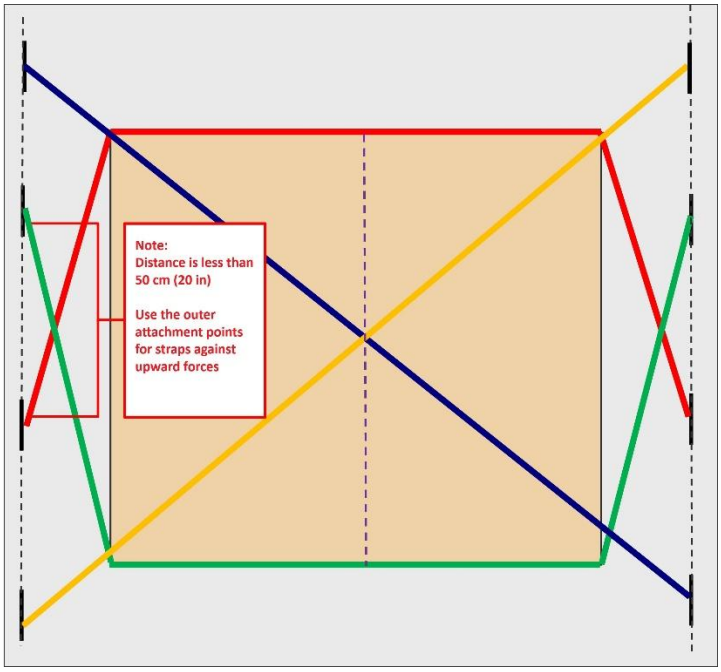
Standard Lashing in Containers

New container types have 8 or more attachment points. Here lashing with straps (PN035 or OAL) is preferred.

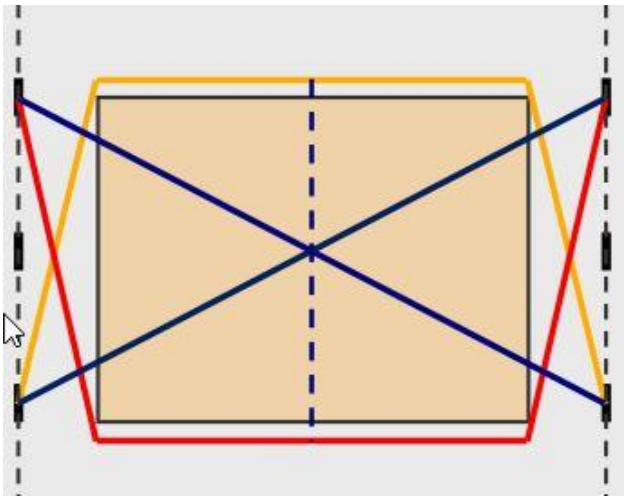
The distance between the attachment points is less than 50 cm (20 in).

Use the outer attachment points for the 2 straps against upward forces.

This assures keeping the minimum distance for straps pulling in the same direction.



Older container types have less than 8 attachment points for tie-down fittings / straps. Here standard lashing in a container is only possible with the use of PN040‘s in conjunction with PN001 (as seen in the picture below).



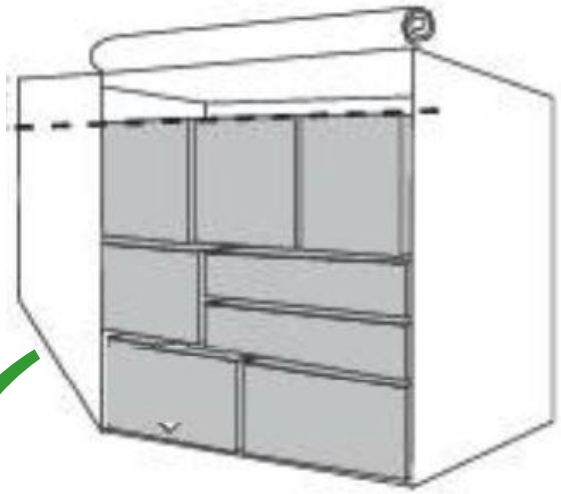
If Standard Lashing is not possible in a container, it is best to load that cargo onto a pallet.

Lasing in containers is required if

- a single piece can be damaged when tilting or moving, **OR**
- heavy pieces might damage other cargo or the container.

Lashing in containers is not necessary if

- the container is filled with mainly small and light pieces, **OR**
- the container is completely filled, but at least up to 3/4 of the internal height.



Pipes and Bars

- Metal pipes and metal bars may not be loaded in pre-built units.
- Pipes and bars made out of other materials and beams or similar pieces (e.g. small and long wooden boxes) must always be loaded opposite to the flight direction (laterally).
- Loading these pieces in flight direction (a longitudinal loading) is not allowed due to safety reason.
- Because of their small cross section they might go through the pallet net meshing or through the forward or aft compartment walls.
- When pipes and bars are loaded, both ends must be secured with a tie-down spider (PN 039 - available from Lufthansa Cargo). At least 2 Tie down straps (PN035) per PN039 are fixed through the rings of the tie-down spider and then to the pallet base. (ex: if 2 PN035 are used, each PN035 goes through 4 rings of the PN039)
- Finally, a net is thrown over the whole pallet load.

PN039 (Tie-down spider)

Capacity Upwards: 750kg

Capacity Forwards: 1500kg

Capacity Backwards: 1500kg

Max. Life Time 3 Years

8. Loading Principles

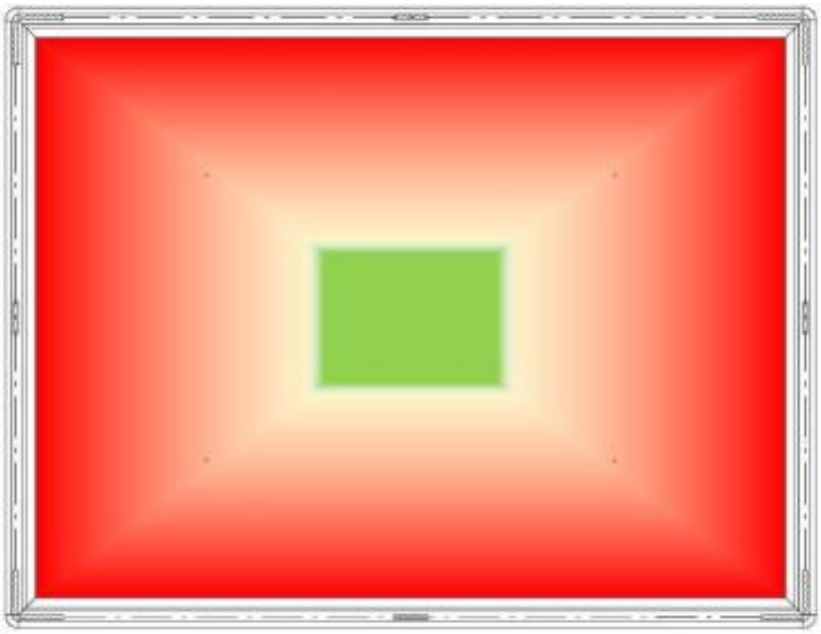
- Before using a ULD the serviceability MUST be examined.
- ULDs must be handled with utmost care.
- ULDs must only be loaded onto ULD Transport dollies or other appropriate roller bed equipment.
- All shipments loaded inside a ULD must be destined to the same unloading station.

- If possible all pieces belonging to one shipment (AWB) should be loaded in the same ULD.
- Big and heavy pieces should be on pallets and small handy pieces in containers.
- Heavy and sturdy pieces are to be loaded as a first or bottom layer. They should be stowed towards **the centre of the pallet**.

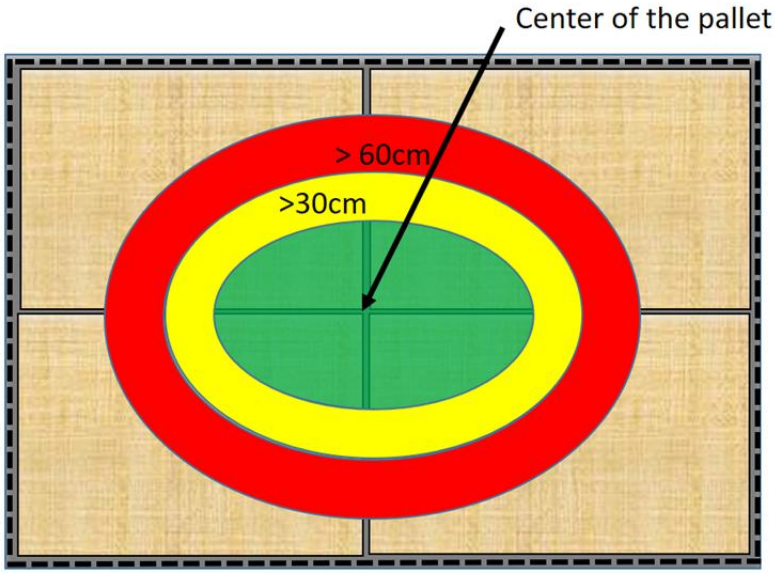
- Use bricklayer method to stabilise cargo, whenever possible.

Centre of Gravity

What is “Centre of Gravity” (CG)?
Why is it so important to pay attention to this?
What are the consequences of not paying attention?



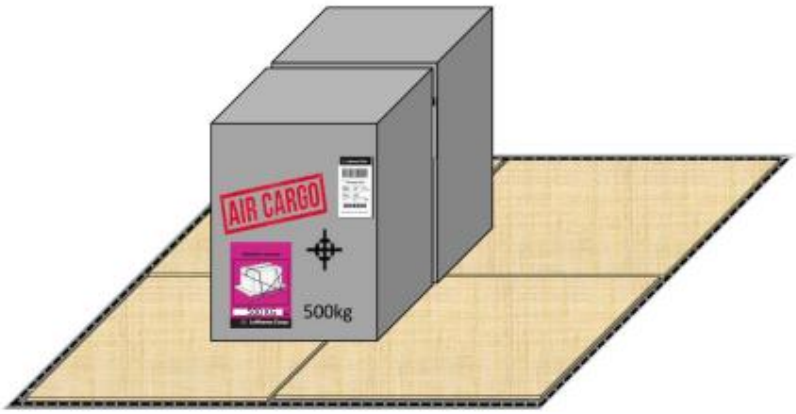
CG is the center of the pallet. Where the most weight can be installed without the pallet (container) losing stability

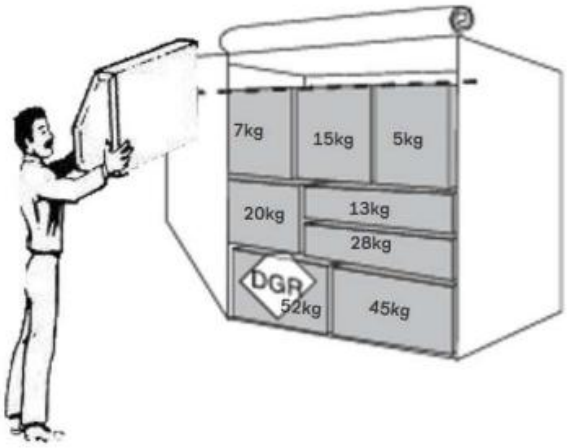


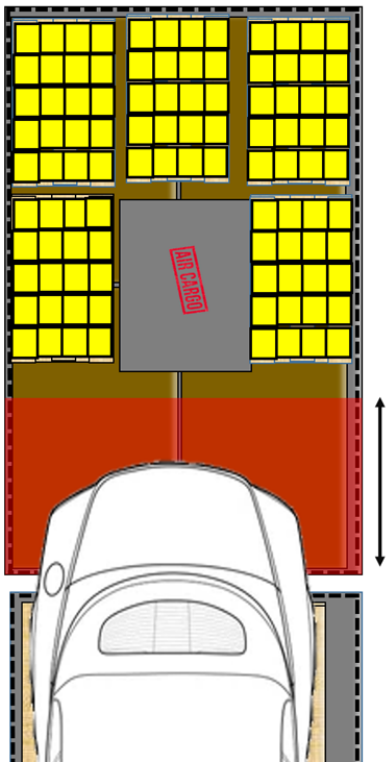
The further away you are from the CG, the less weight you can use

- Heavy pieces are often marked with this symbol

- Marking for CG on the package
- Build this mark as close as possible to the middle of the pallet. Lighter cargo can then be added to it




7kg
15kg
5kg
20kg
13kg
28kg
DGR
52kg
45kg


AIR CARGO


500 kg


500kg

Not built towards the middle...

...the consequences would be:

- Secure small pieces properly so that they cannot slide through the pallet net meshes.
- If necessary, cover the load with a plastic net with small meshes (not provided by LCAG) before applying the normal pallet net.

- Light pieces are to be loaded on top of heavy pieces to lessen the chance of damage.

- Keep the tie down rail on the pallet rim free of load to enable the attachment of the tie down equipment. This is also important for the correct locking of the ULD in the aircraft.

- When loading pieces with a base of metal, supporting planks/platforms must be used to avoid the piece slipping (may need lashing).

- Supporting planks/-platforms must also be used when loading heavy pieces with a small contact area in order to enlarge the contact area and ensure smooth loading of the ULD into the aircraft.

HEA - In General

HEA (from 150kg) must be secured or lashed to prevent any movement during take-off, in flight and landing. Always remember that usually you are lashing the outside box and not the contents. That means if the box has been damaged and/or the box obviously cannot restrain its contents during transport then it must be repaired/replaced before it can be accepted for loading

Loading on Pallets (the preferable alternative)

- HEAs should be stowed towards the centre of the pallet
- Lashing with a pallet net
- Lashing material should be sufficiently tightened without bowing the pallet.
- Consider the Maximum Floor Load and use spreading if required.

Loading in Containers

HEAs must be carefully loaded to avoid damaging the ULD itself.
Be especially careful when loading into RKN, RAP and RLP containers.

- HEAs must always be lashed if the container is filled up to less than 3/4 of the internal height
- Consider the Maximum Floor Load and use spreading if required.

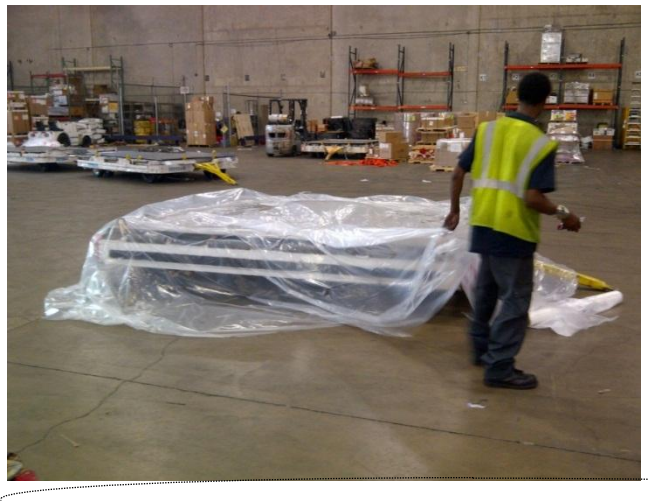
Securing of cargo loaded on a pallet

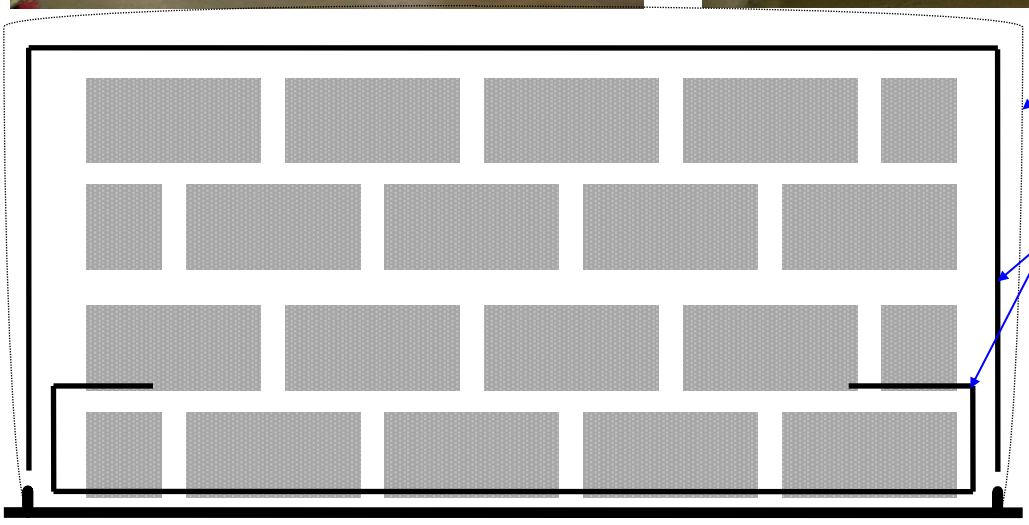
Cover the base of the pallet with plastic.

Cargo is to be protected against rain and snow by using plastic foil or sheeting. The plastic sheeting underneath must be tucked in between the first and second layer of cargo.

The plastic sheeting over the top must be pulled down so that it covers the plastic protecting the bottom layers. To keep the plastic in place and to avoid it hanging over the edge of the pallet, we suggest using adhesive tape. Afterwards make sure that there are no tears or holes in the plastic, otherwise start over again.

Exception: This is not valid for AVI (such as baby chicks), PEF, PEP.
For PEP and PEF – Make sure, that the plastic foil on top does not cover more than the sides of the top layer in order to ensure a sufficient air condition.
Nets and straps should be tensioned without damaging the cargo, or bending





Securing of cargo within containers

Cargo must be stacked accordingly so that it does not fall out of the container when the door is opened. Also cargo loaded in containers which have a flexible door must be skillfully loaded to avoid pressing against the tarpaulin door or deforming the shape of the container.

Logger and Tracker

It is only allowed to use Logger and Tracker, which are approved by the concerned operator (see IATA TACT Rules).

The shipper/forwarder has to check this before every booking; the agent has to check this before every ULD B/U under:
Lufthansa Cargo homepage (https://www.lufthansa-cargo.com) under “Industries” and “Customer-owned Tracker” see https://lufthansa-cargo.com/add-on-services/customer-owned-tracker

Request to LCAG:
Is the preferred Logger/Tracker not available (or cannot be dedicated), a request can be filed to Lufthansa Cargo (see homepage).

Is the preferred Logger/Tracker not approved by the specified operator, it is not allowed to use this.

Documentation:
Is the preferred Logger/Tracker approved by the specified operator before the booking, is a documentation due to the valid regulations (IATA DGR, IATA TACT rules, etc.) necessary (e.g. AWB).

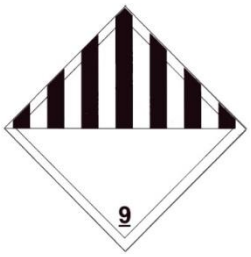
Handling and Serviceability
The shipper/forwarder must ensure that, in addition to the existing acceptance of the logger/tracker, it has been extensively checked for damage in a documented process prior to B/U for an ULD and that the logger/tracker is assembled in such a way that damage is ruled out.

9. Special Loads

Shipments are termed “Special Loads” if their nature requires special precautions to protect

***the aircraft** ***handling personnel**
***other consignments** ***and the shipment itself**

Or which, due to their urgency, require priority handling.



Loading of Dangerous Goods (DG) according to IATA/DGR 9.1.4.1

As per Lufthansa Cargo regulations, an operator must not accept from a shipper a unit load device or a freight container containing dangerous goods other than:

a) freight container for radioactive material (see Appendix A – IATA DG Regulations);

b) ID 8000, Consumer commodities when prepared according to Packing Instruction Y963;

c) UN 1845, Carbon dioxide, solid (dry ice) provided that the unit load device does not contain dangerous goods other than UN3373, Biological substance, Category B or ID 8000, Consumer commodity or goods not subject to the Regulations;

d) UN 2807, Magnetized material;

e) UN 3373, Biological substance, Category B prepared according to Packing Instruction 650;

f) UN 3245, Genetically modified organisms, Genetically modified microorganisms prepared according to Packing Instruction 959;

g) Lithium ion, sodium ion or lithium metal cells and batteries meeting the provisions of Section II of Packing Instructions 966, 967, 969, 970, 977, 978

h) UN 3164, Articles, pressurized, hydraulic or Articles, pressurized, pneumatic prepared according to Packing Instruction 208 (a);

i) Dangerous goods in excepted quantity prepared according to Subsection 2.6.8;

j) jRadioactive material, excepted packages, prepared according to Subsection 10.5.8.

LH Operator Variations for DG (IATA DG Regulations 2.8)

Variations of Deutsche Lufthansa/Lufthansa Cargo AG are:
(this is a shortened list for those items allowed on a BUP ULD)

LH-01 Dangerous Goods in “Limited Quantities” will not be accepted for carriage (Exception: Consumer commodity, ID8000).

LH-03 Biological substance, Category B (UN3373) will not be accepted in air mail.

LH-08 Lithium Batteries will only be accepted under certain conditions.

Full information for the above mentioned Lufthansa Operator Variations may be found in the IATA Dangerous Goods Regulations 2.8

Transportation of Dangerous Goods

Before loading

Before loading on pallets or into containers:
Inspect the packing of dangerous goods to ensure that it has no holes, leakage or other indication that the package has been damaged.

Loading

➢ Handle dangerous goods with utmost care to prevent any damage to persons or goods.

✓ Strictly observe all special handling instructions (labels or imprints), for example 'This Way Up!' or arrows showing the proper orientation of the package.

✖ Do not distribute dangerous goods in such a way that pieces on top of the dangerous goods can damage the dangerous goods piece by their weight or edges, other load underneath the dangerous goods can be damaged by the dangerous goods (for example dangerous goods in barrels)

✖ Do not load dangerous goods on or overlapping the **pallet edge,** even if they are stacked up. Observe this rule also for the **overhang** of lower deck contours, if using a pallet without side extensions


FLAMMABLE GAS
2

x

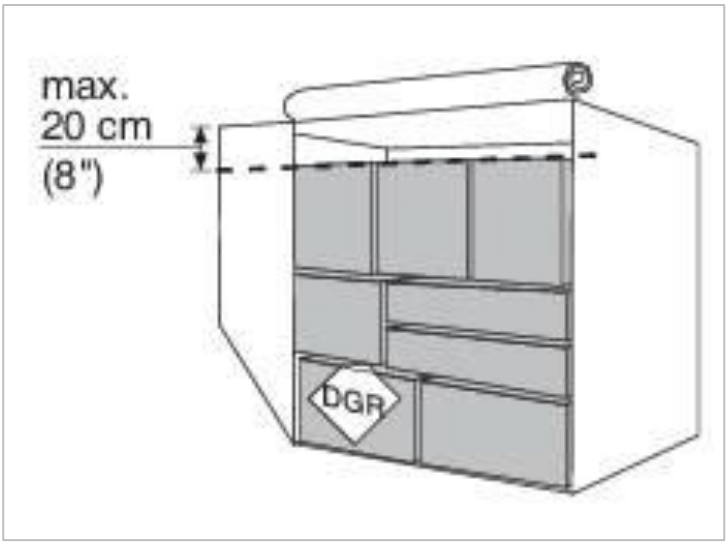

Ethyl formate
UN1190
FLAMMABLE LIQUID
3
4D/X/8/S/10
NL-NNB/168

Lashing Tie down dangerous goods.
Do not damage the package by lashing it too tightly.

Exceptions:

- On a **pallet** additional lashing is not necessary if all load on the pallet including the dangerous goods package is secured by the pallet net.

- In a **container** lashing is not necessary if the package cannot move horizontally or vertically.
  This is the case if he container is filled completely with other load
  - on the entire floor area **AND**
  - up to at least 3/4 of the internal height



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- Each Dangerous Goods shipment must be packed, marked and labelled according to the IATA-Dangerous Goods Regulations.

- Special care must be taken from acceptance to delivery to avoid any damage of the package.

This metal drum has not withstood the pressure of the cargo, loaded on top.

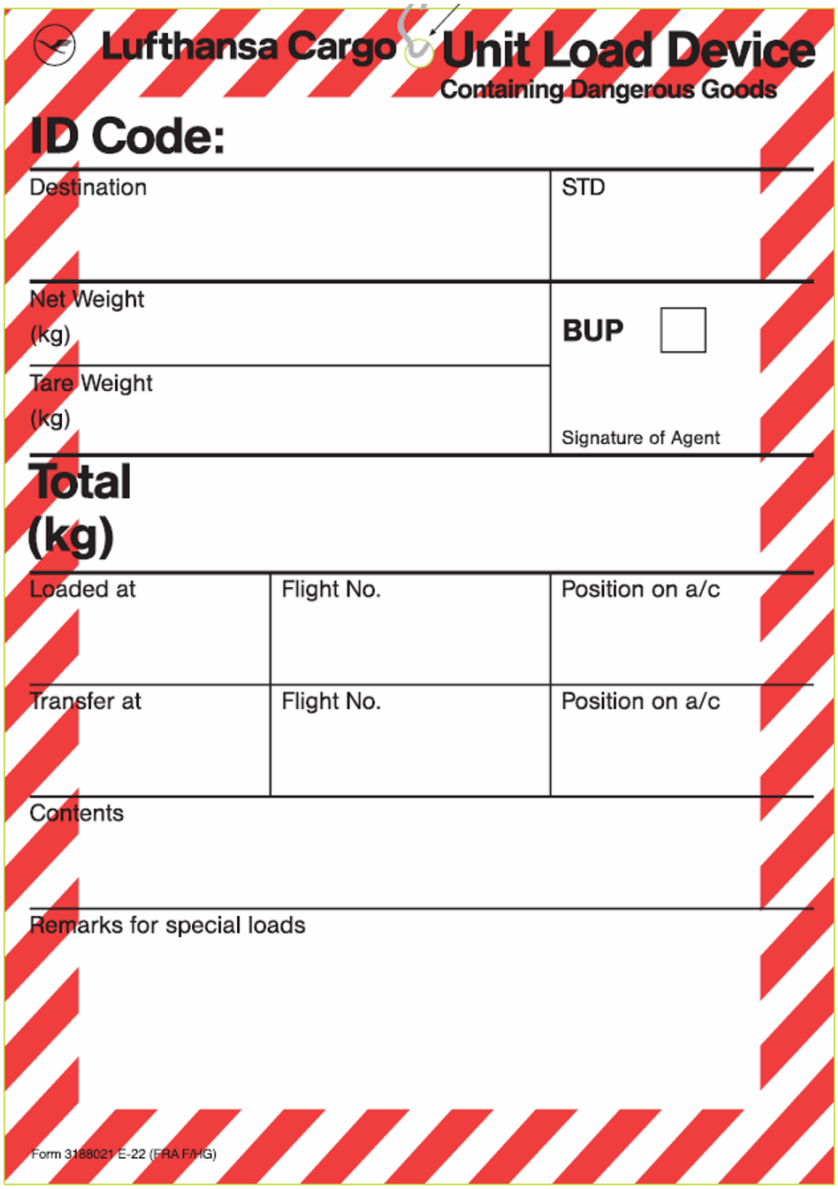
The fibreboard box had been damaged by the tightening of the net.

- Never load DG directly to the floor of a ULD… use supporting planks/platforms to raise the DG up off the base of the ULD (to avoid it becoming wet … due to snow/rain).

- Only packed (e.g. fibreboard box) dry ice may be used for cooling of cargo other than dangerous goods. This is also applicable inside insulating containers.

- If the dangerous goods are spread over several ULDs, the respective quantity (kg/L) per ULD must be entered separately in the ULD Tag.

For all units containing UN1845 (Dry Ice) and ID800 (Consumer Commodity), the ULD Tag for DG must be used.


Lufthansa Cargo

Unit Load Device

Containing Dangerous Goods

ID Code:

Destination		STD
Net Weight (kg)		BUP ☐
Tare Weight (kg)		Signature of Agent
Total (kg)		
Loaded at	Flight No.	Position on a/c
Transfer at	Flight No.	Position on a/c
Contents		
Remarks for special loads		

Form 3188021 E-22 (FRA F/HG)

Excepted Lithium / Sodium Batteries according to Section II

The following UN numbers and Proper Shipping Names exist:

UN Number	Proper Shipping Name	Packing Instruction	Section
UN3481	Lithium ion batteries **packed with** equipment (ELI)	966	II
UN3481	Lithium ion batteries **contained in** equipment (ELI)	967	II
UN3552	Sodium ion batteries **packed with** equipment (ELI)	977	II
UN3552	Sodium ion batteries **contained in** equipment (ELI)	978	II
UN3091	Lithium metal batteries **packed with** equipment (ELM)	969	II
UN3091	Lithium metal batteries **contained in** equipment (ELM)	970	II

All packages containing ELI/ELM must be loaded on Lower Deck ULDs.

Never accept and/or load damaged packages!

Build-up of Baby Chicks (AVX)

Protection

Bad weather conditions, especially direct sunlight, rain, wind or cold are harmful to day-old chicks.

Loading on a pallet

- Boxes must never have direct contact with the pallet surface.
- Put at least one layer of insulating material between the boxes and pallet surface.
- Load chicken boxes with their longer sides parallel to the longer pallet side.
- For air circulation leave spaces of at least 10cm / 4” between the rows of boxes
- Use spacers if available

- Max height for ULD on wide body aircraft is 150cm / 59”

Special permissions can be obtained for units containing the following special loads:

Special	Permission by
Vulnerable Cargo (VUN)	Local Cargo Handling Manager
Perishable Cargo (PER)	Local Cargo Handling Manager
Items on wheels	Local Cargo Handling Manager
BUP 500+ only: Vehicles (no electric and no hybrid electric) additionally: Over Wheel Lashing	Local Cargo Handling Manager Local Cargo Handling Manager

Build-up of VUN (with special permission

Vulnerable Cargo (VUN):

✗ **Weapons, weapons parts and ammunition are never allowed in Shipper Built ULDs.**

- You are only allowed to deliver VUN BUPs in complete ULDs (only after **special permission** has been granted!) VUN BUP cargo as overflow is not allowed!
- Load vulnerable goods preferably into containers
- Additional lose packages (overflow) are not permitted.
- protect the vulnerable goods with two layers of plastic foil if it is loaded on pallets

Build-up of PER (with special permission)

Perishable goods (PER) – Handling Code for all perishable products

- **EAT** Food for human or animal consumption (which isn't PEP, PEM & PES)
- **PES** Fresh fish and seafood
- **PEM** Meat or Meat products
- **PER** Other sensitive cargo (i.e. medicines, serum, blood plasma)
- **PEF** Fresh flowers and plants
- **PEP** Fruit and vegetables

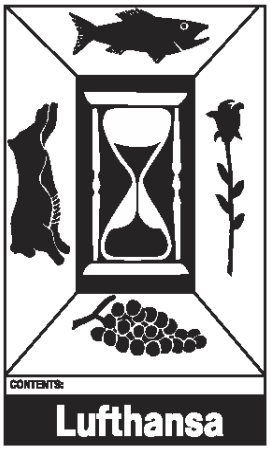
Build-up of PER

Consider the following for perishable goods:

- All of them need to be labelled with this IATA label
- perishable goods must be properly packed
- Must be loaded in a way that the weight of the upper layers does not damage the lower layers
- the pallet is built in such a way that the contour remains intact

Some special handling rules for PEF (flowers and plants) and PEP (fruit and vegetables):

- Do not load flowers next to fruit or vegetables
- Make sure that there is space for sufficient air circulation between the packages
  (important for fresh fruit and vegetables with high moisture, e.g. grapes, berries and salad)
- If pallets with flowers, plants, fruits and vegetables are covered with a plastic foil for weather protection, make sure that the foil does not cover more than 50cm (20”) from the upper rim of the contour to ensure a sufficient air circulation



Special handling rules for WET cargo:

- "Wet Cargo" is defined as goods, which contain liquids or which may leak liquids or give off moisture.
- Examples:
  - fresh and frozen meat,
  - fresh, salted or frozen fish/seafood packed with wet ice,
  - flowers, vegetables or fruits from which liquids can escape.
- Handling: cover the floor of the ULD with absorbent sheets (PN 106).

Build-up of Active Temp Control or Passive Temp Support

Healthcare products, such as Pharmaceuticals, will be booked as Active Temp Control or Passive Temp Support

- No mixture between ACT and PAS is permitted nor with other commodities.
- In the case of PAS or PER shipments, thermal foil may be used instead of the transparent foil.

.

The following temperature ranges are possible:

- **ERT** Extended Room Temperature (+2 to +25°C)
- **CRT** Control Room Temperature (+15 to +25°C)
- **COL** Cool Goods (+2 to +8°C)
- **FRO** Frozen Goods (-20 to -10°C)

(PPH and PPL settings are also allowed/possible for Perishables)

Refrigerating Containers:

Unicooler – RAP (LH)

Base dimension:	224 x 318cm / 88 x 125in
Height:	163cm / 64in
Max Gross Weight:	4000kg
Max Dry Ice in Bunker:	320kg

Opticooler – RAP (LH)

Base dimension:	224 x 318cm / 88 x 125in
Height:	163cm / 64in
Max Gross Weight:	4000kg
Max Dry Ice in Bunker:	n/a

Refrigerating LD3 Containers:

Unicooler – RKN (LH)

Base dimension:	153 x 156cm / 60,4 x 61,5in
Height:	163cm / 64in
Max Gross Weight:	1500kg
Max Dry Ice in Bunker:	120kg

Refrigerating LD6 Containers:

RLP (PC)

Base dimension:	153 x 318cm / 60,4 x 125in
Height:	163cm / 64in
Max Gross Weight:	3000kg
Max Dry Ice in Bunker:	n/a

Refrigerating Containers (RAP, RKN, RLP):

✗ A refrigerating container is not serviceable, if it has

- any parts missing or

- more than **two** missing or loose rivets in the container base **next to each other**, or

- a hole or crack in the base (underneath or inside the container) or

- a damaged door sealing or

- a hole or crack in the side panels or roof panel.

Following have to be observed if a refrigerating ULD (RAP/RKN/RLP) is used:

- check the temperature setting
- make sure that the bottle for condensation water inside the container is empty
- the fan is working
- the fan is not blocked with other cargo
- the internal maximum loading height is observed (bottom edge of the fan)
- Secure load to avoid damages
- Use slave pallets, dollies or rollerbeds (for handling and transportation, e.g. truck)
- Connect to power whenever possible
- During interim storage exceeding 4 hours connect container always to electric power
- Do not place containers on ground
- Do not push containers with forklift
- Container may only be transported with a forklift, when the forklift blades are long enough to go all the way through the forklift feet
- Do not lift a loaded RLP/ RAP from the short side and or door side due to the weight of the refrigeration system to avoid damaging of the container.
- Do not stack containers
- Do not topload containers

If Dry Ice (ICE) is loaded in the dry ice bunker and/or inside the insulating container:

- the net quantity of dry ice loaded in the dry ice bunker per ULD must be inserted in the AWB
- always use the DG ULD Tag
- in addition to other required information, under “Remarks for Special Loads” The following must be entered:

ACT.9/ICE/plus net quantity of dry ice

Items on wheels (with special permission)

Cargo which is loaded on wheels, may only be loaded onto a BUP when an exception has been granted.

This type of load must not stand on its own wheels and must be built up accordingly so that the wheels do not touch the ground.

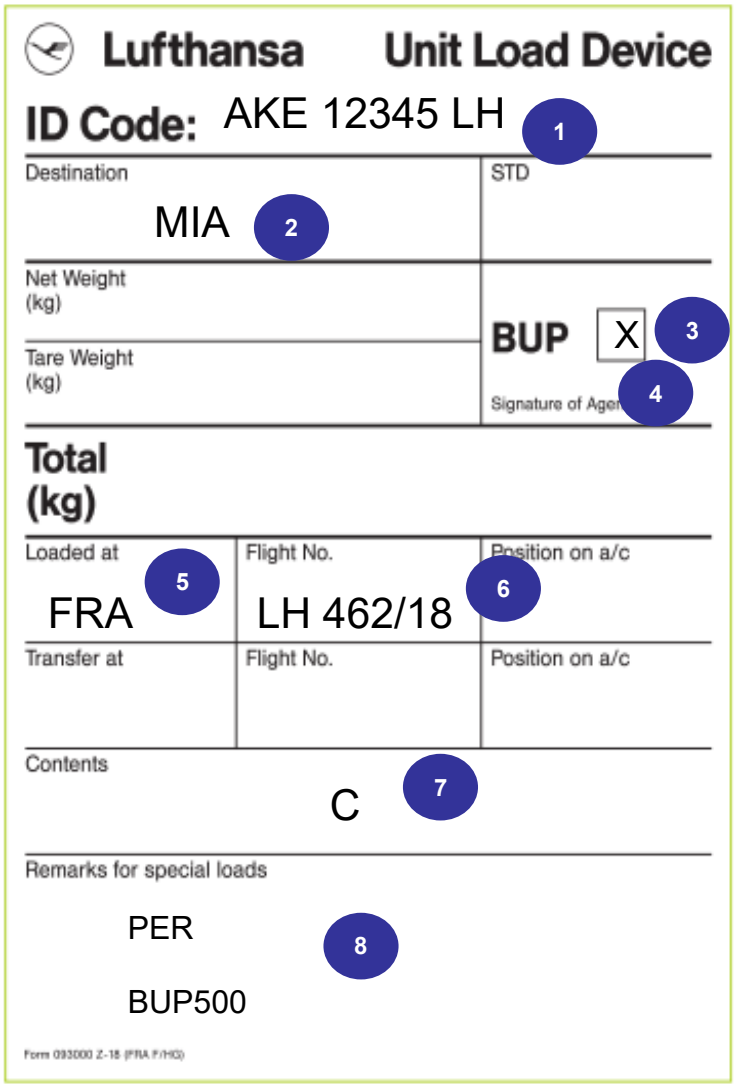
10. ULD Tags

The Lufthansa ULD Tags are mandatory for all ULDs. Alternatively, the IATA ULD Tags may be used.

BUP Agent's responsibility:

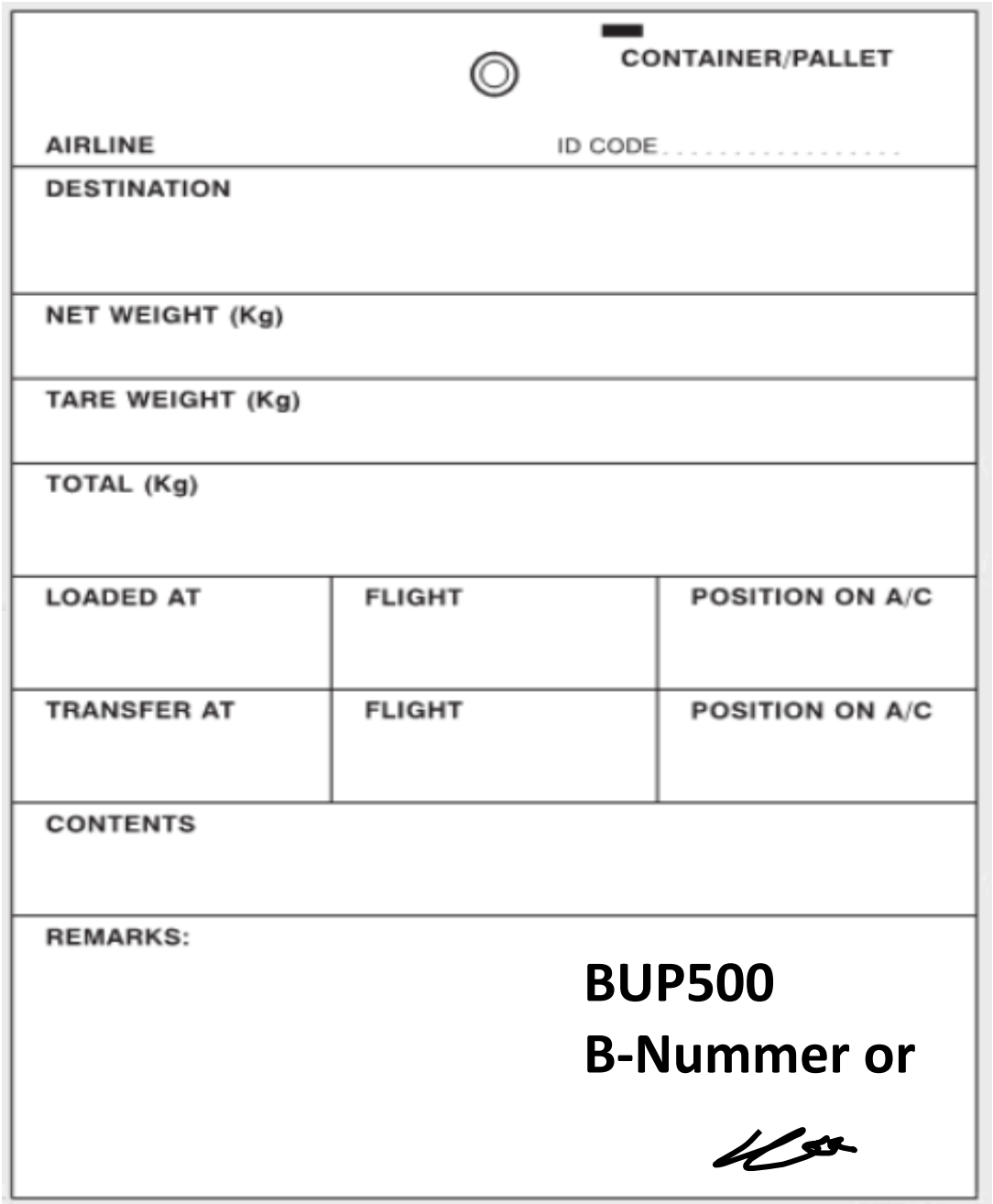
- must be BUP qualified
- necessary fields on the ULD TAG must be filled in
- to confirm that the ULD has been correctly built-up you must enter your B-Number, and if not available, the signature / name, as the agent takes full responsibility for the correct build-up (Point 4)

1. **ID-Code (ULD Number)**
2. **Destination (Airport of Destination)**
3. **Mark the BUP box with "X"**
4. **B-Number otherwise Signature/Name of Agent (Signature for correct build-up according to the LCAG guidelines / requirements)**
5. **Loaded at (Airport of Loading)**
6. **Flight No. (Flight number and date in local Time)**
7. **Contents „C" (= Cargo)**
8. **Remarks for special loads = Special Load Codes and <u>BUP License type</u>**



IATA ULD Tag for BUP units

If a BUP agent uses the IATA ULD Tag, the agent must also add their B-Number otherwise signature/name and license in the "Remarks" field.



Dangerous Goods

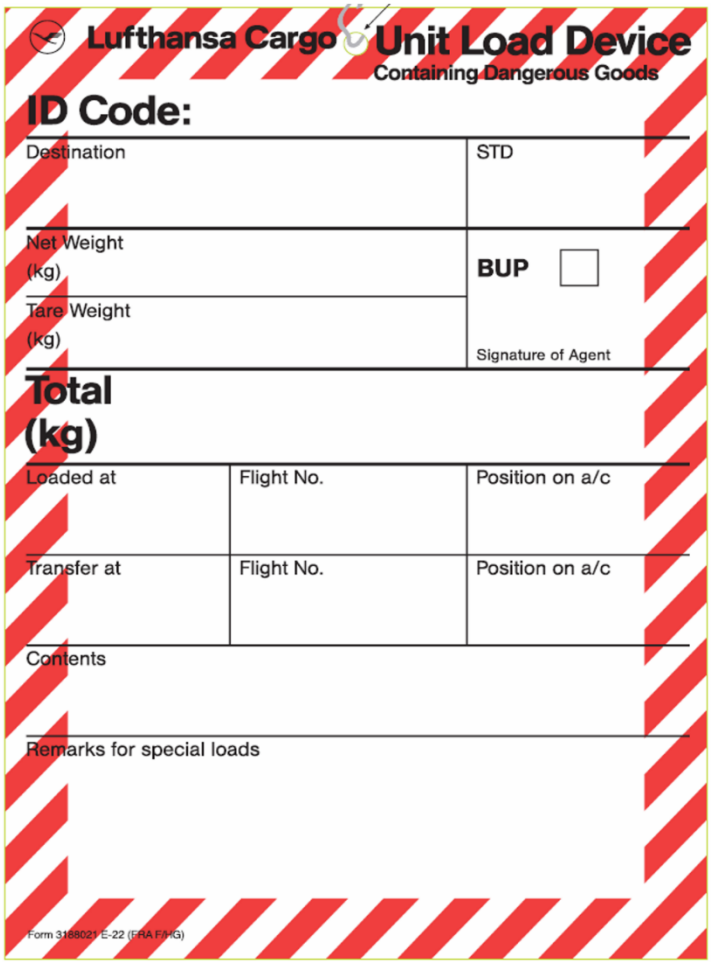
In the remarks column, DG must be entered as follows:

DG Class / IMP Code

Example: **9/ICE/45**

- For flights to/from/transiting the USA enter the net quantity of DG, i.e. **9/ICE/45** (net quantity ICE)

- if a RKN and RAP is used, the code ACT must be entered on the tag as well (ex: ACT.9/ICE/30)



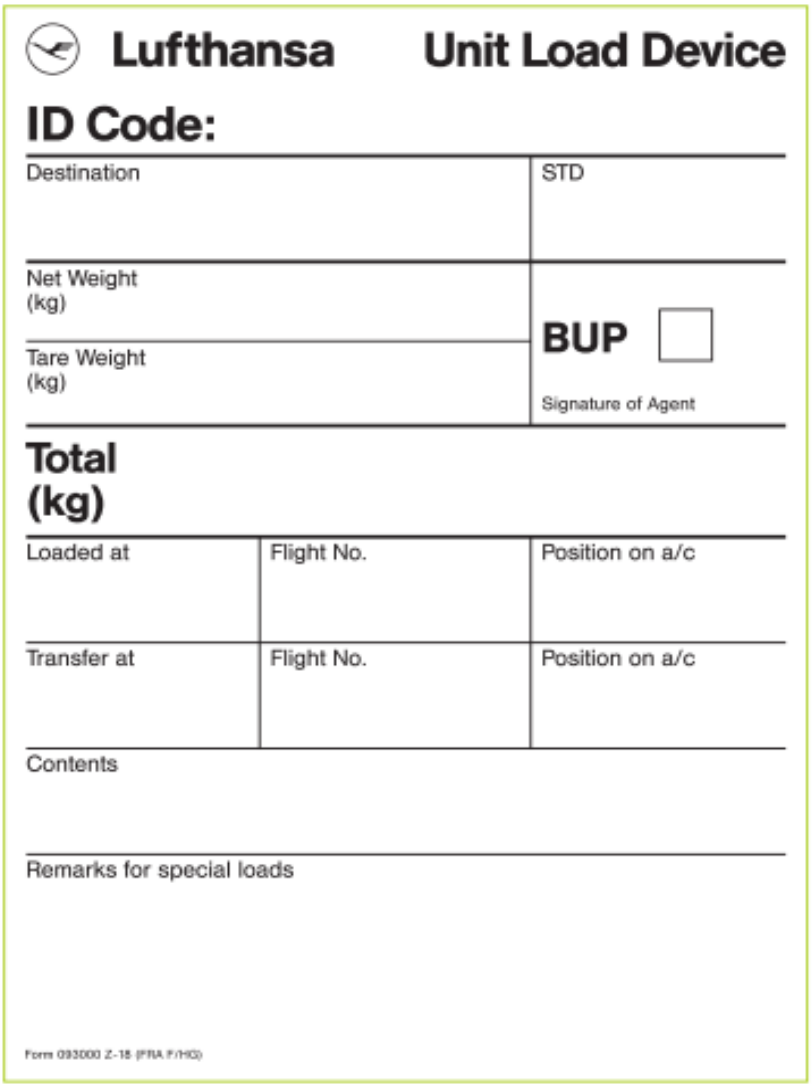
ELI/ELM

For Shipper Built ULDs containing excepted lithium or sodium ion and/or metal batteries a standard ULD Tag for general cargo must be used.

Enter applicable special code:

- ELI (UN3481 as per Section II)
- ELI (UN3552 as per Section II)
- ELM (UN3091 as per Section II)

in the remark field of the ULD Tag


Lufthansa Unit Load Device

ID Code:

Destination	STD
Net Weight (kg)	BUP ☐
Tare Weight (kg)	Signature of Agent

Total (kg)

Loaded at	Flight No.	Position on a/c
Transfer at	Flight No.	Position on a/c

Contents

Remarks for special loads

Form 093000 Z-18 (FRA F/HG)

Thru-units (an example)

A PAJ will be sent from LAX via FRA to DEL.

The ULD must be checked that the loadability (ULD, contour and maximum weight) for all different modes of transport will be possible.

Flight 1: LAX-FRA (B777F)
LH8049/today

Flight 2: FRA-DEL (A340)
LH760/tomorrow

LAX is the station where the build-up is taking place.

FRA is the station where the ULD is transiting.

DEL is the arrival station of the ULD

Lufthansa Unit Load Device

ID Code: PAJ36008LH

Destination: DEL		STD
Net Weight (kg)		BUP X
Tare Weight (kg)		
Total (kg)		Weight correctly established / Signature (LCAG or H/A)
Loaded at: LAX	Flight No.: LH8049/today's date	Position on a/c
Transfer at: FRA	Flight No.: LH760/tomorrow's date	Position on a/c
Contents: C		ULD correctly built-up / Signature (LCAG or H/A)

Remarks for special loads

BUP500

Form 2180023 A-07 (FRA F/CH) Printed in Germany

Alternatives to an already filled out ULD Tag by the forwarder/shipper:

1. The entire ULD tag information can be provided at Cargo Acceptance as a printed document or in electronic form (Excel, Word, PDF or accessible database).
   With this information the ULD Tag can be issued by our own staff/our handing agent.

2. The confirmation of the correct build-up (B-number, other unique ID, name) can also be given in the Handling Information of the AWB / FWB.

The alternative procedures must be agreed in advance with the local Lufthansa Cargo management.

Happy Loading!

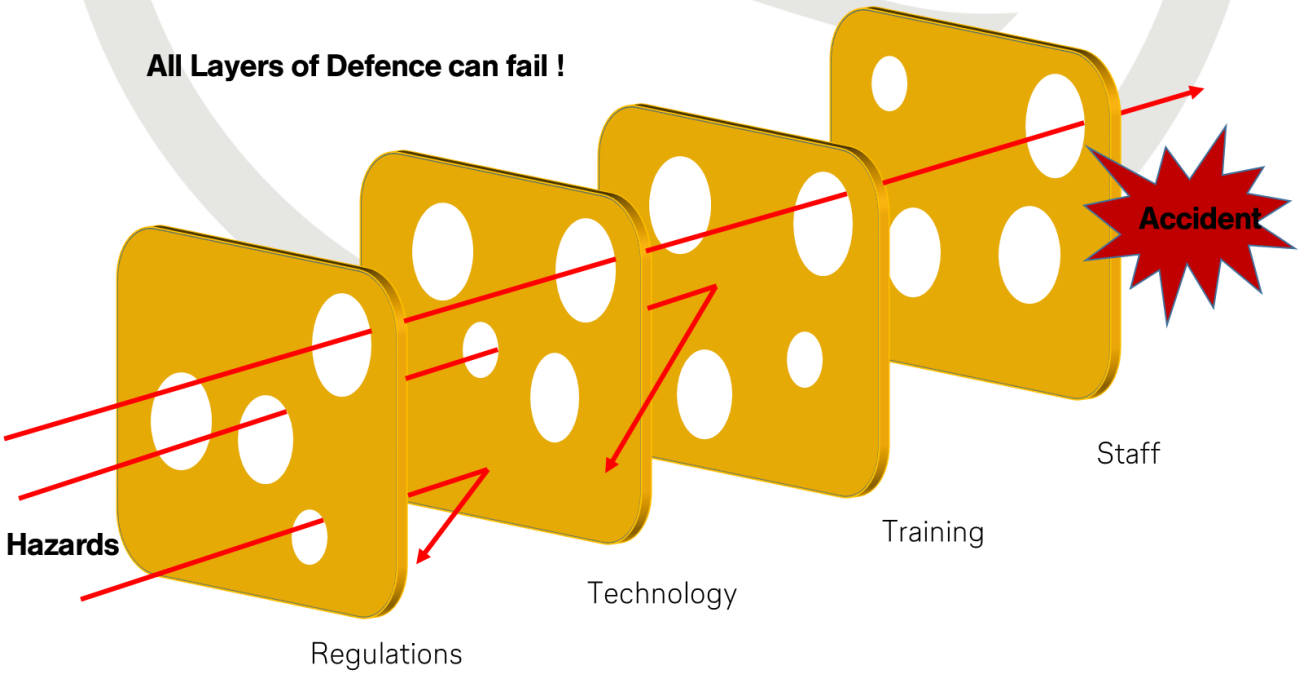
Appendix

THE HUMAN FACTOR

Humans are making mistakes

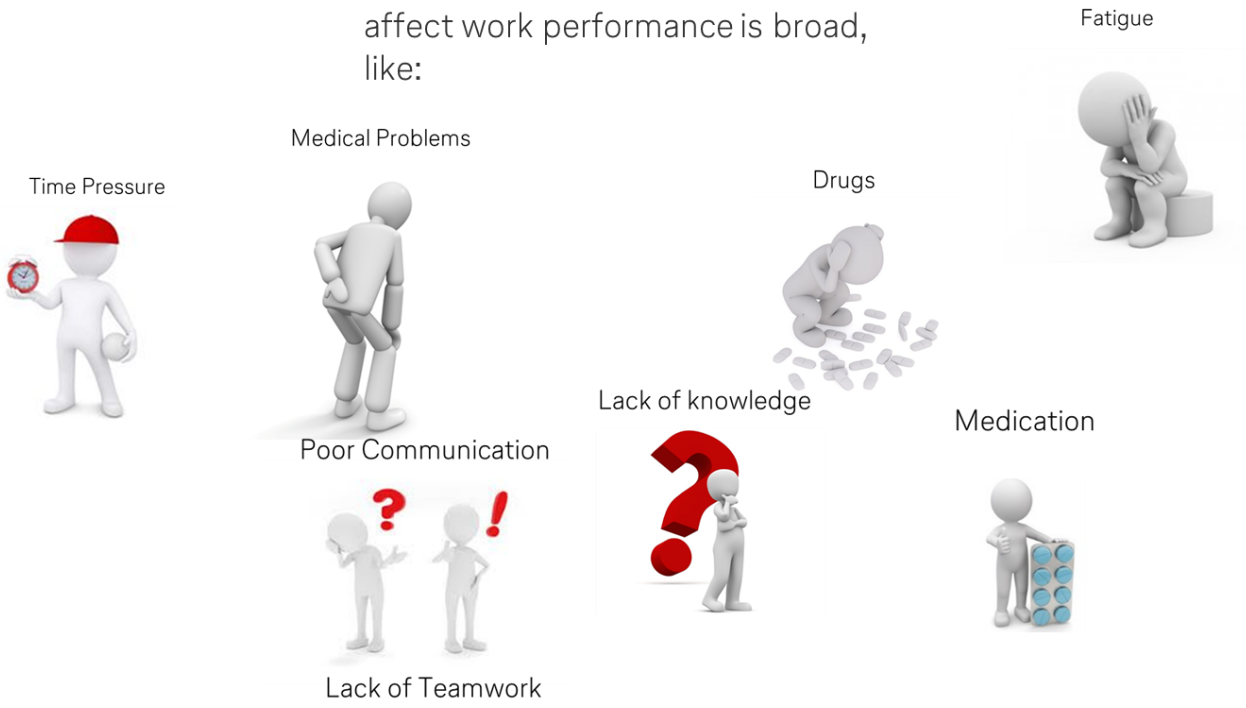
Human error is the unintentional act of performing a task incorrectly like:

Not performing a task or an act
Accomplishing a task incorrectly
Performing a task not authorized



Human error, rather than mechanical failure, underlies most aviation accidents.

The list of human factors that can affect work performance is broad, like:



In Aviation every Hazard or Risk can lead to an Accident.

You can reduce those risks.

Keep yourself fit

Get enough rest

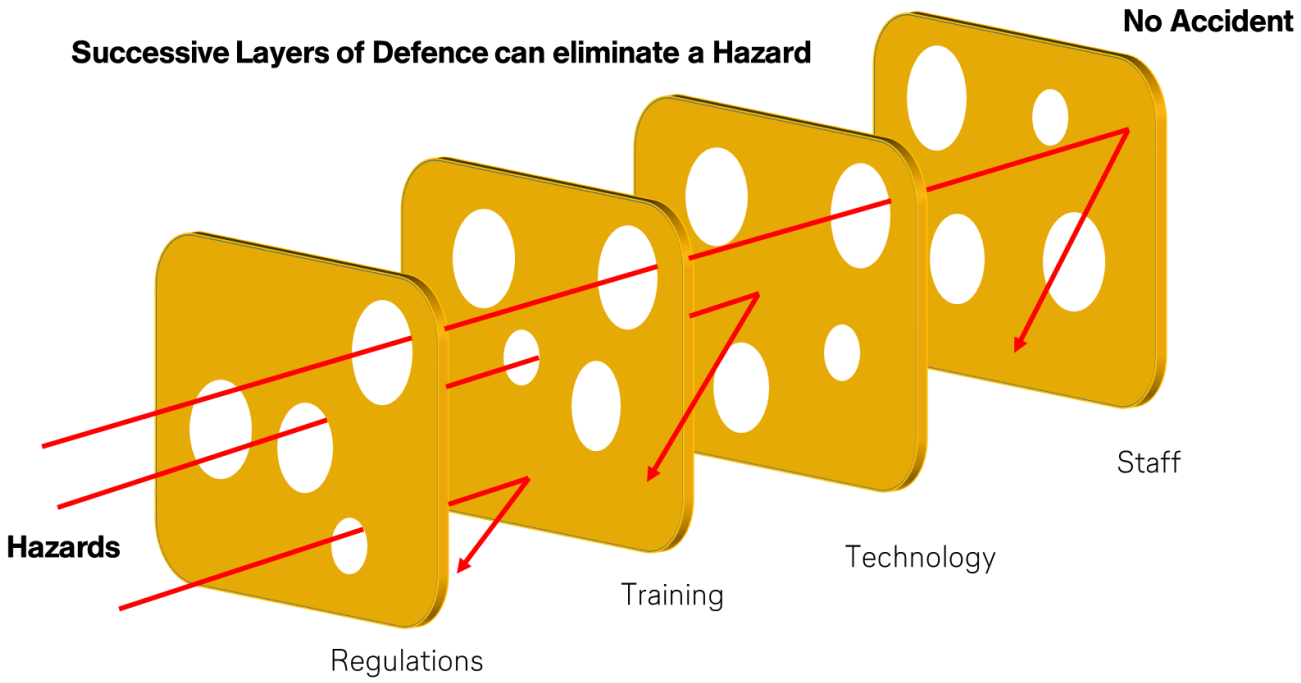
Don`t work if you don`t feel okay

Keep yourself up to date

Always expect to find something wrong

Never sign off on something that you did not fully check

Always double check your work



And if you have identified a risk or made a mistake ….

REPORT IT !!

Even if it is against human nature to show weakness, report what happened, And support others by what has happened to you.

MISSION ACCOMPLISHED!!