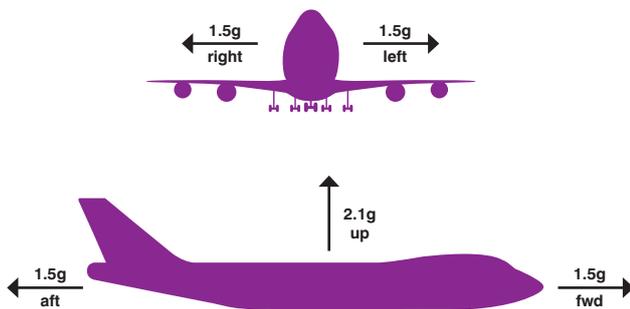




Ready for carriage - Crating guidelines



Cargo is often delivered in crates or wooden packaging. In the air freight business, we need to rely on proper packaging in order to ensure that cargo does not become a danger to the airplane structure and systems in flight.



Considering in-flight accelerations and turbulence, the worst-case expected g-loads can be higher than what would be seen in road, rail, or maritime transport.

Cargolux restrains these acceleration and deceleration loads either with a cargo net or with dedicated nylon lashing straps in the 5 different directions (forward, aft, left, right and up).

Therefore, the

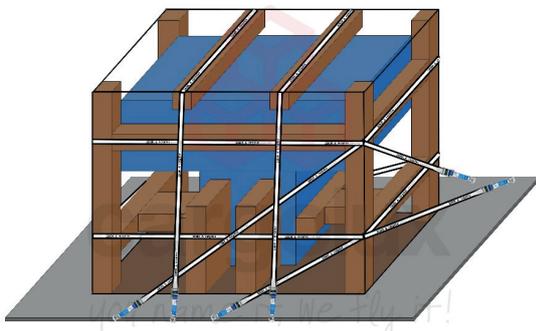
- **Crate** should be designed to safely absorb and transfer the reaction loads imposed by the net and/or nylon straps without disintegrating. The reaction loads can be as high as 2.1g times the gross weight onto the crate lid, and as high as 1.5g times the gross weight on the crate walls.
- **Cargo** should be safely secured inside the crate by a **form-fit** securing against the crate walls and the lid (adequate bracing and stoppers to eliminate empty spaces that could allow the piece to move). Long narrow pieces need proper end-caps to prevent becoming a projectile.

Alternatively, the securing of the load inside the package can follow the **force-fit** principle, which requires the fixation (bolting/screwing) to be designed to transfer the dynamic loads (weight x g-load). This in turn requires a more complex calculation.



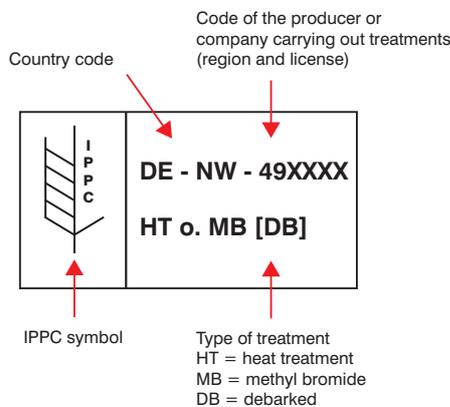
Example

This crate did not provide an adequate load securing. Even ground handling loads already led to a disintegration. It is also evident that the crate would not be able to sustain reaction loads from netting or strapping, as there are no solid stanchions to strengthen the walls and lid. The plywood cladding alone, without reinforcement, will not be sufficient.



Bracing should ideally be loaded on compression, and not on bending. Ideally, the strong points of the crate should be marked on the outside to serve as guidance for strapping.

Wooden packaging exceeding 6mm in thickness needs to comply to [IPSM 15 regulation](#) (ideally heat-treated "HT" for environmental reasons).



To safely pack your goods for air transport, please consult with a professional packing company and advise them to follow industry standards such as [HPE packing guidelines](#).

Please also check with your local Cargolux Office on specific packing requirements for outsize and heavy cargo. Ideally, heavy cargo should be uncrated.



CV classic



CV jumbo



CV power



CV hazmat



CV pharma



CV fresh



CV alive



CV precious

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