

Chapter 12

STOWING AND SECURING OF CARGO IN GENERAL-PURPOSES CONTAINERS

1 General provisions

This chapter defines the conditions and requirements for the stowing and securing of cargo in general-purpose high-capacity containers having typical size of 1D with a nominal gross weight of 10 tons, 1CC and 1C with a nominal gross weight of 20 and 24 tons, 1AA and 1A with a nominal gross weight of 30.5 tons, as well as in medium-capacity containers with a gross mass of 3.0 and 5.0 t.

1.1 Cargoes should be presented for transportation as separate units or in transport packages formed on pallets with sizes of 800x1200 mm or 1000x1200 mm and height, with an allowance for a two-layer stowage in containers 1A, 1C and 1D, not more than 1060 mm, and in containers 1AA and 1CC - not more than 1140 mm.

Transport packages should be firmly secured with straps, heat shrinkable film or other means, excluding the displacement of cargo units inside the package during transportation, including towards to pallets.

1.2 Cargoes should be stowed in containers in such a manner so that a specific load per 1 cm² of the floor area does not exceed 0,5 kgf for medium-capacity containers and 1 kgf for high-tonnage containers.

In order to reduce the specific load on the container floor, pads should be used. In so doing, the pads should be firmly connected to the cargo to prevent it from shifting towards the pads during transportation.

If a center of gravity of cargo item should be in the center of the container length and width, then the pads should be equal in size. In the case where the center of gravity along the length or width of cargo item (or along the length and width at the same time), a pad on that side where the center of gravity is shifted should have a respectively increased width. In such cases it is permitted to use the same pads wider. In such cases it is allowed to use the same pads with increased width.

1.3 Load on the container floor from any wheel of a loader with a weight should not exceed 2785 kgf. At that, width of the wheel should be at least 180 mm, a distance between axles of two wheels of one axle (the axle contains only two wheels) should be at least 760 mm, and a contact area of the tire of each wheel with the container floor should be at least 140 cm².

It is NOT ALLOWED to move over the container floor by way of dragging or turning over.

1.4 Cargoes should be stowed into containers to be transported in direct intermodal service with an allowance for the regulations being in effect on relevant modes of transport.

2 Requirements for stowing and securing of cargo in high-capacity containers

2.1 Cargo in the container should be placed symmetrically to its longitudinal and transverse planes of symmetry.

Height of the total center of gravity of cargo in containers having typical sizes 1A, 1C and 1D should not exceed 1100 mm, in containers having typical sizes 1AA and 1CC it should be not more than 1180 mm.

2.2 Cargo weight should be distributed equally over the whole container floor area.

Shift of the total center of gravity of cargo in a longitudinal direction in containers having typical sizes 1A and 1AA should be not more than 1200 mm, in containers having typical sizes 1C and 1CC it should be not more than 600 mm, in containers having typical size 1D it should be not more than 300 mm.

Shift of the total center of gravity of cargo in a transverse direction in containers having the said typical sizes should be not more than 100 mm.

When it is required to stuff containers with non-uniform cargoes, heavier cargoes are stowed in the middle part of the container or evenly over the entire floor area, lighter cargoes are stowed in the end parts of the container or over heavy cargoes, if this is possible according to conditions of cargo safety and container capacity.

2.3 In order to avoid damage to the container inner casing or other cargo stowed in the container by cargo protruding parts, especially metal ones, as well as by sharp edges or corners, appropriate packaging of cargo or use of liners between the cargo and container walls shall be required.

IT IS NOT ALLOWED to nail spacing materials, pads and other cargo securing elements on the container floor and any other parts of container structure.

2.4 In cases where the total value of clearances along the length or (and) width between specific cargo units and container walls, as well as between cargo units exceeds 200 mm, the cargo shall be respectively secured from longitudinal (or) and transverse shifts.

2.5 When stowing of ingot metal, rolled section and metal pipes, sheet metal; corrugated asbestos board, gypsum boards; wood-fiber boards, chip boards, plywood; cylindrical cargoes (for example, drums, coils) in containers with position to generatrix; cargoes loaded in bulk; and cargoes having protruding parts which can damage walls and doors, then the container side wall and

doors shall be covered with a shield to the height of loading in cases when the total value of gaps along the length and (or) width of the container between specific cargo units and between them, and between the container walls exceeds 200 mm. The shield should consist of two racks installed at the corners of the container and horizontal boards placed close to each other, or at intervals with a value not more than the board width. Thickness of racks and horizontal board of the shield should be at least 40 mm. Board shall be nailed to racks using nails with a length of at least 80 mm, not less than 2 pieces for every joint. The shield shall be installed perpendicular to the longitudinal plane of symmetry of the container so that the shield horizontal boards be engaged with notches of corrugation of the container both side walls.

2.6 Securing of cargo which excludes the possibility of its movement inside the container shall be carried out by protective shield which can be made in two versions: with transfer of longitudinal forces from cargo to corner posts of the doorway; with transfer of longitudinal forces to the container side walls.

In both cases, a base of the shield shall be three transverse boards 1 having section of 50 x150 mm, their wide side should be located in a horizontal plane approximately at equal distances in height from each other. The bottom board shall be placed on the container floor, the second one shall be placed in the middle of the stack height, and the third one shall be placed at mid height of the upper layer of cargo. Length of these boards should be: in the first version of the shield - from 2310 to 2320 mm inclusive, in the second version – from 2410 to 2420 mm inclusive.

In the first version of the shield (fig. 1), transverse boards shall be connected to vertical boards located on the side of cargo.

Vertical boards 4 should have a width of 25 - 30 mm inclusive, width of 120 - 150 mm inclusive and length equal to the stack height. Vertical boards of the shield shall be fixed with transverse ones using nails with a length of 60 to 70 mm inclusive, 2 nails should be driven in every connection of such boards. The shield should be installed with vertical boards against cargo. Three spacing blocks with section of 50x100 mm which are held down by four vertical planks with section at least 30x70 mm fixed on the block ends with nails of 70 mm long, 2 nails in every connection, shall be placed tightly between transverse boards of the shield and container corner posts from container both longitudinal sides. In addition, two planks located on the shield side shall be fastened with one nail to transverse boards in every point of contact.

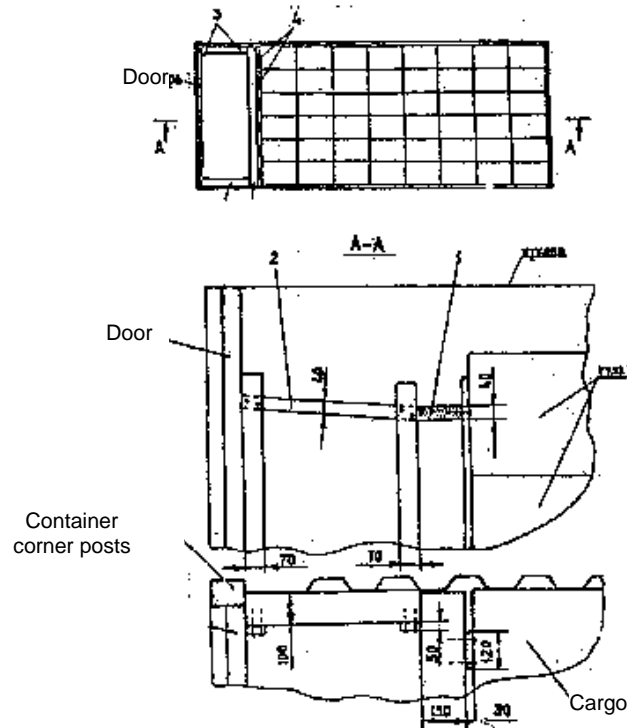


Figure 1 (Top view of container).
 1- transverse boards; 2- spacing block;
 3- vertical connecting planks; 4-vertical boards

When making a shield according to the second version (fig. 2), ends of transverse boards should be sawn round in accordance with a shape and sizes of notches of corrugations of the container side walls.

All transverse boards shall be fastened with four vertical boards having thickness of 25 30 mm inclusive, width of 120 to 150 mm inclusive, and length along the stack height, arranged with width in vertical plane along the container width, using 2 nails 60 mm long which should be driven in every connection of the said boards.

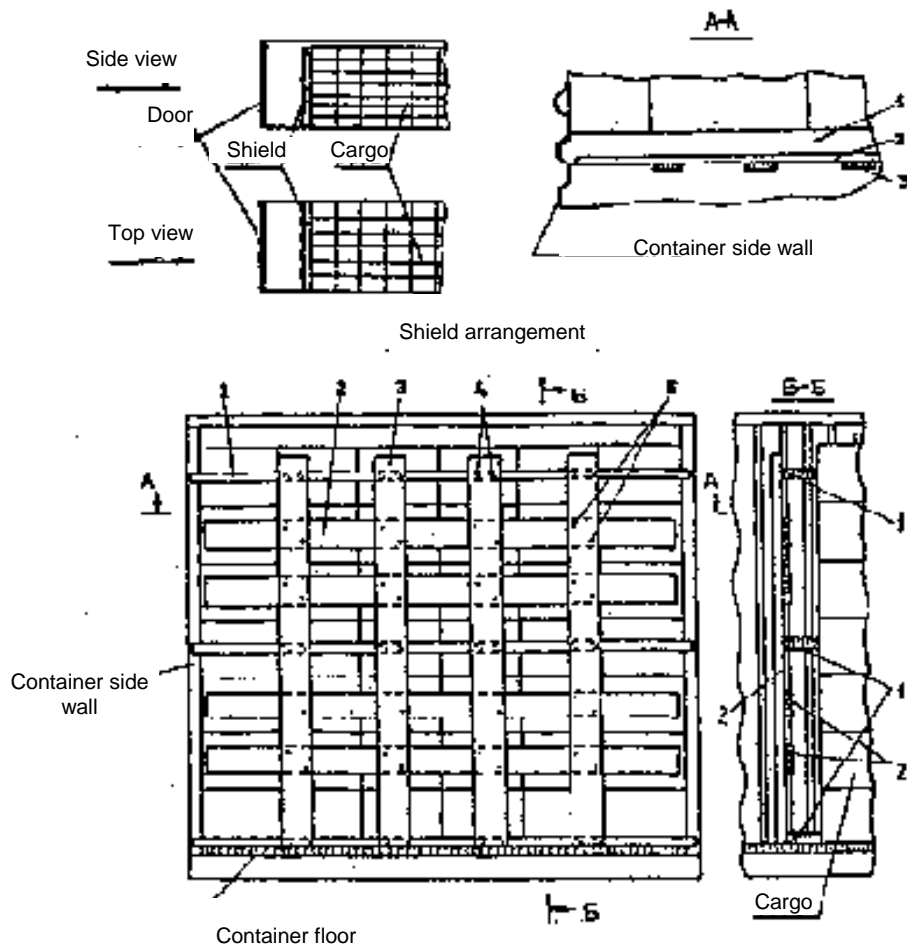


Figure 2

1- transverse boards located in horizontal plane; 2- transverse boards located in vertical plane; 3- vertical board; 4- nails 80-90 mm long; 5- nails 50-60 mm long

3 Stowing and securing of packaged and single-piece cargo in high-capacity containers

3.1. Packaged and single-piece cargoes formed in stacks are placed close to the container end wall and the protective shield is installed in accordance with the requirements of clause 2.6 of this chapter. On the door side, packages should be placed along the length of the container, except as specifically stated.

When loading plywood, gypsum boards; wood-fiber boards, chip boards it is allowed, in stead of shields, to enclose the end wall with the same cargoes installed vertically.

It is allowed as an enclosure to use bundles and packs of pipes, sections, metal items, timber, cylindrical and other cargoes having sufficient strength, and arranged with long side across the container.

3.2 Cargoes shall be secured in containers using wooden stop bars and spacing blocks, connecting planks and pads, with bracing wires with the diameter of not less than 6 mm, in two or more threads, by passing to container eyes, brackets and rings. Bracing wires should be arranged at an angle to the floor and side walls not more than 40° (figure 3).

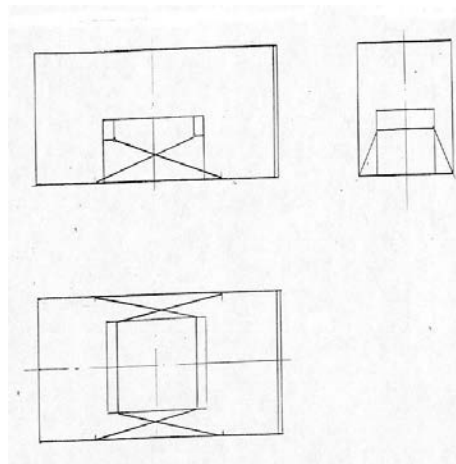


Figure 3

Devices for securing of cargoes with brace wires located at the base of the container can be loaded in any direction with a force up to 2000 kgf inclusive, those located on the side walls can be loaded with a force up to 500 kgs inclusive.

3.3 Cargoes stowed in several layers with two stacks along the container with a distance over 200 mm between them should be secured across the width of the container using spacing frames made of boards with a section at least 25x100 mm (figure 4). Each frame should consist of two vertical boards equal to the stack length and height, and two spacers closely placed between them. Adjacently located frames are connected to each other in pairs using four longitudinal planks with a section at least 22x50 mm, which shall be nailed on end with two nails 50 mm long to vertically installed board at the top and bottom. Quantity of frames and their installation should exclude the possibility of movement of stacks.

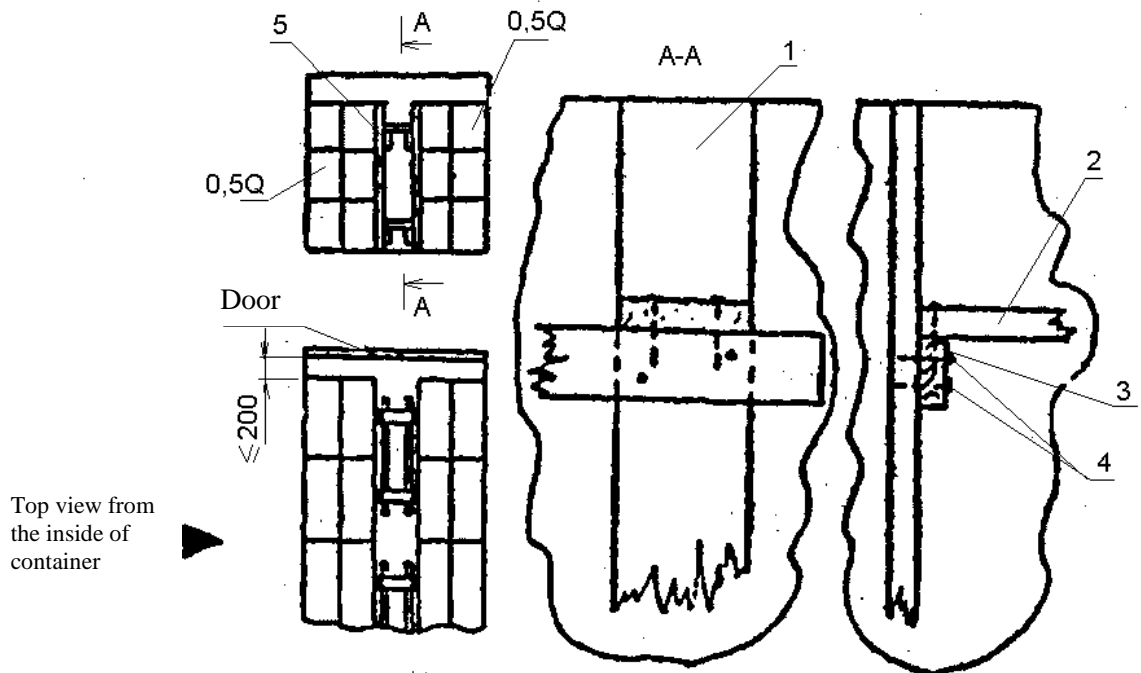


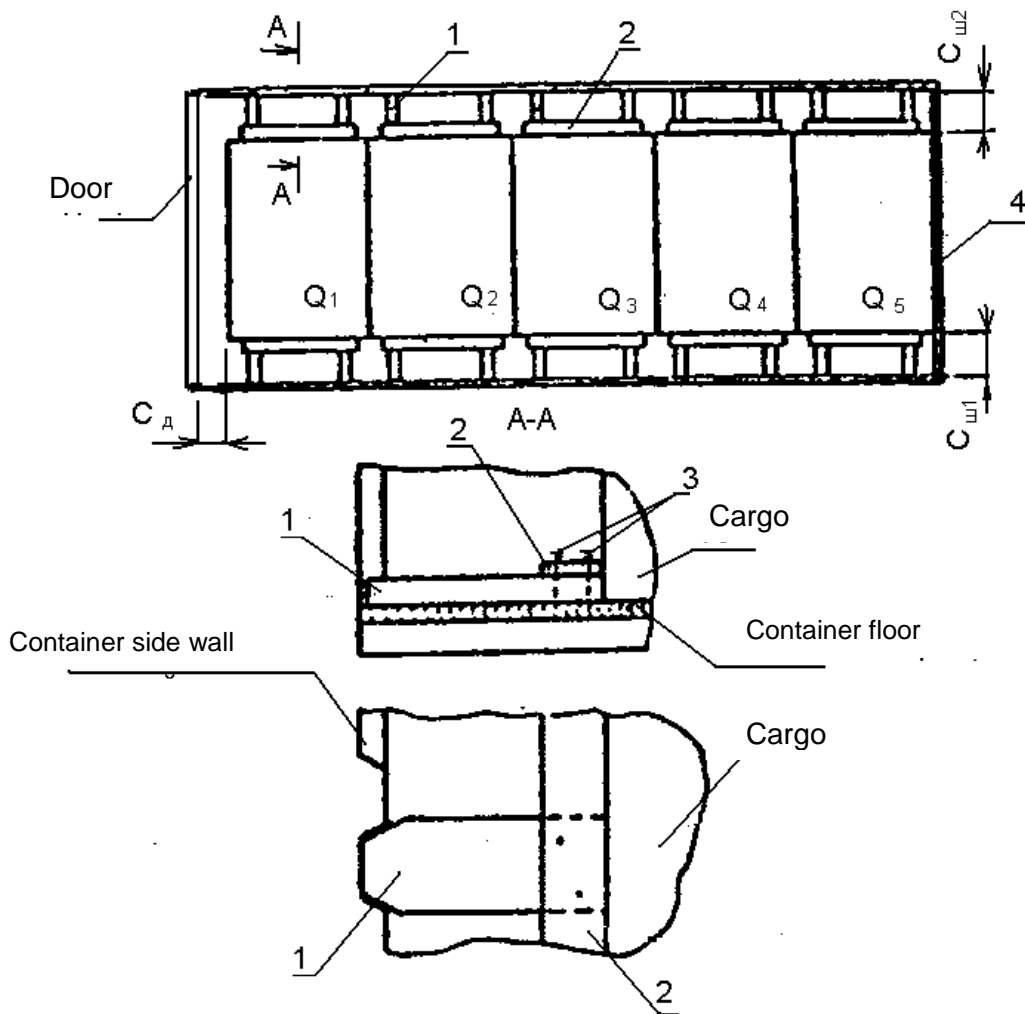
Figure 4

1 - vertical board; 2- spacer; 3- connecting plank; 4- nails; 5 – spacing frame

4 Stowing and securing of cargo with weight up to 1,5 tons inclusively in high-capacity containers

These cargoes should be stowed close to each other and the container end wall. Metal and also flat cargo surfaces should be separated from inner container walls by liners.

Cargoes stowed in the container symmetrically towards the longitudinal plane of the container's symmetry in one row in width and one layer in height should be secured from translocations by stop bars with the cross section at least 30x100 mm. The bars should be stacked by two close to both sides of every package and container sidewalls (Figure 5).



$$C_{\text{ш}} \leq 200 \text{ mm}; \quad C_{\text{ш1}} = C_{\text{ш2}}; \quad C_{\text{ш1}} + C_{\text{ш2}} \geq 200 \text{ mm}$$

Figure 5 (Top view inside container)

1 - stop bar; 2- connecting plank; 3- nails; 4 - liner

Ends of stop bars should be engaged with notches of corrugations and come in contact with the container casing with all area of end. For that purpose, the bars should be swan round in accordance with sizes and shape of corrugations. On the side of cargo the stop bars should be connected in pairs from top with connecting plank 2 with section at least 22x100 mm to be fixed to every bars using two nails 3 with the length of 40 mm.

5 Stowing of unpacked cargo with the length of 6 000 mm inclusive in high-capacity containers

5.1 Cargoes with the length of 2 250 mm inclusive (metal rods, tube without sockets or packs of metal, etc.) should be stowed across the container (see fig. 6).

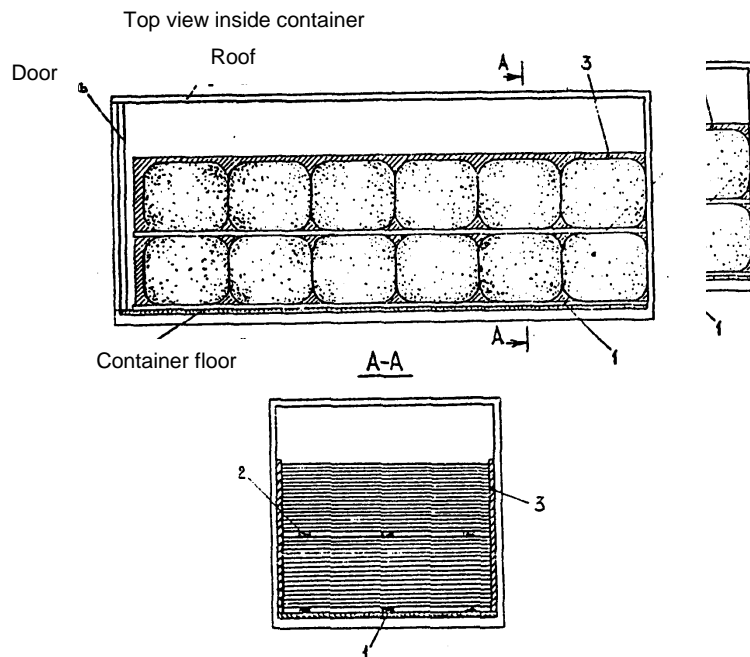


Figure 6

1 – pad; 2- liner; 3- vertical liner

5.2 Cargoes with the length of 2 250 mm to 6 000 mm inclusive should be stowed along the container (see fig. 7).

At mechanized loading of unpacked cargoes, it is necessary to lay wooden pads 1 not less than 40 mm thick and 150 mm wide on the container floor.

For cargoes stowed with the long side across the container, the length of the pads is taken to be equal to the length of the container. Upon that, under the cargoes with the length of up to 1 100 mm, it is necessary to lay two pads, with a length of over 1 100 to 2 250 mm - three pads. It is allowed to use pads made of two parts through thickness, connected by two nails 50 mm long. Protruding ends of the nails should be bent.

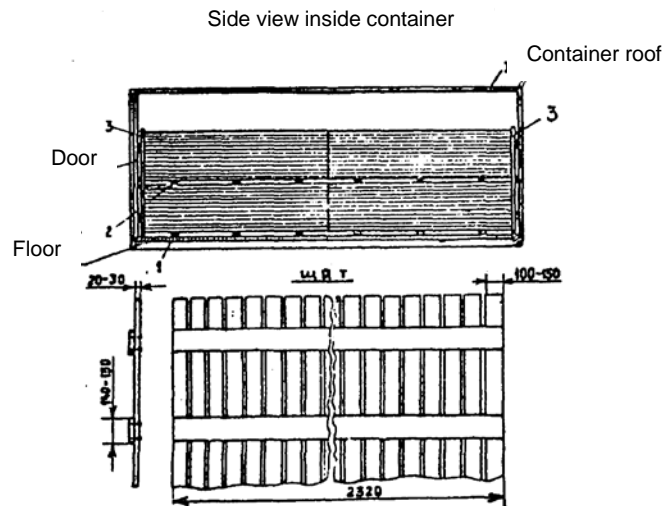


Figure 7
1 – pad; 2 – liner; 3 – shield

These cargoes should be separated from the container side walls by vertical liners 3 (fig. 6) made of thick cardboard, plywood, batten, etc.

When stowing cargo along the container, the pads length is taken equal the container width. For cargoes of length from 2 250 mm to 3 000 mm inclusive, it is necessary to lay three pads; with the length of more than 3 000 to 4 000 mm inclusive - four pads; with the length of more than 4 000 to 5 000 mm inclusive - five pads; with a length of more than 5 000 to 6 000 mm inclusive - six pads.

End wall and door of the container should be enclosed with shields 3 (fig. 7) made of boards 30 mm thick and more. The shields should be solid or with gaps between the boards. Upon that, the size of gaps should not exceed 50% of the smallest size of transported products.

6 Stowing of cargoes of cylindrical form in high-capacity containers

6.1 Cargoes of cylindrical form (e.g., metal drums, water cans or bobbins of metal band) should be stowed in containers vertically in 1-3 layers heightwise (see fig. 8).

Each cargo unit at the low layer should be stowed on two wooden pads 2 with section not less than 40x100 mm, laid along the container. The pads may be solid throughout the length of the container or made of several parts.

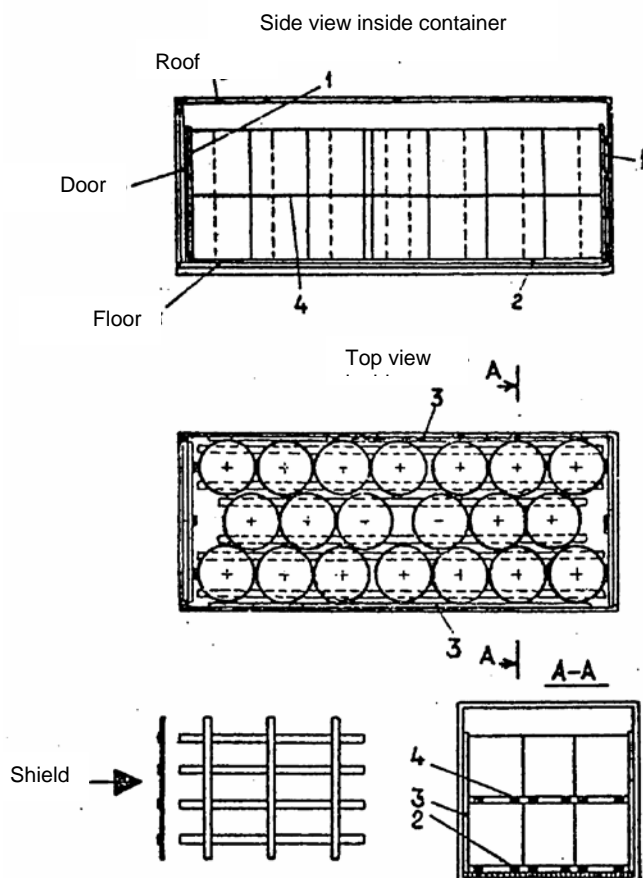


Figure 8

1- shield; 2- pad; 3- vertical liner; 4- liner between cargoes of lower and upper layers

The end wall of the container should be enclosed according to the loading height with shield 1, pursuant to item 2.6 of this Chapter.

6.2 Bobbins of wide metal band and other cylindrical cargoes in metal wrapping with weight of one “package” up to 1 ton inclusive, should be loaded in one layer heightwise with placing each “package” on two longitudinal pads 1 of sizes specified above (see fig. 9).

Close to the end wall on the top of pads ends stop bar 2 should be placed, with the thickness of 50 mm, the width of at least 150 mm and the length across the width of the container. It is allowed to use bars composed of two parts in

thickness, fastened together by four nails with the length of 60 - 70 mm inclusive. Ends of the nails passed through should be bent.

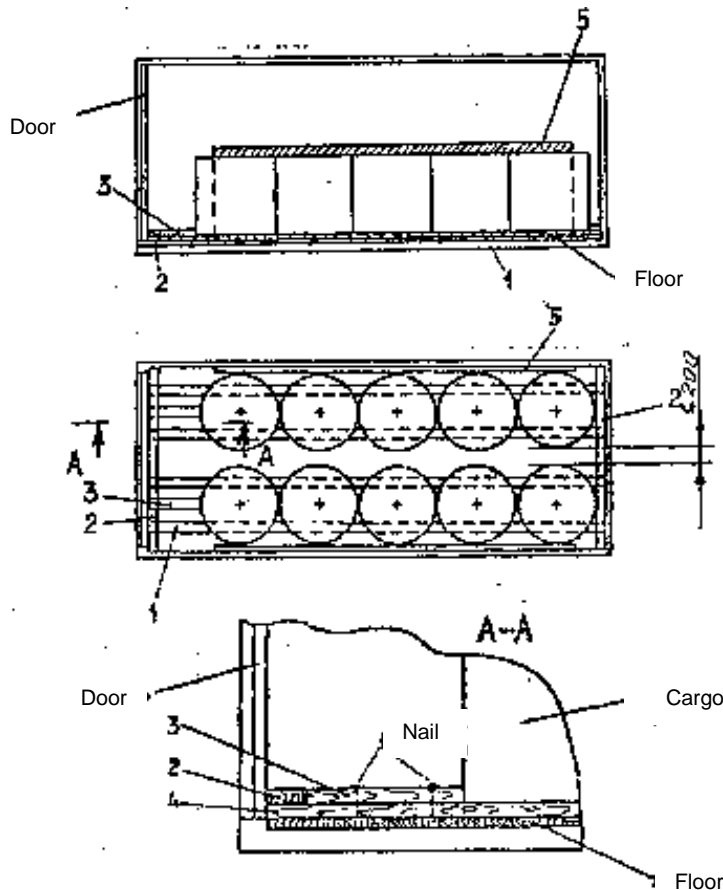


Figure 9

1 – pad; 2 – stop bar; 3 – spacing block; 4 – pad under the spacing block;
5 – wall-mounted liner (conventionally hatched)

From the door side stop bar 2 of the same dimensions should be stacked, through which the longitudinal force from the cargo is transmitted to the corner posts of the container. Close to the bar and to the extreme bobbins spacing blocks 3 should be placed, with the thickness of 50 to 100 mm inclusive and with the width of at least 150 mm. The length of the latter shall be determined in place. Pads 4 of the same thickness as the pads under the cargo should be placed under the spacing blocks. Each spacing block shall be nailed to the pad with two nails from 100 to 150 mm long inclusive. Stop bars shall be fixed at the ends to the pads with the same nails.

In all cases the cargo should be separated from the longitudinal walls of the container with liners made of thick cardboard, wood-laminated plastic (hard fiberboard), plywood or boards.

6.3 Casks with liquids and dry cargoes should be stowed in containers on their flat end. Casks with liquids should be placed caps up. The caps should be tightly pushed into the holes and not protrude above the bottom surface. The method of placing the casks in containers shall be determined depending on their size and quantity.

When loading in several layers, size-similar casks should be placed in every layer heightwise. Wooden liners should be placed between the layers in such a way that each cask of the second and subsequent layers is placed with support on two liners. The liners dimensions shall be established by the consignor based on dimensions of the casks, and their weight.

7 Stowing and securing of light vehicles in high-capacity containers

7.1 Light vehicles (including off-road vehicles) with fully loaded weight of not more than 3,5 t shall be stowed: in containers of typical size 1C, 1CC – 1 vehicle, in containers of typical size 1A, 1AA – 1-2 vehicles.

Before loading the vehicles shall be washed and mopped dry, car wheel protectors shall be clean from dirt. Tire pressure shall be adjusted in such a way so that the contact area be 130 through 150 mm².

Gasoline shall be drained from the vehicles' tanks, car battery shall be removed. Leaks of oil, brake and cooling fluids from vehicle's systems are not allowed. Protective cover (for example, polymer film) shall be laid and fastened on the container's floor in the areas where an engine and axles are placed. Installation of vehicles' wheels on the cover is not allowed.

After stowing of the vehicle in container it shall be broken with a hand-brake. Gear selection handle shall be fixed on the first speed position (for manual transmission) or on 'parking' position (for auto transmission).

7.2 In container of typical size 1C, 1CC the vehicle shall be secured (figure 10) with two bracing wires 6 of rod dia. 6 mm in two threads, as well as with two longitudinal 3 and four transverse 4 and four stop 5 bars, cross section not less than 100x120 mm.

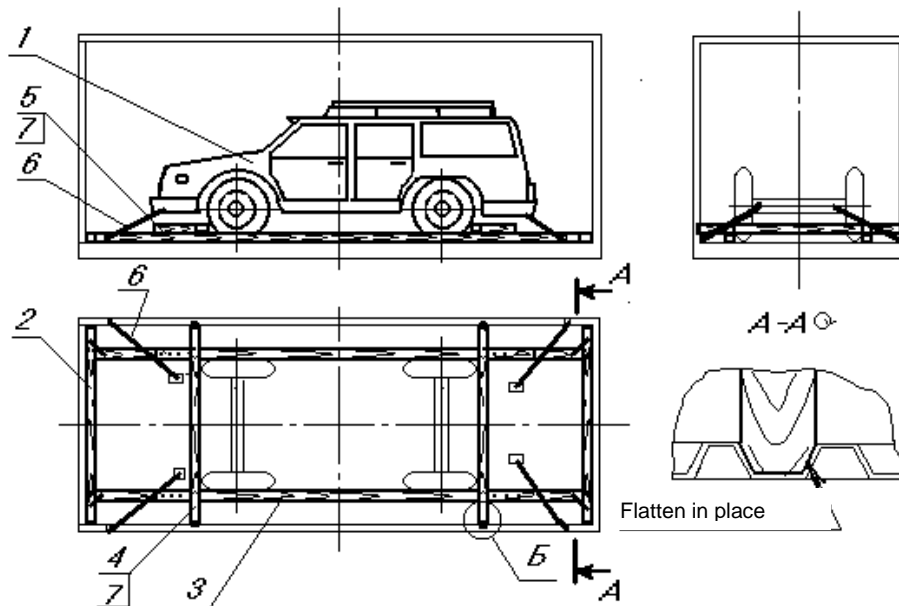


Figure 10

1 – vehicle; 2 – stop bar, size 100x120x2400 mm; 3 – longitudinal bar, size 50x120x5867 mm; 4 – transverse bar block, size 100x120x2400 mm; 5 – block, size 100x120x300 mm; 6 – bracing wires of rod dia. 6 mm in two threads; 7 – dog anchor.

Bracing wires 6 are fastened with one end to the container's lower tie down devices on side walls in its end parts, and with the other, to the vehicle's bearing components (for example, towing devices, shocks, manufacturing holes in wheel disks, etc.).

Bars are stowed in the container as following:

- two buffer blocks 2 of length equal to container's inside width are stowed near the end wall and container doors;

- two longitudinal bars 3 of length equal to the distance between the mentioned transverse bars 2 are stowed outside the wheels tightly to them. It is allowed to place protection liner to preserve tires from rubbing marks between wheels and longitudinal bars 3;

- each of the two transverse stop bars 4 are placed on longitudinal bars 3 tightly to the fore and rear wheels on the outside and are secured to each longitudinal bar with two nails. Four bars 5 not less than 300 mm long are placed on the longitudinal bar 3 tightly to the transverse bar 4 and are secured with three nails. Longitudinal and transverse bars laid by end wall and container door are secured with dog anchors 7, one in a joint. Transverse stop bars 2 and 4 on the one end door side are stowed and secured after the vehicle rolling. The nail length shall be equal to the thickness of the secured bars, but it shall preclude

damage of the container floor. Nailing and putting dog anchors in the container floor is not allowed.

7.3 In a container of typical size 1A, 1AA the vehicles are secured (figure 11) similarly to securing in a container of typical size 1C, 1CC.

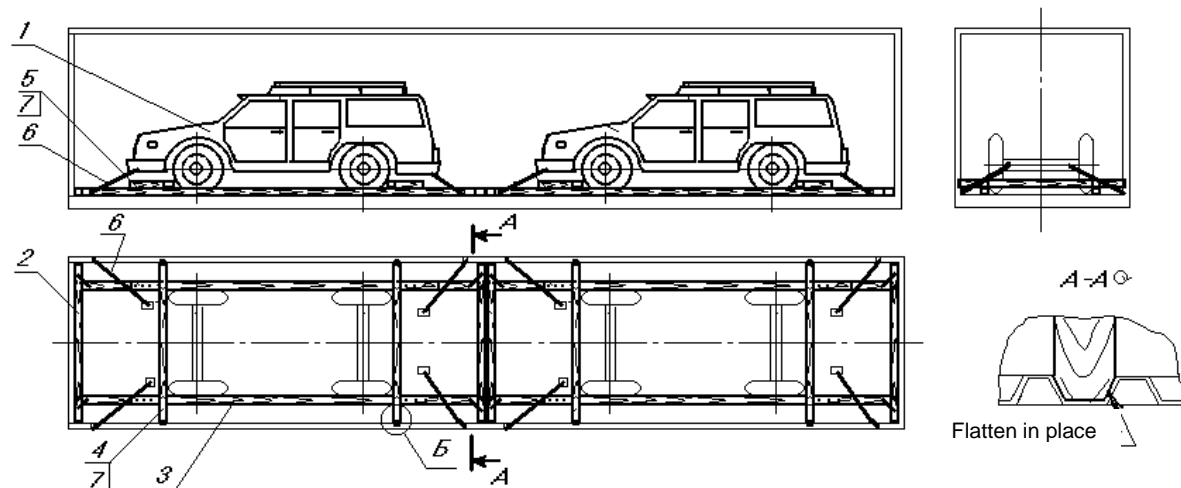


Figure 11

1 – vehicle; 2 – stop bar, size 100x120x2400 mm; 3 – longitudinal bar 50x120x5867 mm; 4 – transverse stop bar, size 100x120x2400 mm; 5 – bar, size 100x120x300 mm; 6 – bracing wires of rod dia. 6 mm in two threads; 7 – dog anchor

7.4 Bars used for securing vehicles may be compound height-wise, transverse ones – length-wise, but not more than of two parts. In order to avoid damage to the container floor, fastening of transverse bars of several parts into a whole shall be carried out outside the container.

7.5 Of the carrier provides stowing and securing of vehicles, the consignor shall be present at loading, В случаях обеспечения размещения и крепления автомобилей перевозчиком, грузоотправитель обязан присутствовать при погрузке, for this reason it shall be informed on date and time of loading in advance.

8 Requirements to stowing and securing of cargo in medium-capacity containers

8.1 Cargo shall be stowed in container symmetrically to its longitudinal and transverse planes of symmetry.

Height of cargo total load center shall not be in excess of half container height, displacement of the general center of cargo mass crosswise shall not be more than 100 mm.

8.2 Corresponding cargo packing or application of liners between cargoes and container walls is necessary between container inner covering and cargo or between cargoes with projecting, especially metallic parts, as well as sharp edges or angles.

8.3 Cargoes shall be placed in containers evenly, in the entire floor area. Total amount of clearance length-wise or breadth-wise of the container between individual units (packages) of cargo, as well as between them and container walls shall not be in excess of 200 mm.

8.4 Securing of cargoes in medium capacity containers shall be carried out using spacing, stop bars, bracing wires and container eyes.

Eyes for securing of cargo with bracing wires may be loaded in any direction with a force under 300 kgf.