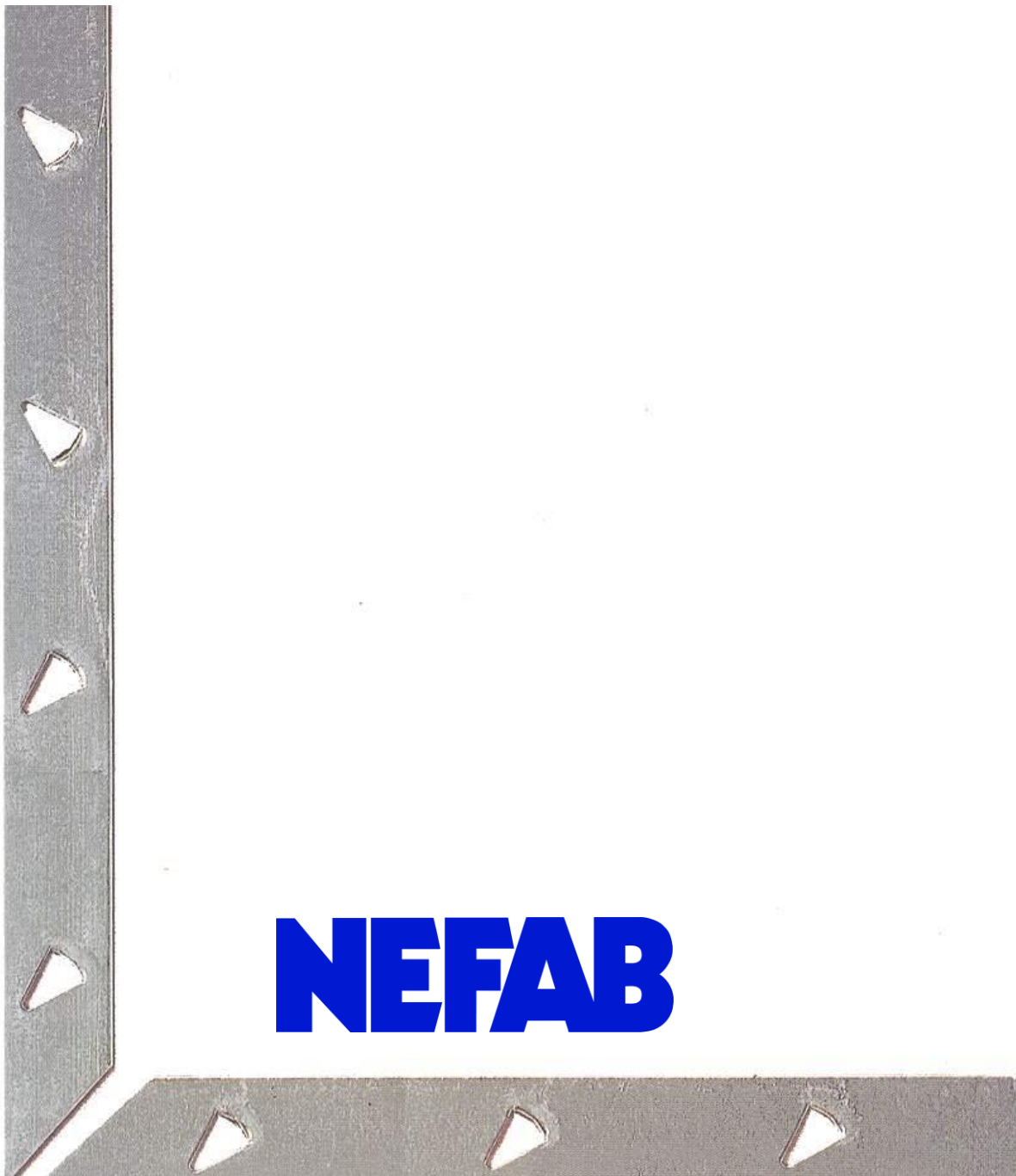


Compression test

ExPak typ-P 780x580x550



Report nr: NT-9945
Date: 1999-10-29
Filename: X:/xxxxxxx/Compression test ExPak typ-P 780x580x550.doc
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SUMMARY:

This test shows that the maximum force limit for overstacking of an ExPak type-P in 6 mm plywood, dimension 780x580x550 mm is approximately 10 tons. This is however far from practical use. Normally this kind of boxes do have runners or pallets, which reduce the stacking capacity substantially.

As a general rule, runners will reduce the stacking capacity up to 50 %, irrespective the number of runners. When the runners are displaced to 30 mm, the overstacking will be reduced to 35-40 % of the theoretical limit, depending of the thickness on the lid.

By experience we know that a box with a displace pallet will reduce the stacking capacity to 70-75 % of maximum load. The pallet have larger contact surface then the runners and distribute therefor the load to a larger contact area on the frame.)

There is a number of way to secure or to increase the stacking capacity on boxes, different kind of reinforcements as inner fittings, outer fittings, fox braces ... but there is always the strength of the vertical frame that gives the ultimate stacking limit of the box.

PURPOSE OF THE TESTS:

The test where made in order to evaluate effects of different solutions to increase stacking capacity of ExPak type-P boxes. Different design of Euro-coin box was also tested. All boxes had though same internal dimension as the Euro-coin box.

TEST ENVIRONMENT:

The test was performed at Packforsk institute Stockholm.

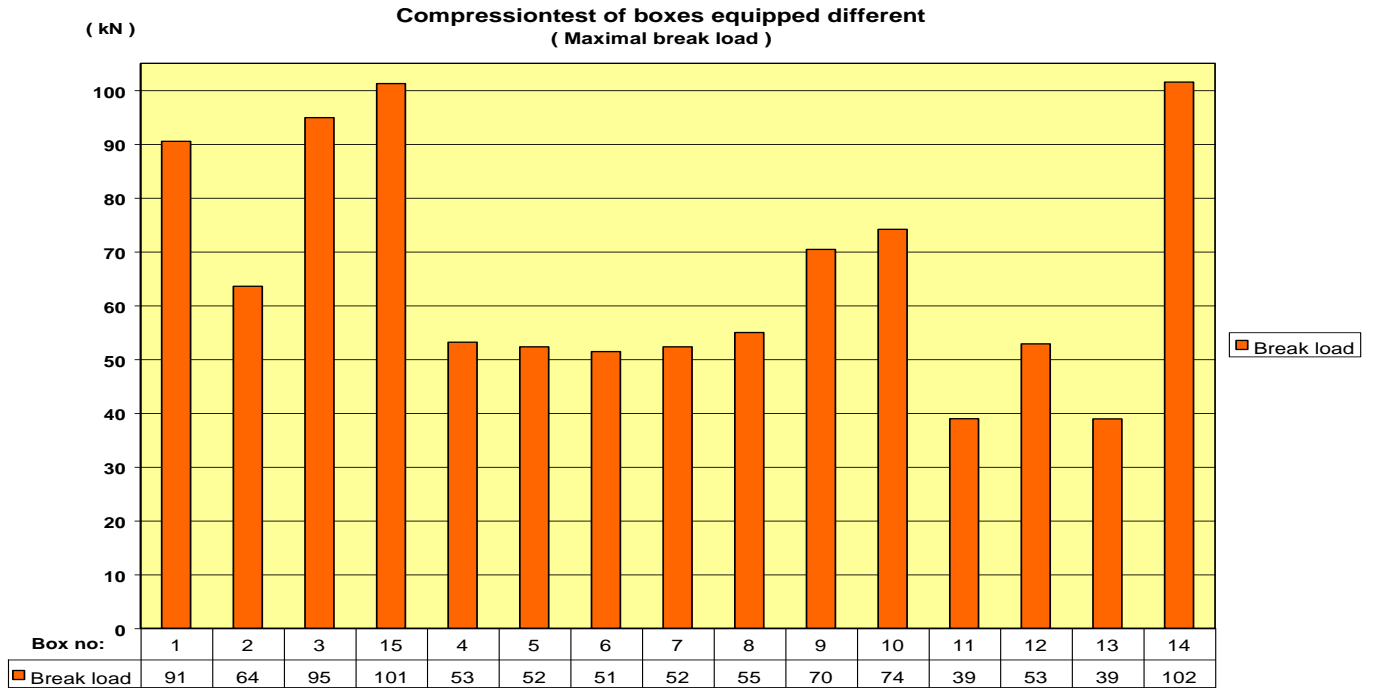
PERFORMED TESTS:

Force was applied on boxes with a compression of 10 mm/min. The test machine have parallel pressing plates. All boxes have the dimension 780x580x550 mm, half euro pallet. The fibre direction of the face veneer on the frame where on all boxes horizontal. 42 mm ExPak profile on lid and bottom. Two boxes of each design where tested and maximum force and deflection was registered.

Test boxes as below:

Test nr	Load	Frame	Tongues	Lid	Bottom	Runners	Internal fitting
1	2 Runners	6 mm birch, 5 ply	2 correctly locked on top longside.	6 mm birch, 5 ply Fit with 2 plywood 12x135x595	6 mm birch, 5 ply. 12 mm plywood fixed under bottom	Fit with 2 runners 55x115x595	2 plywood 6x579x550 mm with strips 12x20x550 on shortside. Foxbrace 12x62x579 EURO-COIN
2	2 Runners	6 mm birch, 5 ply	2 correctly locked on top longside.	6 mm birch, 5 ply Fit with 2 plywood 12x135x555	6 mm birch, 5 ply. 12 mm plywood fixed under bottom	Fit with 2 runners 55x115x595	2 plywood 6x579x550 mm with strips 12x20x550 on shortside. Foxbrace 12x62x579 EURO-COIN
3	2 Runners	6 mm birch, 5 ply	2 correctly locked on top longside.	8 mm birch, 7 ply Fit with 2 plywood 12x135x595	6 mm birch, 5 ply. 12 mm plywood fixed under bottom	Fit with 2 runners 55x115x595	2 plywood 6x579x550 mm with strips 12x20x550 on shortside. Foxbrace 12x62x579 EURO-COIN
15	2 Runners	8 mm birch, 7 ply	2 correctly locked on top longside.	8 mm birch, 7 ply	6 mm birch, 5 ply. 12 mm plywood fixed under bottom	Fit with 2 runners 55x115x595	2 plywood 6x579x550 mm with strips 12x20x550 on shortside. Foxbrace 12x62x579 EURO-COIN
4	2 Runners	6 mm birch, 5 ply	2 correctly locked on top longside	6 mm birch, 5 ply	6 mm birch, 5 ply.	None	None
5	2 Runners	6 mm birch, 5 ply	10 correctly locked.	6 mm birch, 5 ply	6 mm birch, 5 ply.	None	None
6	3 Runners	6 mm birch, 5 ply	10 correctly locked.	6 mm birch, 5 ply	6 mm birch, 5 ply.	None	None
7	2 Runners	6 mm birch, 5 ply	10 correctly locked.	8 mm birch, 7 ply	6 mm birch, 5 ply.	None	None
8	3 Runners	6 mm birch, 5 ply	10 correctly locked.	8 mm birch, 7 ply	6 mm birch, 5 ply.	None	None
9	2 Runners	6 mm birch, 5 ply	10 correctly locked	8 mm birch, 7 ply	6 mm birch, 5 ply.	None	2 New special foxfitting22x100x779
10	2 Runners	6 mm birch, 5 ply	10 correctly locked.	6 mm birch, 5 ply	6 mm birch, 5 ply	None	2 New special foxfitting22x100x779
11	2 Runners displaced 30 mm	6 mm birch, 5 ply	10 correctly locked.	6 mm birch, 5 ply	6 mm birch, 5 ply	None	None
12	2 Runners displaced 30 mm	6 mm birch, 5 ply	10 correctly locked.	6 mm birch, 5 ply	6 mm birch, 5 ply	None	2 New special foxfitting22x100x779
13	2 Runners displaced 30 mm	6 mm birch, 5 ply	10 correctly locked.	8 mm birch, 7 ply	6 mm birch, 5 ply	None	None
14	Flat compression	6 mm birch, 5 ply	10 correctly locked.	6 mm birch, 5 ply	6 mm birch, 5 ply	None	None

Testresult



Comments: Box 1,2 and 3 is design with the original concept as Euro-coin box, modified according to above description. Box 15 has a 8 mm frame and 8 mm lid, further like Euro-coin. Box 14 is a plain type-P 6 mm, under flat compression, this is the absolute limit of what a box with 6 mm frame can resist and is not realistic in practical use. On box 11,12 and 13 the load was displaced 30 mm in the runners longitudinal direction.

