

**TEST REPORT****N° G-22.154**

**REPORT DATE:** 22/06/2022

**YOUR REF.:** P-LiB UN 001

**SUBJECT:** Tests on plywood boxes (4D), to obtain the authorization for the transport of dangerous goods.

**BY ORDER OF:** **CLIP-LOK SIMPAK (SCANDINAVIA) APS**  
**SOLVANG 25**  
**DK - 3450 LILLERØD**

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Recognition:



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(F)IBC & Dangerous goods  
packaging



Eng. D. De Valck  
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**1. Received samples:**

Contact person : Katrine Skovbjerg Cardellino  
E-mail contact person : [kskovbjerg@clip-lok.com](mailto:kskovbjerg@clip-lok.com)

Receiving date of the samples : 21/06/2022

Description of the received samples : Filled & empty plywood boxes.

The samples were taken and sent by Clip-Lok SimPak Scandinavia ApS to IBE-BVI.

Testing date : 21 & 22/06/2022  
Analyst : Stefaan De Ryck & Joachim Bronselaer

**2. Objective of the project:**

Prototype tests on plywood boxes (4D), to obtain the authorization for the transport of dangerous goods.

The packaging will be used to transport Lithium batteries.

All tests with (Q) are executed under the Belac accreditation.

This report is a test report and exclusively refers to the tested objects.

**3. Description of the samples:**

Type of box:	Plywood box (4D) conform with the description as mentioned in the different regulations.	
Manufacturer:	CLIP-LOK SIMPAK (SCANDINAVIA) APS SOLVANG 25 DK - 3450 LILLERØD	
Composition:	6 plywood walls which are held together by 32 metal profile hooks that are clamped in recesses in the walls.  The box has 5 wooden beams with each 2 wooden blocks attached to the bottom part with nails.	
Closure of the package:	The 32 metal profile hooks act as closure of the complete packaging. Weight 1 metal profile hook: 147 g Thickness metal: 1.7 mm	
Dimensions: (L x W x H)	Outside:	1700 x 550 x 499 mm
	Inside:	1664 x 514 x 350 mm
	Beams under the bottom:	190 x 47 x 115 mm
Thickness of the plywood:	Walls:	18 mm
	Top/bottom:	18 mm
Empty weight:	Total	60.1 kg (Including all 32 metal profile hooks and interior which is attached to the inside of the box).

See also technical drawing in annex.

Content:

1 Lithium battery held in place by 3 plastic supports attached to the bottom and 3 cloth straps.

Plastic supports at each short end of the battery and 1 in the middle act as extra support.

The plastic profile is held in place with screws.

A plastic textile strap is placed underneath each plastic profile so the content can be secured in the outer box.

Smaller batteries, similar in shape, may be used if the plastic profiles are placed in a way that the battery cannot move during transport.

For the test a wooden box with larger dimensions and higher weight was used as dummy content.

Plastic corner profile:

- Material: HDPE
- L x W x H: 452 x 120 x 70 mm
- Thickness: 20 mm

This is also the free height under the battery when placed on the plastic profile.

Plastic middle profile:

- Material: HDPE
- L x W x H: 452 x 73 x 20 mm
- Thickness: 20 mm

This is also the free height under the battery when placed on the plastic profile.

Plastic textile straps:

- Type: Plastic textile straps  
Placed under the plastic profile so it cannot move during transport
- Width: 26 mm
- Tensile strength: 400 kg

Dummy battery:

- Type: Wooden box closed with nails.  
At each short end there is a wooden slate on top of the box.
- L x W x H: 1544 x 394 x 270/288 mm
- Gross test weight: 201 kg

Gross mass of the tested sample : 261 kg  
Gross mass of the final package : **261 kg**

Pictures:

Outer box – Long side



Outer box – Pallet riders



Outer box – Short side



Outer box - corner



Outer box – holes for closures



Outer box – closure in box



Closure - Metal profile hooks



Dummy content (wooden box)



Plastic supports with straps inside outer box



Plastic corner profile



Plastic



Plastic textile strap under plastic profile



#### **4. Test program:**

Performance tests for plywood boxes (4D) prescribed by:

- UN-Recommendations – part 6
- IMDG-Code – part 6
- ICAO-TI – part 6
- ADR-RID - part 6

##### **A. Drop tests (Q):**

Filling material	:	See point 3 'content'
		The samples were filled and closed by the client.
		A wooden box with a gross mass of 200 kg was used as a dummy content. The dummy was secured with tissue straps as will be done.
Number of tested packages	:	5
Preconditioning	:	Ambient
Weight of the samples	:	261 kg
Drop height	:	1.20 m
Drop orientation	:	First drop: flat on the bottom
		Second drop: flat on the top
		Third drop: flat on the long side
		Fourth drop: flat on the short side
		Fifth drop: on a top corner

##### **Criteria for passing the tests:**

No damage liable to affect safety during transport.

No important breakage or leakage, nor of the box, nor of the inner receptacles.

##### **Results of the tests:**

Flat on the bottom	:	No loss of contents
Flat on the top	:	No loss of contents
Flat on the long side	:	No loss of contents
Flat on the short side	:	No loss of contents
On a top corner	:	No loss of contents



**B. Stacking tests (Q):**

Filling material	: See point 3 'content' The samples were filled and closed by the client. A wooden box with a gross mass of 200 kg was used as dummy content. The dummy was secured with plastic straps as foreseen.
Number of tested packages	: 3
Conditioning	: 23 °C / 50% RH
Stacking height	: 3 m
Duration of the test	: 24 hours
Calculated load	: $[(3000/499)-1] \times 261 = 1308$ kg
Applied load	: 1320 kg

**Criteria for passing the tests:**

No deterioration which could adversely affect transport safety.  
No distortion liable to reduce the strength of the box or to cause instability in a stack of packages.

**Results of the tests:**

No test sample shows any deterioration which could adversely affect transport safety.  
No distortion liable to reduce the strength of the box or to cause instability in a stack of packages.

## **5. Conclusion:**

The presented package has successfully met the performance tests prescribed for the transport of dangerous goods and may be used in accordance with the following conditions:

For the content Lithium Batteries:

- Maximum stacking height : 3 m
- Maximum permissible gross mass : 261 kg

All other conditions of use are not covered by this report.

The use of other packing methods or components other than stated in this report will render the use of this package invalid.

### Important notes:

*In addition, lithium batteries (except for damaged or defective batteries) with a different cell chemistry but having a similar design, format and weight may also be transported in this packaging under condition all packing requirements and conditions as described in this report and in the applicable packing instructions are met.*

*In the case of damaged or defective batteries, supplementary testing, assessment, and reporting that proves compliance with any additional requirement of the applicable packing instructions of the regulations for the transport of damaged lithium batteries may be required.*



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**Delivered UN mark**

The hereafter mentioned: **Plywood boxes (4D)**

that form the subject of report: **G-22.154 of 22/06/2022**

may obtain the hereafter mentioned UN-mark:



4D/Y261/S/\*  
B/1223-\*\*

\* : year of manufacture  
\*\* : registration number to be attributed by  
the competent authority

as far as the use of the above-mentioned packaging in the IMDG-Code, ICAO-TI and ADR-RID prescriptions is provided for.

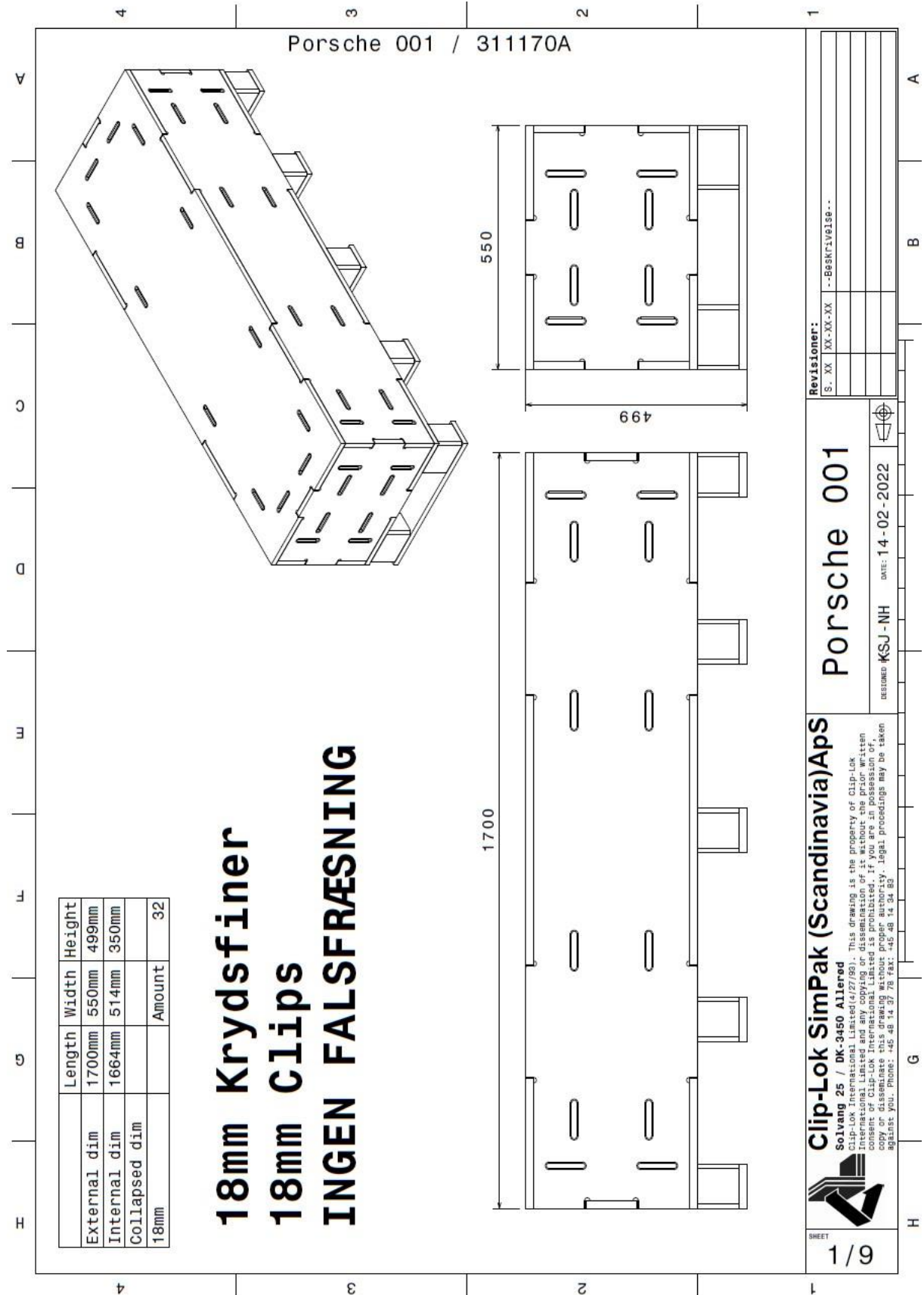
The stacking test was effectuated for a stacking height of 3 m.

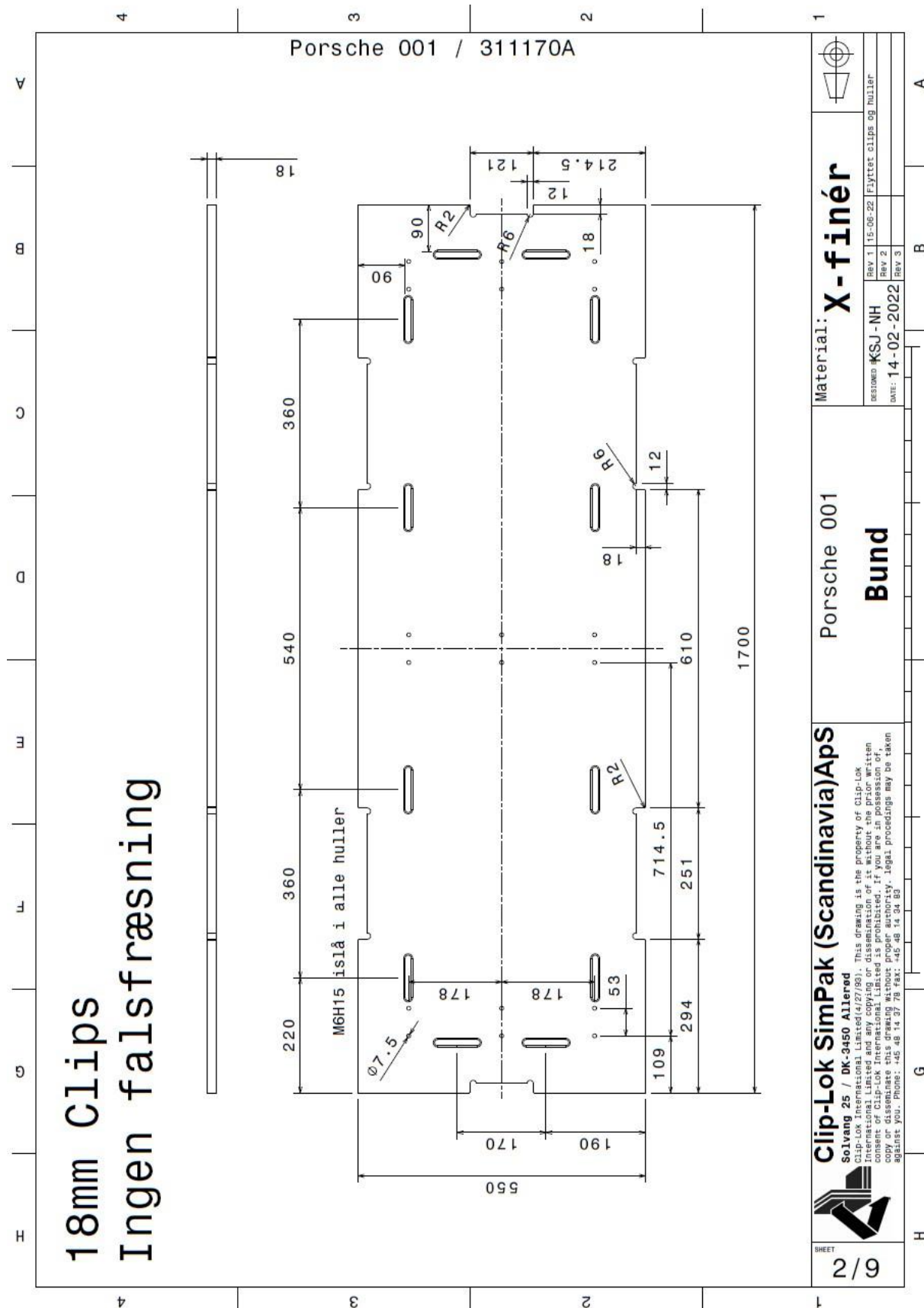
Gross mass : **261 kg**

Firm : **CLIP-LOK SIMPAK (SCANDINAVIA) APS**  
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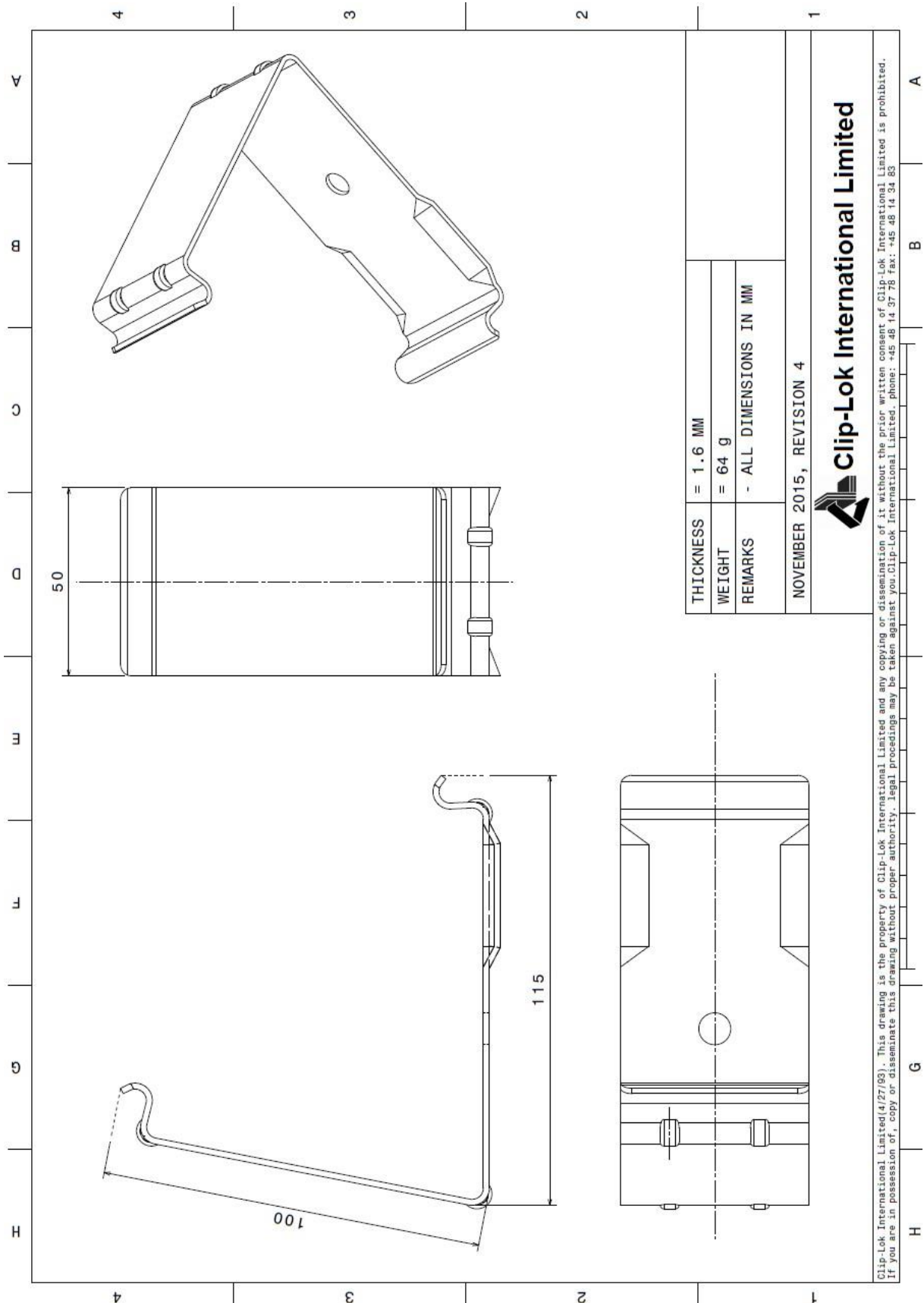
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Annex 1: Technical drawing outer box:

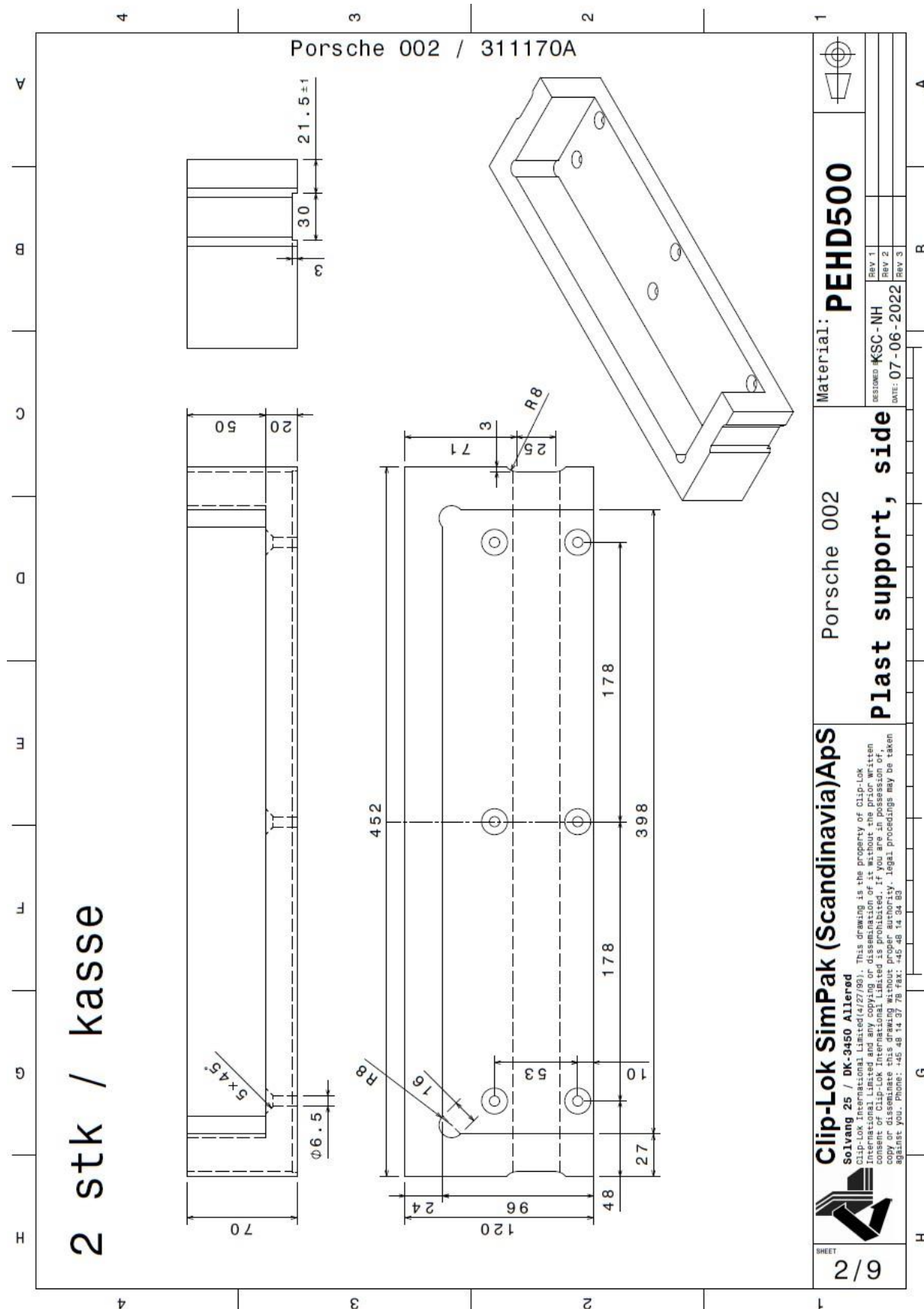




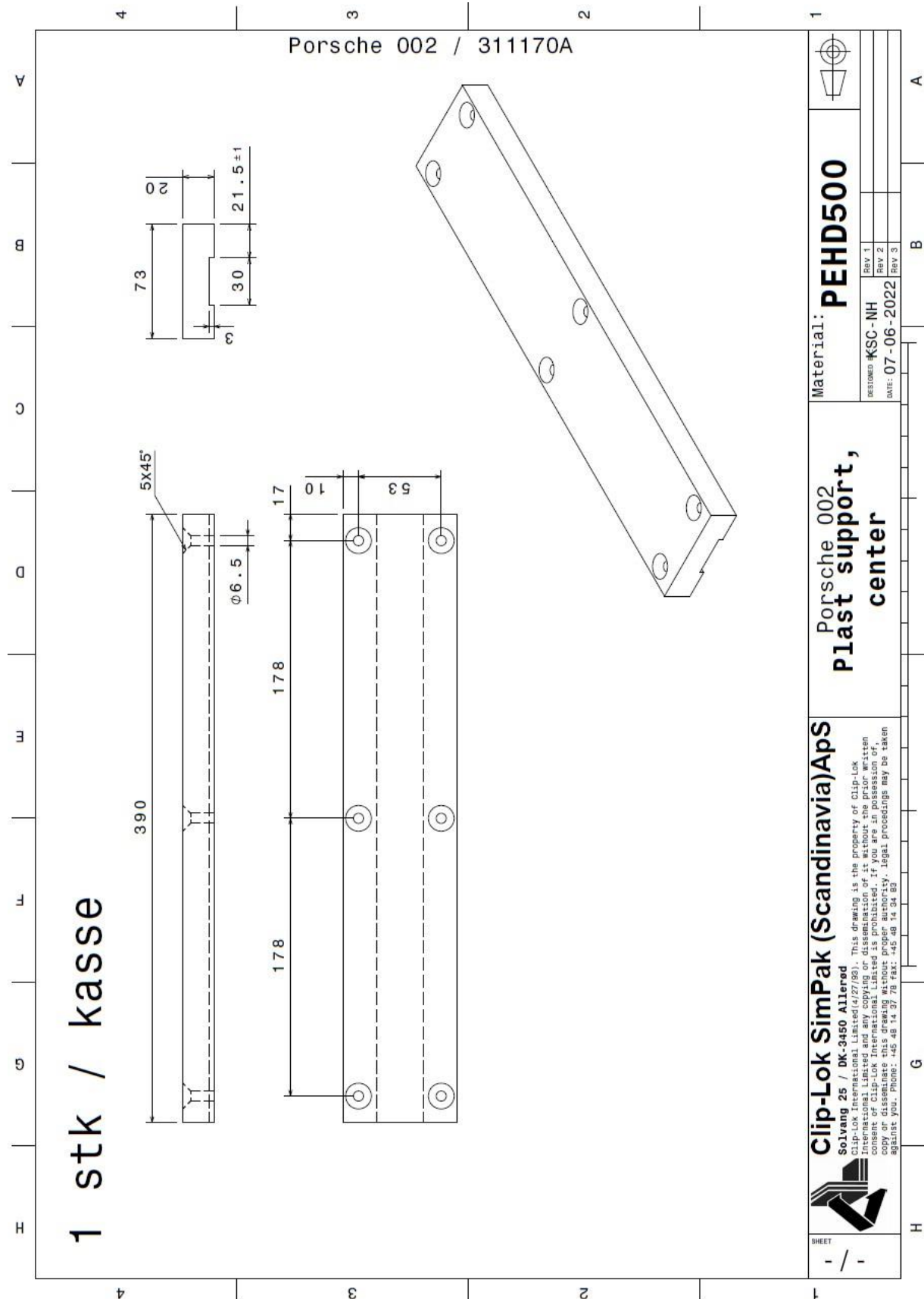
*Annex 2: Technical drawing metal profile hook:*



*Annex 3: Technical drawing plastic corner profile:*



Annex 4: Technical drawing plastic middle profile:





*Annex 5: Technical drawing of the dummy test content – wooden box:*

