

**Working with Presses – Course: Mechanical woodworking techniques.
Instruction examples for practical vocational training**

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Working with Presses – Course: Mechanical woodworking techniques. Instruction examples for practical vocational training

**Institut für berufliche Entwicklung e.V.
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Preliminary Remarks

The present material includes five selected instruction examples where the working technique of the manufacturing of composition material and veneering can be practiced.

Typical production examples are described. The trainees practice their skills in using a spindle press. In order to ease the preparation and implementation of the exercise for each instruction example the necessary material, machines and tools, measuring and testing devices as well as auxiliaries are mentioned. The basic knowledge which is necessary to prepare and to carry out the instruction examples, are mentioned too.

Together with the working sketches and the added operation schedules the exercises can be carried out independently. For the Instruction Examples 4 and 5 a working sketch was dispensed with.

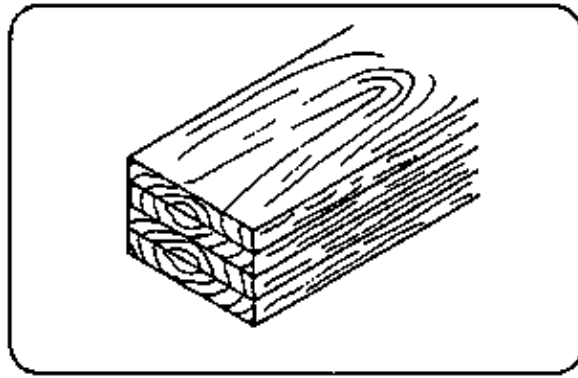
Exact measures for the pieces of work are not provided with the instruction materials. This can be done additionally for each exercise.

Instruction Example 08.01.: Gluing of Blocks

The manufacturing of thick pieces of work by gluing of blocks will be practised here. This working technique is mainly applied with the manufacturing of pieces of work which are exposed to a high bending stress. But also residual material can be manufactured to yield new pieces of work.

Material

- 4; 6; 8; ... pieces of work of the same width, same thickness and same length.
- Cold glue (the amount is calculated according to the total surface of the joint)



Tools

Gluing device (brush or putty knife)

Measuring and testing devices

Folding rule

Auxiliaries

Pencil, two glue stands, glue cup, a sandwiching sheet

Necessary basic knowledge

Construction, operation and working with a spindle press (or a veneer press), hints on how to use the glue. Labour safety rules for working with presses.

Explanations to the working sketch

1 thin free hand line (glued joint)

The measures for each processing task are given additionally (that is why no measures are given in the sketch).

Sequence of operations	Comments
1. Preparing the working material, checking the press for regular technical condition.	Completeness control of the material and the condition of the sandwiching sheet (possible damages, glue residues and dirties).
2. Put the pieces of work together and mark them with triangle marks.	When gluing solid wood glue the right sides of the boards and the left sides together.
3. Place the sandwiching sheet into the press or onto the veneer stands.	Pay attention to sufficient length of the sandwiching sheet!
4. Adjust the spindle height to the necessary measure.	(With veneer stands the height of the pressing sheets should be taken into consideration.)
5. Place a piece of work into the press for testing and find out the best fitting position.	No spindle should press over the length of the piece of work.
6. Calculate the amount of the glue and measure out the necessary amount plus the processing losses.	The laying amount is to be selected according to the absorptive capacity of the material $150 \text{ g} \cdot \text{m}^{-2}$ to $220 \text{ g} \cdot \text{m}^{-2}$.
7. Using HF-glue measure out the cold hardening compound and mix it with the glue efficiently.	Mix a hardening compound of 2 vol. % (HF-glue = urea-formaldehyde glue).

8. Place the pieces of work blockwise into the glue stands, place the glue and immediately put the pieces of work together to blocks again.

Apply the glue with a brush or a putty knife carefully. The glue must moisten the whole surface and should not be absorbed by the wood completely.

9. Place the pieces of work into the press (or into the veneer stands) and adjust them according to the spindle position.

Add a glue joint only to one of the faces!

All pieces of work must sit above each other in a block!

10. Pull the spindle slowly and alternately.

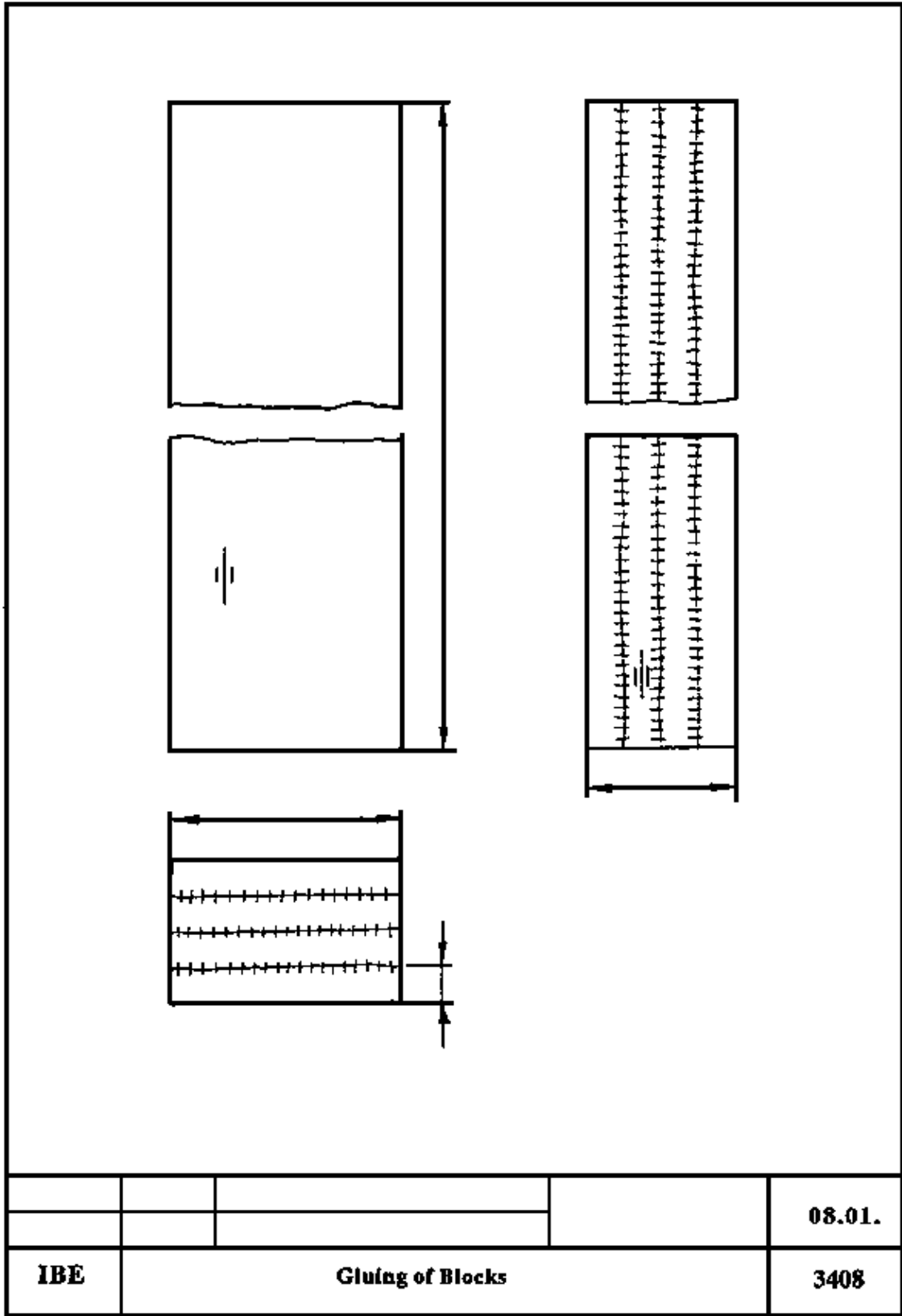
Excess glue must be pressed out of the joint slowly.

11. Check if all pieces of work are still under pressure and if they are still lying exactly above each-other.

The pieces of work can easily slip out of place! At the joint edges a bit of glue must come out.

12. Clean the gluing devices with water.

13. Clamp out the pieces of work after the necessary setting time.



Gluing of Block

Instruction Example 08.02.: Frame Edge Joints

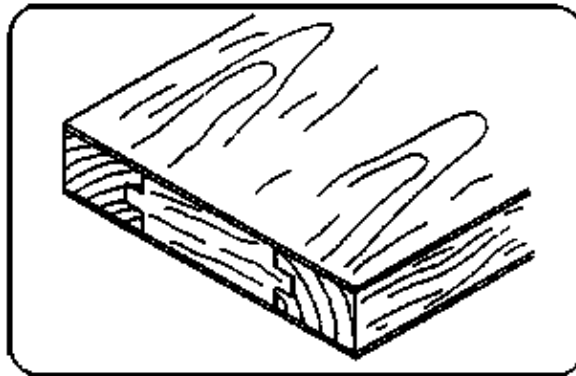
The planking of frame work constructions with plates will be exercised here.

Large face structural elements are often manufactured in a frame work construction with one-sided or two-sided planking. Less material expense, less weight and a high stability are the advantages of these

structural elements.

Material

- Prefabricated frame woods for a complete frame
- Two fibre boards or two plies, measures: frame size + 5 mm allowance in length and width
- Cold glue



Tools

Gluing device (brush)

Auxiliaries

Two glue stands, one sandwiching sheet, a glue cup

Necessary preparatory work

Manufacturing a frame in an applicable size. Preparing the plates.

Necessary basic knowledge

Construction, operation and working with a spindle press.

Hints on how to use glue.

Labour safety rules for working with presses.

Explanations to the working sketch

- 1 Frame edge joining grooved and elastic
 - 2 Frame edge joining bluntly clamped
 - 3 Frame edge joining mitre clamped
- Material thickness 20 mm, planking 3–4 mm

Sequence of operations	Comments
1. Prepare the working materials, check the press for regular technical condition.	Completeness control of the material and the condition of the sandwiching sheet (possible damages, glue residues) place the frame on the glue stands.
2. Adjust the press to the necessary height, place a board into the press for testing.	The spindles should not press over the length of the piece of work.
3. Prepare the glue according to the processing instructions.	Calculate the average necessary amount of glue.
4. Apply the glue on the frame woods. With the frame middle woods apply the glue only thin, place the board exactly on the glued frame, turn the frame with	Apply only 2/3 of the frame wood's width with glue on the outer edge, this process should be carried out by two people.

the board.

5. Apply glue on the opposite side of the frame woods.

6. Place the second board.

Two people are necessary.

7. Place the piece of work into the press and adjust.

Attention!

When placing the piece of work the boards on or under the frame can easily slip out of place, with too high pressing pressure the frame woods can be deformed.

8. Do not pull the spindle too strong.

9. Check the clamped in piece of work.

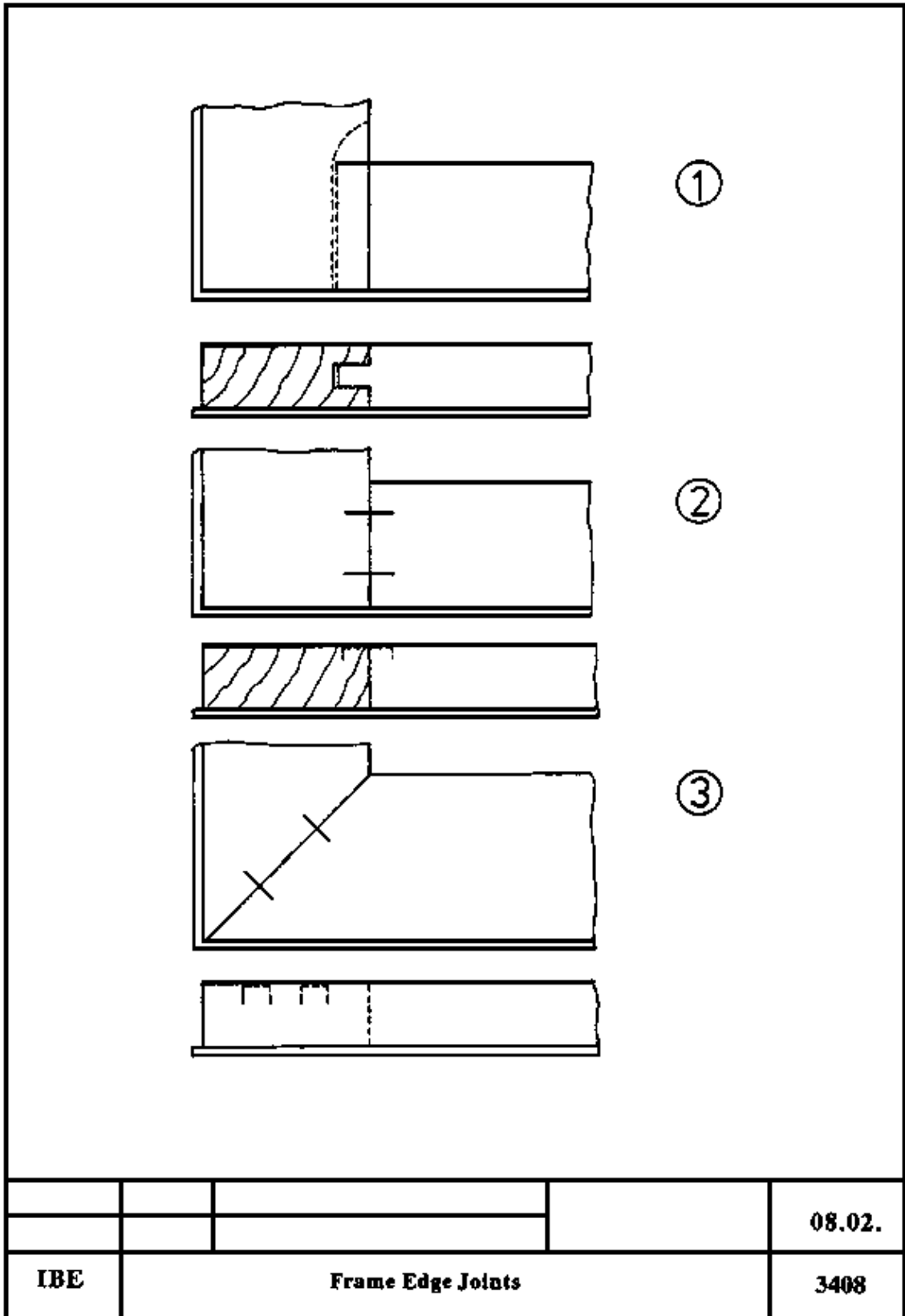
10. Clean the glue devices with water.

11. Unclamp after the setting time.

Possible extensions

Further frames can be planked.

If necessary the frames can be planked on one side only. When manufacturing a larger number of pieces of work of the same size several pieces of work are clamped above each other into the press. Here you should take into consideration the limited processing time of the glue.



Frame Edge Joints

Instruction Example 08.03.: Board with Reinforcement Strips

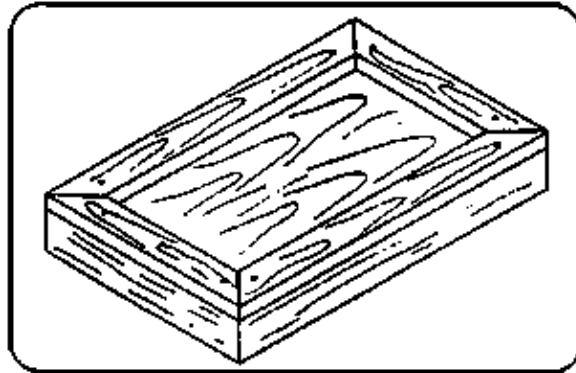
The gluing of a board reinforcement is practised here.

For optimal reasons it is often necessary to mount thick boards on tables or other pieces of furniture.

By fixing a board reinforcement thick looking pieces of work can be manufactured simply and material saving.

Material

- One piece of board material, measures according to the task
- Four strips as board reinforcement, measures according to the width and the length of the board material
- Cold glue, eight nails for pinning the reinforcement strips on the board material



Tools

Glue brush (thin), hammer (100 g), carpenter's pincers

Auxiliaries

Two glue stands, one sandwiching sheet, a glue cup, pencil

Necessary preparatory work

The strips for the board reinforcement are mitre cut according to the measures of the board. Arranged on the opposite side of the board they should form a frame. The external edges of the frame and the board edges must be flush.

Necessary basic knowledge

Construction, operation and working with a spindle press. Processing instructions for the applied glue. Labour safety rules for working with presses.

Explanations to the working sketch

No measures are given in the sketch, they should be added according to the working task.

Sequence of operations	Comments
1. Prepare the working material, check the press for regular technical condition.	Completeness control of the material and the condition of the sandwiching sheet.
2. Adjust the spindle height, place the sandwiching sheet into the press, position the board in the press for testing.	
3. Place the plate in the glue stands, mark the width of the reinforcement strips with a pencil on the board's face.	The face on which the reinforcements are to be glued is on top.
4. Prepare the glue according to the processing instructions.	

5. Apply the glue on the marked face and then pin the strip with two nails.
Cut off the overlength of the nails with the carpenter's pincers, strike the nail with a gentle hammer blow flush to the strip's face.

Apply the glue only up to 5 mm before the pencil marking, nails are stroken only 2–3 mm into the board material, they should prevent a slipping of the reinforcement.

6. Glue and pin the remaining reinforcement strips in the same way.

7. Place the board with the reinforcement strips into the press.

8. Tighten the spindle modestly.

Check the density of the joints and the right position of the reinforcement strips.

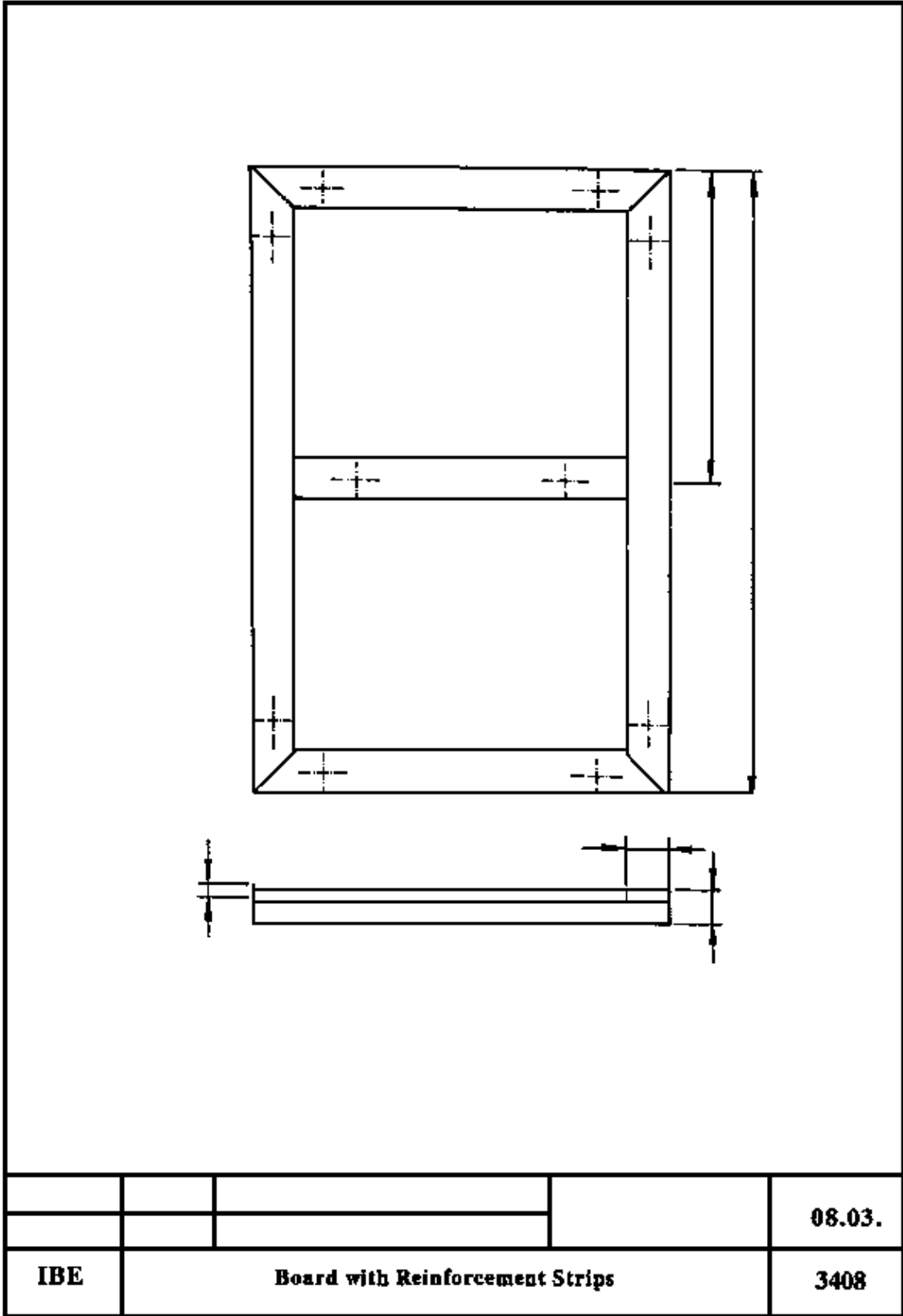
9. Clean the gluing device with water.

10. Unclamp after the setting time.

Possible extensions

Pressing on further board reinforcements.

Several boards of the same size can be pressed above each other at the same time.



Board with Reinforcement Strips

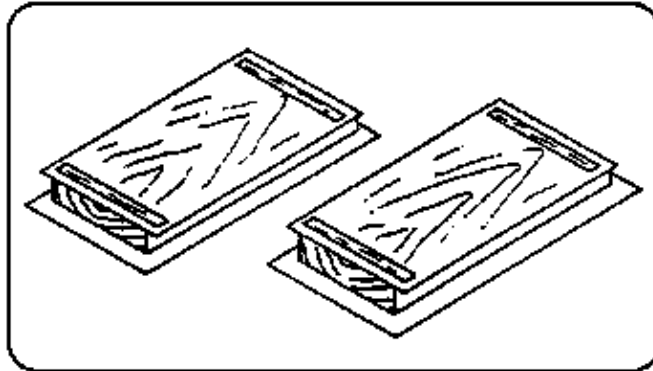
Instruction Example 08.04.: Veneer Glued Pieces of Work

Gluing of smaller pieces of work with veneers is exercised here.

Gluing of wood and wood material with veneer is a technology of material finishing. Along with the optical features of the material the physical features are improved too.

Material

- At least two pieces of work of the same thickness, length about 300 mm to 800 mm, width about 100 mm
- Pieces of veneer in double amount to the pieces of work, width and length each with 20 mm allowance
- Joint paper, cold or warm glue



Tools

Glue brush or glue putty knife

Auxiliaries

Two glue stands, two sandwiching sheets, a glue cup, stacked woods

Necessary preparatory work

Shaping the piece of work of solid wood or board material.

Cutting the pieces of veneer.

Necessary basic knowledge

Construction, operation and working with a spindle press.

Processing instructions for the applied glue.

Labour safety rules for working with presses.

Sequence of operations	Comments
1. Prepare the working material, check the press for regular technical condition.	Completeness control of the material and the condition of the sandwiching sheets.
2. Secure the pieces of veneer against formation of fissures on the upper side during the pressing.	The veneer side with the small surface fissures is glued on. The other side is secured with two joint paper strips.
3. The material to be veneered should be stacked on the glue stands. The pieces of veneer should be sorted, and be placed according to their application – front side and opposite side of the pieces of work.	According to the further application of the pieces of work the most beautiful pieces of veneer with the best quality are glued on the permanently visible front faces. Less or later not visible faces can be glued with veneer of less quality.
4. Adjust the press, place the pieces of work on the press for testing.	Adjust the spindle height. Only those pieces of work should be glued which are placed into the press together.
	Calculate the necessary of glue.

5. Prepare the glue according to the processing instructions.

6. Apply glue on the first face sufficiently and uniform, place the veneer face and turn the piece of work, glue the second face, place the second veneer face, stack the piece of work on a non-processed stack.

7. Place a sandwiching sheet into the press.

8. Distribute the pieces of work in the press on the sheet as assigned.

9. Place the second sheet carefully.

10. Tighten the spindle(s) carefully.

11. Tighten the spindle(s) to the necessary pressing pressure.

12. Clean the gluing devices with water.

13. Unclamp the press after the setting time, stack the pieces of work (for further drying and glue hardening) with stacked woods.

Attention! Too much glue causes glue penetration on the veneer face. No glue should appear on the outer faces of the veneer. This could cause discolourings of the veneer.

When using warm setting glue the sheets should be heated up to 60°C in advance.

Do not push the sheet, otherwise the veneers can slip on the pieces of work.

Tighten them only a little the glue must spread uniform, excess glue should get out on the edges.

Check the pressing material. (Visual control of the distribution of the pieces of work and the getting out excess glue).

Remove the glue residues from the sheets, small pieces of work can be leaned against a wall to dry.

Possible extensions

Gluing of further pieces of work with veneer.

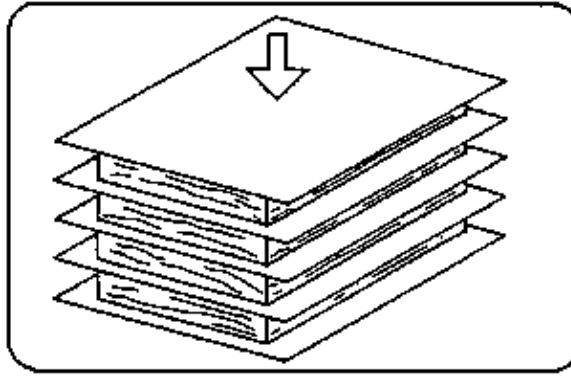
With smaller widths of pieces of work often a gluing of just one face with veneer is necessary.

Instruction Example 08.05.: Simultaneously Clamped Even Pieces of Work

The simultaneous clamping in of several even pieces of work of the same size is exercised here. For the production of furniture and structural elements for interior decoration mostly one or more or less large numbers of sink parts of the same size have to be manufactured. The large spindle lift of a press makes a clamping of pieces of work in several levels possible.

Material

- Shaped board material according to the present working task
- Prepared faces of veneer for further processing, doubled to the number of the board material
- Joint paper, cold or warm glue



Tools

Glue brush

Auxiliaries

4 glue stands, sandwiching sheets (pieces of work to be clamped + 1 = number of sheets), pencil

Necessary preparatory work

Shaping, joining, placing together and marking the veneer faces. Calculation of the necessary amount of glue.

Necessary basic knowledge

Construction, operation and working with a spindle press.

Processing instructions for the applied glue.

Labour safety rules for working with presses.

Sequence of operations	Comments
1. Mark the pieces of work with triangle marks and accordingly letter the veneer faces. Place the pieces of work in right order on two glue stands.	Do not mark with a copying pencil or with water soluble colour pencils. The dye-stuff penetrates through the veneers.
2. Put the prepared veneer faces in the same order as the boards and place them to be at hand.	Fissures which are caused by storage or handling on the front side are glued over immediately with joint paper.
3. Check the press and the sheets for their use.	When using warm setting glue the sheets are heated in advance.
4. Adjust the spindle height and position one piece of work in the press for testing.	
5. Prepare the needed amount of glue according to the processing instructions.	
6. Apply the glue with a putty knife on the first face, place the veneer and turn the piece of work immediately, apply glue on the second face and place the veneer, place the piece of work on both the glue stands.	The process has to be carried on till the clamping into the press without stopping, the glue should not set or dry before that.
7. Handle the next piece of work as said in 6. and so on with all pieces of work.	Do not apply glue on the outer faces of the veneer.
8. Pull out the press table of the press, place the sheet and then piece of work.	

9. Place the sheet on the piece of work, place the second piece of work, place the next sheet and so on until all pieces of work are placed and covered with a sheet.

The pieces of work should be placed exactly above each other, no spindle should press over the length of a piece of work.

10. Push the press table carefully to the stop into the press.

With a hard stop of the table the pieces of work can change their position.

11. Lower the spindle slowly and carefully and then pull softly. After a break of 0.5 min. pull again softly and again wait for 0.5 min.

The veneer faces start to glide on the glue surface with light pressure! When the excess glue has been pressed out of the edges the veneer cannot glide any longer.

12. Pull the spindle to maximum press pressure.

13. Clean the gluing devices with water.

14. After the setting time of the glue the pieces of work can be unclamped.

Pay attention when handling the unclamped pieces of work. The glue has not reached yet its full setting power and damages are possible.

15. Stack the unclamped material for drying and hardening on stacked woods on stands.

16. Clean the sheets from glue residues.

Possible extensions

The veneer faces can be replaced by layer plies or artificial leather faces. When using artificial leather a smooth piece of cloth is placed between the leather and the sheet, and the spindle is tightened only a little bit.