

ASSEMBLY OF A LOG BUILDING: BASIC PRINCIPLES

1. Before assembling the logs, **check the horizontal level of the foundations** using a laser level and a quality measuring tape, **as well as the consistency of the measurements and right angles**. The measurements must correspond with those in the drawings, and the diagonals must also match each other. The maximum permissible deviation is 2 mm.

2. It is the **drawings** of the log building's storeys and other levels, **plans** for floor beams and roof purlins, **as well as the layout of the walls**, that **determines the procedure and order of assembly** of the log building's frame. Once this has been determined, it should be easy to locate the necessary parts at any point during assembly using the attached packaging lists.

3. **Start by assembling the first layer of logs, but before attaching them to the foundations the right angles must be carefully checked and adjusted.** To do this, move the logs forwards and backwards, left & right until the diagonal measurements of every perimeter (room) match. This is **absolutely necessary!** If there are minor, permissible measurements or geometric deviations in your foundations, there is nothing that can be done about it at this point: the wall will overhang it, and it will be possible to add any extra necessary foundations or grind off any superfluous parts later. However, if the wall overhangs the foundation by more than two fifths of the log's thickness, assembly must be postponed until the errors in the foundations have been eliminated.

N.B. Remember to **position your external wall logs so that they hang over the outside edge of the foundations by 3 cm** to allow position for the rain groove. This overhang can tolerate a slight additional deviation and can be used to compensate for any potential discrepancy between the first layer and the foundations, or in the setting of right angles.

4. If the foundations are not as level as they need to be, the **first layer of logs must be levelled**. This means **laying wood supports of varying thicknesses** under the first layer so that they gradually compensate for the deviation in level. Supports must be placed at the corner junctions, at the ends of free-standing walls and in the middle of logs, or at intervals of 2 metres for longer logs. Only a sufficient number of supports will ensure a stable building, meaning that the logs will not bend and the supports will not be compressed.

5. **Unless you ensure the quality of the foundation level and/or all the right angles, the logs laid over apertures will inevitably show discrepancies.**

Remember that angle deviations at the foundation level will increase as the walls go up. Thus perpendicular walls will not be vertical and this will create gaps between connecting walls as they rest upon the lower logs. Moreover, once the assembly of the log frame has reached this stage, it is extremely difficult to raise and tighten up the remaining walls, or to pull into the correct position walls which are out of vertical, have fallen down, have been pushed aside or have not been secured.

Is it worth taking the risk and breaking the overhangs, as well as other fragments, off of these log layers? Even if you succeed in pushing the joints into place, even if you manage to position the covering logs, the deviations in measurements and the inability to connect the logs with subsequent parts will not disappear. The discrepancies will make themselves known over and over again – when positioning the purlins, the beams and the grooves, and elsewhere.

6. **There must not be any gaps between the assembled logs.**

This is the main evaluation criterion for a correct and successful assembly.

It means that all logs must be both pulled into the joints and tightened to the preceding logs. It is recommended that each log is tightened and driven into its place one at a time; however, experienced assemblers may be able to tighten the logs in an expert manner once every three layers.

If there are no gaps between the logs construction is going well. It means that there will not be any gaps in the joints either.

7. Required preparation. Before starting assembly, carefully **plan and prepare the appropriate points where each wall will be being tightened.** Unless the log building is placed on levelling (temporary) supports, saturated planks or special spacers, **small recesses will need to be created in the appropriate places** in the first layer of logs, in order to thread the belts under the walls.

Be careful with the external walls: they **must not** touch the rain groove. When tightening the walls, place a protective lath in the rain groove or put protective wooden boards around its sharp edge.

It is best to use plywood boards, as these can be reused.

8. To tighten the logs, use flexible cargo securing straps with a fastening mechanism that has a tension force of at least 4 tons. The straps must be placed at proportionate distances from both the ends of the logs and partitions; the fastening mechanisms of the straps must be located on opposite sides of the logs to balance the tightening process.

Tighten the straps consecutively and gradually, and strike vertical blows as close to the corner joints as possible. Then tighten the straps again, repeat the strikes, tighten again and strike again, until the log has settled.

To tighten the roof fronton with these straps, use the triangular external roof ends, left there specifically for this purpose. To ensure additional fronton stability, it is recommended that the rafters are attached to these ends from both sides using a sliding joint.

N.B. Place short protective boards under the straps on the sharp edges of the profile and at other exposed points. Place some underneath the fastening mechanisms as well, otherwise these will press into the logs and damage their surface.

9. Only strike the upper side of the log on the horizontal side of its profile.

A wet or heavy end of a log, about 70 cm long, with clamps driven into its sides for handles, is an ideal tool for this. The perfect blow is accelerated and balanced by the assembler, allowing this improvised hammer to fall freely.

TIP: It is recommended that the straps on the tightened logs are not released until at least one of the intersecting or perpendicular wall logs has been tightened. This means that there must be a sufficient number of securing straps available, and they must be in good condition. This will make the work easier and ensure faster assembly of the frame of the log building.

10. Before placing the next log on the wall, **insulation (bands are suggested) must be fitted in the groove of the log and stapled into place.** The insulation must be carefully cut or melted around the pegs, electricity cables and drill holes, and the edges carefully stapled, making sure that no bits of insulation fall into the drill holes, that pegs cannot get stuck, that parts or pipes of the installations do not get caught, etc. This is the only way to ensure that everything will fit into these drill holes.

Minimum thickness insulation bands must **also cover the points of contact at corner joints**, covering the inner, invisible part, and being stapled on from the top down. Depending on the thickness of the material and the adjusted stretch of the joint, this will make it easier or harder to fully push the logs into the joints - to fulfil the basic requirement of leaving no gaps, not even the tiniest ones, between logs.

11. Drive wooden ø60 mm pegs into the tightened walls at regular intervals. The optimum connection would be one that connects four logs, in which the peg goes fully through two logs, with its ends halfway inside the upper and lower logs. However, if there is a stitched log in the middle, the pegs will often only connect two logs. In order to be able to start inserting the next peg, the most important thing is to measure or calculate the length of the pegs so that they can be countersunk into the middle of the log that is currently being worked on.

As drill holes usually go in straight lines through the logs to the top of the building and the ends of the pegs meet, **a settling reserve is only needed for the upper or final pegs, as well as where pegs have been used to solve specific log joining situations:** for example, where a construction element is covering a drill hole at the top. It is also recommended that you consider changing the pattern of the pegs in each wall, as well as alternating the peg transitions, thus strengthening connections between the logs.

N.B. Do not confuse peg drill holes with those for electricity cables and other services; it is difficult to extract an incorrectly inserted peg. So you will lose other drill holes that are equally important.

12. Non log-built constructions:

The most important thing is to **carefully follow the process and make sure that the settling of the log construction is not encumbered or even blocked**. Rafters, roof planks and any other materials and installations that are or will be connected or attached to the **logs must be able to move (slide) and also space is left for a settling reserve**, so that these materials do not endanger the settling of the building. This relates to the frames and partitions, windows, doors, chimney and fireplace masonry, tiling, furniture attached to walls, shower cubicles, stairs, drains, pipes, cables – in short, all the accessories of the building and their fittings.

13. Logs exceeding 8 m in length, as well as other special logs, are stitched to the insides of corner joints, and these joints are then always covered by placing cross-beams over them. **Use special ties**, included in the log-building set, **to tighten the ends or halves** of these parts. See the manual.

Inserting.

Insert a **white** plastic* semicircle in the drill hole of the **right-hand** element and angle it towards the centre of the joint. Screw an M16 threaded bar (right-hand thread) **clockwise** in a semicircle, until its end is **4-6 mm behind** the end of the element, when semicircle is pressed close to the detail.

Insert a **black** semicircle in the drill hole of the **left-hand** element and angle it towards the centre of the joint. Screw M18 threaded bar (left-hand thread, with a nut) **anti-clockwise** in a semicircle, until the thread catches. Continue screwing using a 24 mm spanner, until the end of the bar is **10-12 mm over** the end of the element, when semicircle is pressed close to the detail. Move it towards the drill hole, so that the end of the nut does not hang over the end of the log.

N.B. If the semicircles are inserted the other way around, adjusting with the left hand will be less comfortable and it will also be harder to find the thread. Note also that in this case the directions of towards you and away from you will change when tightening and dismantling (see below).

Then lift the log parts into the corner joints in the correct places in the building; however:

The log parts must not be screwed together before lifting.

The wooden pegs must be driven into the respective parts before tightening the construction.

Joining.

Use your right hand to pull out the nut on the left-hand side by ~ **8 mm** and centre it;

Use the fingers of your left hand to press down on the red semicircle, thus fixing it in place;

Hold it down and use your right hand to:

1. Adjust the position of the threaded bar and nut to successfully and **immediately** centre it into the nut;
 2. Use your fingers to turn the threaded bar **anti-clockwise**, until you manage to screw it into the nut;
- Continue turning the threaded bar until its end hits the nut.

Tightening.

Use a 24 mm spanner to turn the nut **towards you** or **anti-clockwise**;

Continue until the joint is sufficiently tight;

Use the insulation material to fill the remaining space in the tightening incisions.

N.B. After tightening, both ends of the threaded bars must be behind the semicircles. This can be verified from the top, by looking into the drill holes. It is very important because only so ties will provide the maximum of tension resistance.

Dismantling.

Turn the nut **away from you** or **clockwise**, until the resistance weakens;

Holding the nut, use your fingers or pliers to turn the threaded bar **clockwise**;

Then screw the released threaded bar out of the nut;

Before lifting the element off, screw both bars in to return them to their original positions and slide their ends in. See - p.1.

* - High hardness and durability nylon: Ertalon®6PLA. Read more on: quadrantplastics.com

14. Key points regarding roofs:

- The log building must be assembled with a lot of accuracy and care, from the first log to the last, so that the purlin support surfaces match the incisions in the external walls of the building perfectly, the finished construction is well roofed and it has straight support planes for the ceilings. If assembly is rushed, the end result will be a disappointment: the planes will definitely not be straight and all the other imperfections will be difficult to fix as well.
- The side grooves cut into the ceiling triangles are for inserting ceiling planks, using 38x50 mm counter-laths to drive them into place. Sometimes, **only around the purlins**, it will be necessary to deepen the grooving and/or create a recess in the ceiling planks to be able to drive the outer planks in deeper, behind the contact lines of the logs. We are leaving the grooving a little less deep in such spots, so that the joining corners do not get broken off before the logs are set in place.
- Pressing laths and ledges may only be attached to the **upper or lower purlin**, depending on the direction in which the settling reserve has been left, and to the ceiling planks. Never connect them to the middle purlin logs.
- **Rafters must not be directly connected to the logs.** They may only be attached to each other – in twos, at the moving joints and on the ridges of the building. Laths and planks may be attached to the rafters in as many layers as necessary. If you are attaching wind latches to the lower ends of the rafters, they must allow the rafter to slide at least 3 cm.
- There are many different ways to construct a roof, and various kinds of drains, systems, insulation materials and their thicknesses, and innumerable combinations of these elements! It makes no sense to provide detailed instructions for every kind of roof, when all you really need to know can be found in sections 12 and 14.