

# AL220 ALUMINIUM ROOF TOWER INSTALLATION MANUAL

**DO NOT** install this equipment unless you have been instructed in its safe use and operation and have been given permission.



Never install equipment during storm activity. There is no safe location outdoors during a storm event. If you can hear thunder you are in danger of being struck by lightning.

Look up and live. You may be killed if the equipment comes in contact with powerlines. Always think ahead and plan your task in advance.

## PERSONAL PROTECTIVE EQUIPMENT



Gloves recommended.



Sturdy, enclosed footwear must be worn at all times.



Personal Fall Arrest System (PFAS) needed for at-heights installation. Qualified personnel only.



Hard hat recommended.

## GENERAL SAFETY & REGULATORY REQUIREMENTS

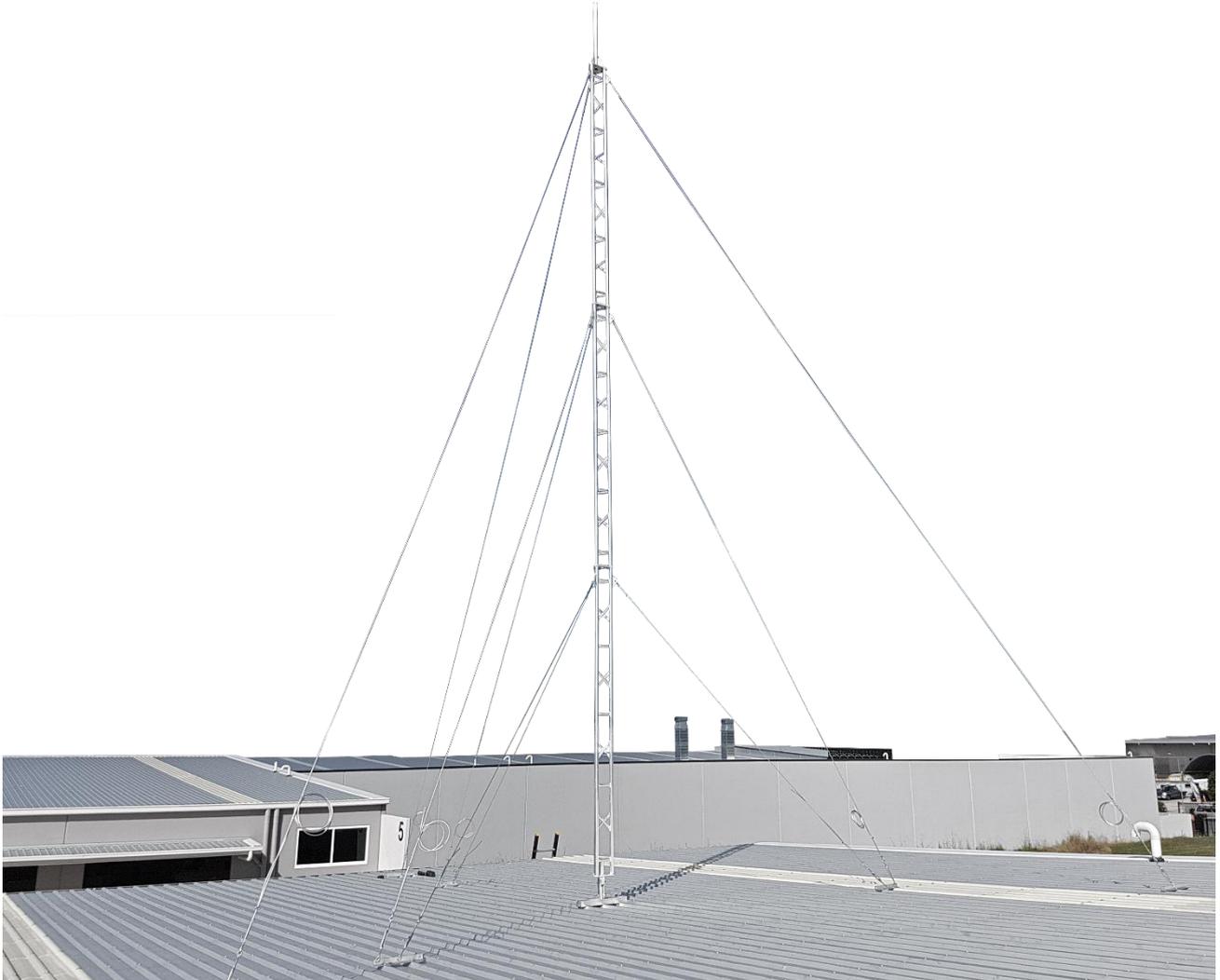
### DO

-  Check workspaces and surrounding area to make sure no slip/trip hazards are present.
-  Check installation area for obstructions and electrical cables.
-  Make sure underlying roof structure is structurally sound. You may need an engineer to inspect it.
-  Make sure you follow correct weatherproofing process.
-  Make sure installation is done by qualified personnel only. Check state and local regulations for safety and building code requirements. The installation might need council development approval.

### DON'T

-  Don't install near powerlines.
-  Don't install during a storm event.
-  Don't install on your own. A minimum team of two is needed for most tower sizes. Larger teams are needed for larger towers.

## COMPLETED INSTALLATION



## INSTALLATION PROCEDURE

These are the steps for installing the AL220 series aluminium roof lattice tower onto an ordinary metal roof. The tower size used in this installation example is a 9.3 metre three section model.

### Step 1.

Unload and check supplied materials. Package should include:

- 2x AL220 3.1 metre aluminium lattice modules
- 1x AL220 3.1 metre aluminium lattice base module
- 1x AL220 spigot or headframe (spigot pictured)
- 1x AL220 multi-axis base with M12 bolt + nylock
- 6x guy wire anchor plates
- 1x spool of 6 mm 7x19 strand guy wire (galvanised or stainless steel)
- 9x turnbuckles (galvanised or stainless)
- 36x wire rope clamps / saddles
- 18x 7/16" bolts and nylocks
- 18x guy wire thimbles

You will also need:

- 2x 16 mm / 7/16" spanners (or shifters)
- 2x 18 mm spanners (or shifters) for M12 (multi-axis base)
- Spirit level
- Measuring tape
- 11 mm socket for wire rope clamps / saddles
- Socket set
- 6 mm drill bit
- Driver / drill
- Weatherproofing silicone
- Additional roof screws as necessary

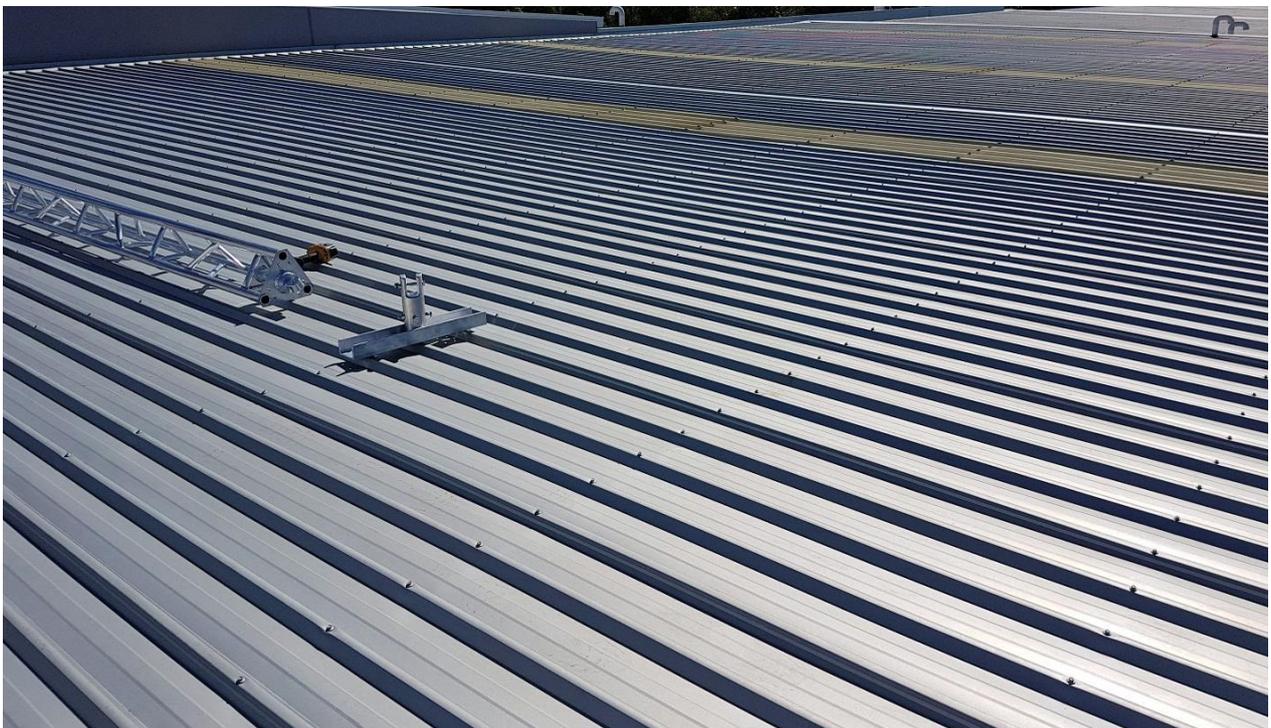
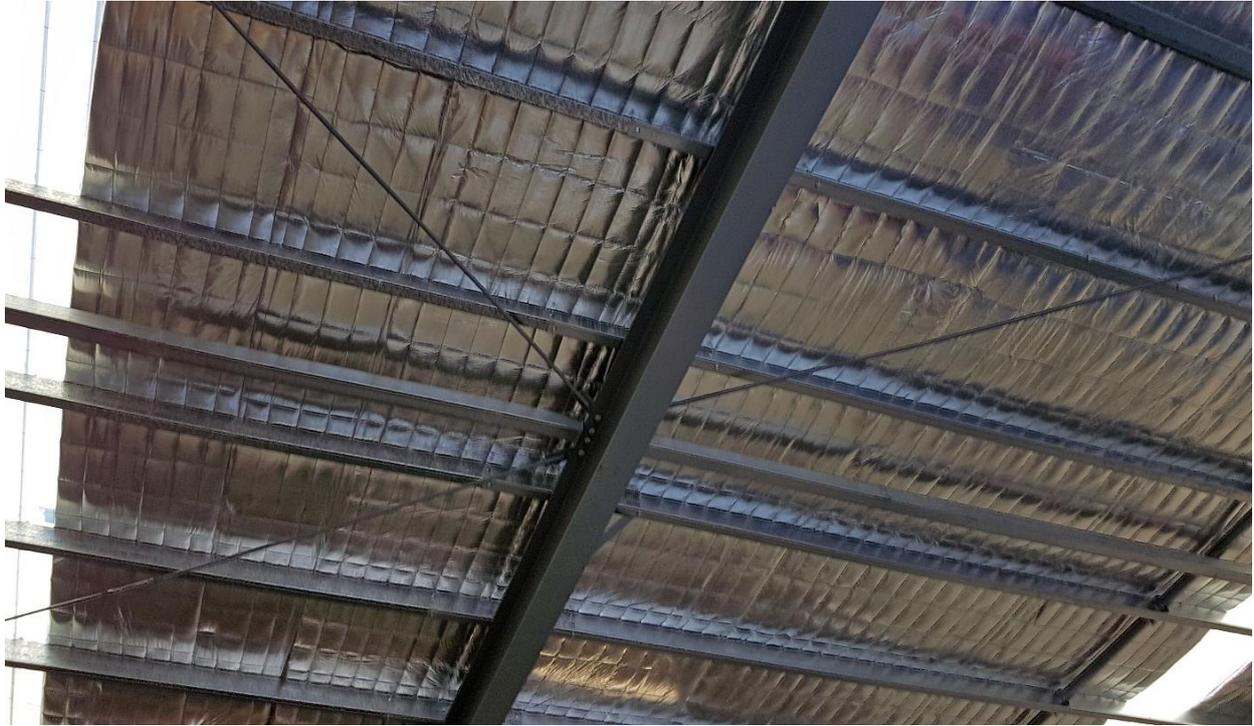


## Step 2.

Inspect underlying roof structure and identify installation position for tower multi-axis base.  
*Ideally you'll raise the tower in the direction of the downwards slope. This makes lifting easier and installation safer.*

Make sure there is a sufficient area available for guy wires.

Use industry standard calculation tools to determine radii and associated guy wire lengths.  
*A 9.3 metre tower on this flat roof needs a 5400 mm radius to maintain optimal 60° guying.*



**Step 3.**

Position multi-axis base.

Remove and replace roof screws. Apply plenty of silicone. Secure with additional roof screws if necessary.  
*Larger roof towers use a more advanced base frame to better distribute compression load.*



**Step 4.**

Attach AL220 3.1 metre lattice base module to multi-axis base using M12 bolt.

Thread nut until firm but don't fully tighten yet.

*Don't attach additional tower modules at this stage.*



**Step 5.**

*To safely raise the fully assembled tower it's important to complete the guying for the first 3 metre section so that when you raise the tower, the first 3 metre section can be anchored off and the tower will remain upright.*

Prepare guy wire attachment by attaching thimbles to tower.

Widen the thimbles by hand and close once attached. Loop the guy wire through the thimble and use 2 saddles to clamp the guy wire.



**Step 6.**

Push the first guy wire saddle as close as possible to the thimble.  
*Observe the “never saddle a dead horse” rule, that is, nuts must face the direction of the main cable and not the severed tail.*

Use an 11 mm socket to tighten saddle nuts.  
*Alternate tightening to make sure both nuts are as tight as possible.*



**Step 7.**

*In this example we're using 6 guy anchor plates, attaching the 3 metre and 6 metre guy wires to our inner plate. To maintain a 60° pitch for our 6 metre guy wires the inner 3 anchor plates are placed at a distance of 3.6 metres from our base plate.*



**Step 8.**

*Depending on anchor plate variation, you might need to drill holes matching the corrugation distance on your roof design.*

Remove and replace roof screws and secure plate tight.

Use brush or blower to remove metal shavings.



**Step 9.**

*To attach guy wires you need to raise the first tower section to make sure the measurements are correct. Each section weighs about 12 kg, so the tower can safely be raised by hand.*

Have one team member hold the tower section in place, making sure the guy wire tabs stay lined up with the guy anchor plates.

Lock off the rotational axis by tightening the 4x M12 locking bolts on the multi-axis base using 2x 18 mm spanners or shifters.



**Step 10.**

Attach guy wires to their anchor plates using turnbuckle assemblies.

Unthread each turnbuckle to about 80% of maximum.

Repeat steps 5 and 6 to loop guy wire through the turnbuckle eye, using a thimble and 2 wire saddles and tightening with an 11 mm socket.



**Step 11.**

Once guy wires are taut, loosen and detach only the front guy wire from its anchor plate and lower tower back down for assembly of the remaining sections.

**IMPORTANT!**

*Make sure the rear 2 guy wires stay attached. This is important to ensure the safety of the lift.*



**Step 12.**

Attach each AL220 module section using 6x 7/16" bolts and nylock nuts and 2 shifters. Alternate tightening to make sure bolts are tightened equally and sections are aligned properly.

Repeat this process to attach the spigot or headframe.



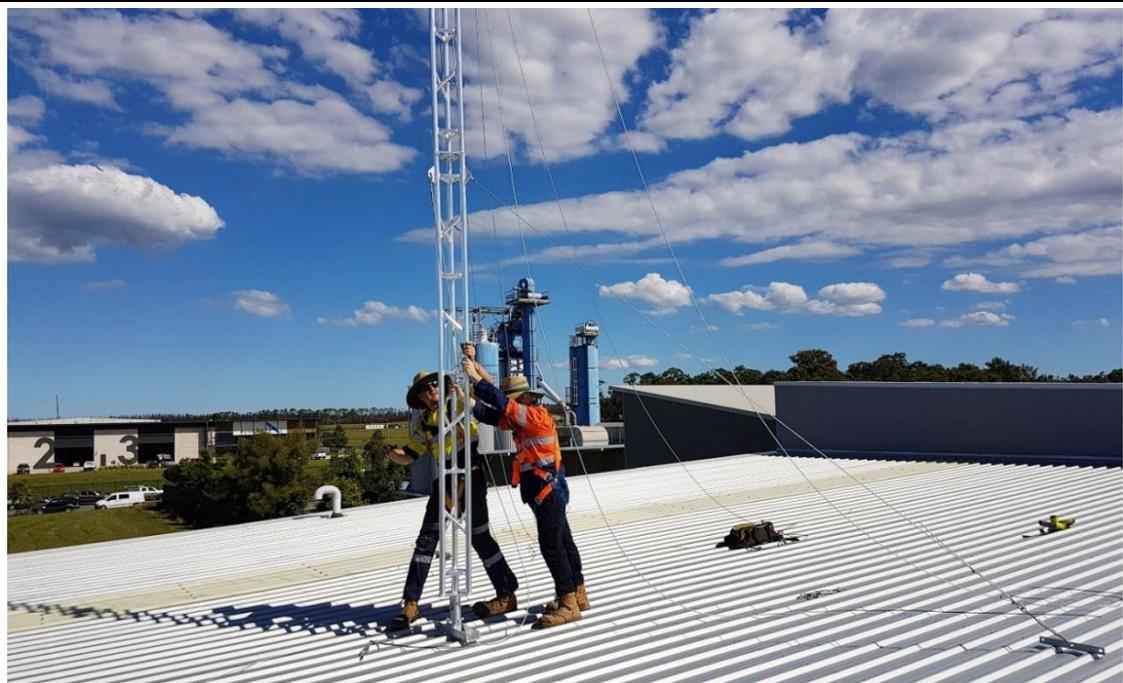
### Step 13.

Before lifting you might want to attach the outer 3 guy anchor plates. If you do this, make sure the rear guy wires remain attached. *In this example we are attaching our 6 metre guys to our inner anchor plates, so this is not necessary.*

Lift the tower.

#### **IMPORTANT!**

Lifting is the most safety critical step. **DO NOT** attempt it if you are not appropriately qualified. While the tower is lightweight aluminium the lift becomes increasingly difficult as you move towards the centre. We recommend you have a third team member to help the lift by pulling from the front. Larger towers require a gin pole and winch assembly. Very large towers may require a crane to complete the lift. Use your professional judgement and always be safety conscious.



**Step 14.**

*When positioned upright the rear guy wires will now be taut. One team member should now attach the front guy wire to its anchor plate.*

Tighten the M12 hinge bolt (vertical axis) on the multi-axis base using an 18 mm spanner / shifter.

*The tower should now remain upright under stable weather conditions. Use your professional judgement and always be safety conscious.*



**Step 15.**

Repeat step 10 to attach 6 metre guy wires to the inner anchor plates using turnbuckle assemblies.

Tighten turnbuckles until guy wires are taut.

*At this point you might want to use a level to perform adjustments.*



**Step 16.**

Attach the outer 3 guy anchor plates now if you haven't already.

Repeat step 10 to attach turnbuckle assemblies to the 9 metre guy wires.



### Step 17. – FINAL STEP

The tower is now fully installed.

Adjust turnbuckles, using a spirit level to make sure tower remains straight.

*Larger towers may need measurement using a guy wire tensioner to make sure they meet engineering specifications for the wind region.*

Tidy excess guy wire cabling and clean installation environment as per your environmental policy.



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