

General Guidance For Users



INTRODUCTION

Technical Briefing Notes (TBN) are produced by Lakeside Industries Ltd and are primarily for guidance in connection with ALTO Access Tower Products which are classified as either ALTO Medium Duty (MD) or ALTO Industrial (HD) aluminium mobile access towers. However, the information contained may be of value to users of other makes of BS EN 1004-1:2020 compliant towers or BS 8620 podiums.

This TBN deals primarily with towers complying with BS EN 1004-1:2020, however it also contains information relevant to tower structures which fall under BS 1139-6. It is intended to give guidance on good practice for the safe use of mobile access towers.

WORKING AT HEIGHT

Work at Height is, statistically, the most dangerous activity in the workplace in terms of serious accidents or fatalities in the workplace. The primary focus at all times when using access equipment of any make or format must be to ensure the safety of all concerned. For all working at height a Risk Assessment and Method Statement must be undertaken before setting out on the task under consideration.

The primary objective of this document is to assist users in the safe utilisation of Alto Access Towers. It is not a definitive instruction manual, nor is it a substitute for adequate training or qualification. In the UK, all work at height is subject to The Work at Height Regulations 2005. If you are using any item of work at height equipment in the workplace, including a scaffold tower, either as an employee or as a self-employed person, the Work at Height Regulations apply to you. You must ensure that not only the person building the tower is competent but also those who specify, use, supervise or manage the use of a tower are competent to do so.

A competent person is a person who can demonstrate that they have sufficient professional or technical training, knowledge, actual experience, and authority* to enable them to:

- Carry out their assigned duties at the level of responsibility allocated to them;
- Understand any potential hazards related to the work (or equipment) under consideration;
- Detect any technical defects or omissions in that work (or equipment), recognise any implications for health and safety caused by those defects or omissions, and be able to specify a remedial action to mitigate those implications.

* **Note:** “authority” here means delegated authority to the individual by his employer to carry out a certain function or duty.

SCOPE

This TBN applies to mobile aluminium scaffold towers made from prefabricated elements having dimensions fixed by the design and four legs with castors, providing one or more platforms, as defined in BS EN 1004-1:2020.

Unless covered by and compliant with another relevant UK recognised standard- such as BS 8620 or BS 1139-6 we strongly advise against the use of towers or devices for working at height which are not certified as complying with BS EN 1004-1:2020.

Any tower conforming with BS EN 1004-1:2020 should be supplied with a current manufacturer's assembly guide and safety manual, which, in turn must conform to and be certified to the European Standard covering "Rules and Guidelines for the Preparation of an Instruction Manual" BS EN 1004-2:2021. Other relevant regulatory considerations include:

- Health & Safety at Work Act (1974)
- Work at Height Regulations (2005)
- Management of Health & Safety at Work Regulations (1999)
- Health & Safety in Construction HS(G) 150
- HSE Information Sheet CIS 10

STANDARD TOWER TYPES

Towers are constructed using a range of components - commonly frames, horizontal and diagonal braces, platforms, toeboards, adjustable castors or base plates, and stabilisers or outriggers.

AGR (Advance Guard Rail) towers incorporate an advancing guardrail system which replaces most or all of the horizontal and diagonal braces in a tower.

The two most popular types of mobile aluminium scaffold towers are stair towers and ladderspan towers. Stair towers incorporate a diagonal staircase within the tower structure to gain access to each platform. Ladderspan towers use vertical ladders fixed into the end frames of the tower to gain access to each level.

Additionally there are other kinds of tower or tower related structures, including the following:

- Stairwell Towers
- Room Scaffolds
- Podium Units

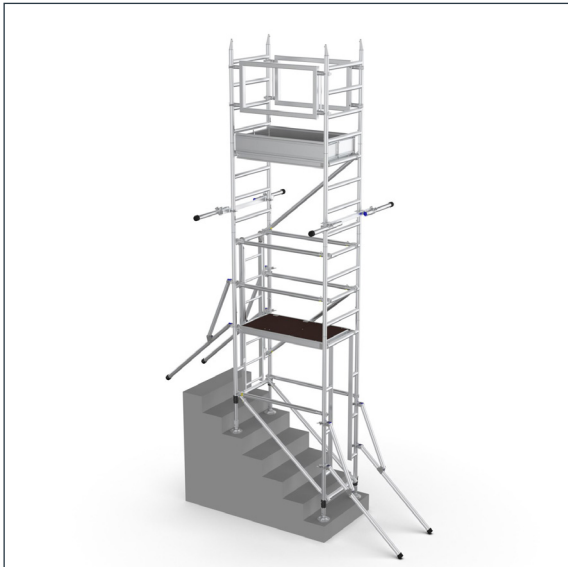
STAIR TOWER



LADDERSPAN TOWER



STAIRWELL TOWER



ROOM SCAFFOLD



PODIUM



SAFE WORKING LOADS

In terms of capability, aluminium towers are of three basic types:- Industrial or Heavy Duty, Medium Duty and Lightweight.

INDUSTRIAL/HEAVY DUTY TOWERS

The ALTO HD tower is an industrial tower, constructed from 3mm x 48mm tube. The maximum vertical load on the ALTO HD tower (including the tower self weight) should not exceed 2500kg.

MEDIUM DUTY TOWERS

The ALTO MD tower is constructed from a unique castellated 2mm x 48mm tube. The maximum vertical load on the ALTO MD tower (including the tower self weight) should not exceed 2000kg.

LIGHTWEIGHT TOWERS

ALTO do not make a tower categorised as Lightweight. The maximum vertical load on lightweight towers (including the tower self weight) typically varies from 650kg to 950kg.

After allowing for the weight of the structure, this means that these towers have very limited payload capacity. Unfortunately, a number of manufacturers categorise their towers as “heavy duty” or “industrial”- when in fact they are nothing of the sort. Most of these towers claim to have class 3 capacity, but a careful inspection of their manual will reveal that they are limited to lower than class 3 loads, especially in double width format. We regard these towers as unsuitable for all but the lightest and most undemanding of tasks. Using one piece of equipment with inadequate capacity for the task in hand presents obvious and avoidable risks from a Health and Safety point of view.

Some towers claiming to be BS EN 1004 compliant towers are either not actually certified or are advertised at package prices which do not include all of the components for a fully compliant tower.

As a general guide, if a product is described as “compliant” you can assume it has not been tested. There will be a reason for this.

There are no other towers on the UK market which offer the capacity or durability of ALTO towers.

COMPLEX STRUCTURES

Complex structures can be created using standard tower components - sometimes with additional enabling elements. These include Linked Towers, Bridge Towers, Large Deck Structures, Cantilever Towers, Tall Towers and Stepped Towers.

LINKED TOWERS



BRIDGE TOWERS



LARGE DECK STRUCTURES



CANTILEVER TOWERS



STANDARD TOWER COMPONENTS

Set out below are examples of the main types of components in standard towers.

BRACES

The braces are either horizontal or diagonal and are identical apart from the length. The ends have a spring-loaded pin which locks the hooks on to the horizontal or vertical members of the frame. It should not be possible to remove a brace without first disengaging the locking mechanism.



TOWER FRAMES

Standard frames are available in two widths- single (0.8m wide) and double (1.4m wide). Frames vary in height, generally between 1.0m and 2.5m tall. The number of horizontal rungs varies from 2 to 8 depending on the frame type. They can also have a built-in ladder. Bespoke frames are available in treble width (approx 2.0m) and quintuple width (approx 3.1m).



ACCESS LADDERS/STAIRS

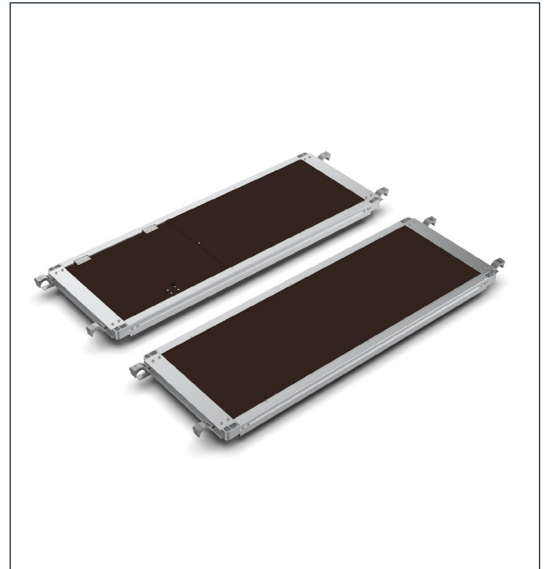
Access to working platform(s) is gained by vertical ladders integrated into the frames or clip in stair units.

Some special purpose towers have removable vertical ladders - generally to facilitate walkthrough access.



PLATFORMS

Platforms comprise of an aluminium frame with 2 hooks at each end that have a locking device to prevent the platform lifting off in high winds. Decks comprise slip resistant ply. Trap platforms are used to allow access inside the tower. The trap should be designed such that it closes automatically when released. All platforms will be at least 0.6m wide and have a minimum length of 1.0m.



AGR FRAMES

These are designed to be a substitute for horizontal & diagonal bracing. They are installed during the assembly process, creating a guardrail in advance of the installation of the next level of platforms.



TOEBOARDS

Toeboards shall have a minimum height of 150mm and must be fitted all the way round each working platform or, any platform used for storing materials. These are required to prevent tools and materials from falling off the working platform whilst the tower is in use.



STABILISERS/OUTRIGGERS

Stabilisers or outriggers are attached to increase the base dimensions to achieve adequate levels of stability (see "Tower Stability" section below). Alto stabilisers are fitted with self-aligning anti-slip feet. They are available in different sizes to ensure a compliant degree of stability for the relevant tower height.



CASTORS/BASE PLATES

Adjustable castors generally between 125mm and 200mm diameter with a brake mechanism for locking the castor, an adjustable leg for levelling the tower and a mechanism to prevent the leg from falling out of the frame. For towers which are not required to be mobile, adjustable base plates may be substituted. These also have an adjustable leg for levelling the tower and a mechanism to prevent the leg from falling out of the frame. Alto base plates also have holes in which allow the tower to be secured to the surface as part of a stability solution.



COMPLEX TOWER COMPONENTS

Complex towers generally require some enabling components to create the structures as safe and practicable to assemble, use and disassemble. Examples of some of the more common items are shown below.

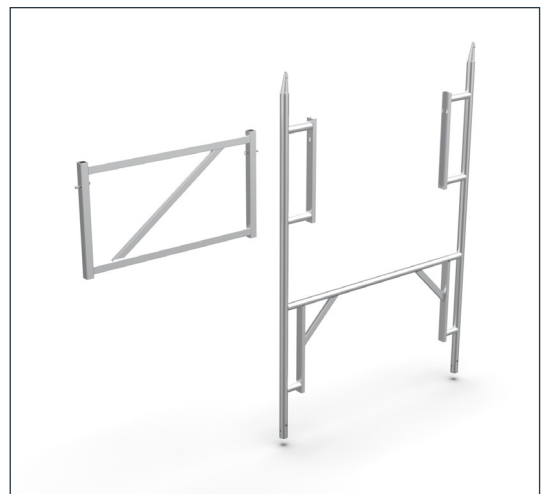
GROUND LEVEL WALKTHROUGH FRAMES

These can be either substantially full width or single width portals in a double frame for special applications. Extra tall frames are available where public access portals need to be created. Where ladder sections need to be retained, special narrow portal frames are also available for double width towers.



UPPER-LEVEL WALKTHROUGH FRAMES

These are designed to facilitate safe build of complex linked towers using the 3T process and allow free movement for operatives around the structure once the structure is complete.



SIDE WALKTHROUGH BRACE PANELS

These frames are designed to allow safe lateral ground level access into a tower bay.



PLATFORM BEAMS

These are primarily used to transversely link towers to create large deck and bridging structures.



ACCESS BRACKETS

These are used to create cantilever sections in towers.



GUARDRAIL POSTS

In some bespoke tower structures, it is necessary to create guardrails where no suitable frame uprights are present. Guardrail posts are a convenient way of establishing a suitably positioned post.



INFILL PLATES

Where large decks and transverse linked towers are created, there is a need to close off the gap between sections of platform units. The Infill plate creates a secure trip free method of providing a continuous surface.



SOCKETS AND TOE BOARDS

Complex towers can be created in an almost infinite variety of sizes and shapes. Our standard one-piece foldout toe board is not suitable for these structures.

The Alto HD platform has a designed in location to accept a socket which allows timber toeboards to be added to suit any layout of the working platforms.



SCAFFOLD COUPLERS

Scaffold couplers are used to attach a mobile scaffold tower to tying in components or additional stability solutions such as buttresses. Standard scaffold couplers can be used on the ALTO system as the tubing is the same diameter as scaffolding and of an adequate strength to deal with the forces involved. NOTE: Special, non-standard couplers must be used on most other scaffold tower systems, obtainable from the supplier.



BUILD METHODS

There are two recognised safe methods of building an access tower recognised and endorsed by the HSE and PASMA. These are: Through The Trap method – or “3T” and Advance Guard Rail method – or “AGR”.

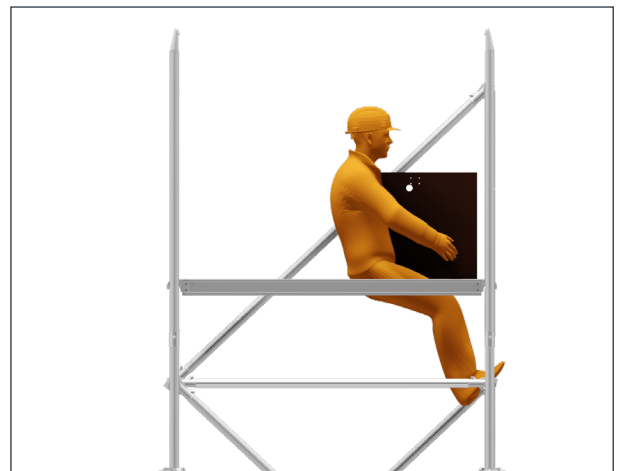
3T METHOD

In the 3T method, once the base section of the tower is established and new tiers of tower are added, as each new level of platform is installed, the operative takes up a working position in the trap door of the platform, standing on the ladder and leaning back against the edge of the trapdoor aperture

Then, from this position the operative fits the horizontal braces 500mm and 1000 mm above the platform level (i.e. on the first and second available rungs). If the far end of the guardrail braces don't fully engage when they are put in place, the operative fully engages it when first climbing up onto the platform. This process ensures that operatives never have to stand on an unguarded platform.

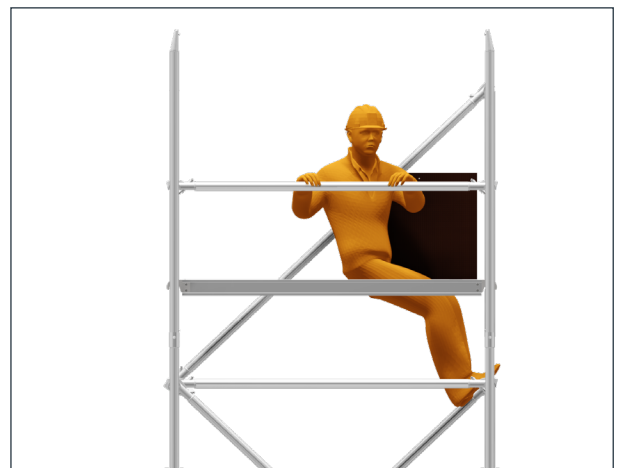
Step 1:

As each new level of platform is installed, the operative takes up a working position in the trap door of the platform, standing on the ladder and leaning back against the edge of the trapdoor aperture.



Step 2:

From this position the operative fits the horizontal braces 500mm and 1000mm above the platform level (i.e. on the first and second available rungs). If the far end of the guardrail braces don't fully engage when they are put in place, the operative fully engages it when first climbing up onto the platform. This process ensures that operatives never have to stand on an unguarded platform.



AGR METHOD

An AGR tower uses prefabricated frames to derive the rigidity and structural integrity of the tower instead of the horizontal and diagonal braces used in traditional 3T assembly methods. AGR frames lock into the tower frames to create a fully locked and rigid structure.

As each new level is added onto a tower, the operatives first install the AGR frames and tower frames from a safe guard railed position on the platforms below. Once the AGR frames are in place, platforms for the next level are installed such that the two uppermost horizontal bars on the AGR frames form guardrails at 0.5m and 1.0m above the deck level. This process repeats until the tower is at the required height.

The Alto AGR panels feature deep locating hooks on either end of the top horizontal bar and scaffold couplers on either end of the bottom horizontal bar. This design positively locks the AGR frames into place, giving a rigid interface.

Step 1:

Working from the guard railed platform (or the ground for the first set of AGR panels) install the next set of 4 rung end frames.



Step 2:

Install the AGR panels to the 4 rung frames in the positions shown. Locate the top hooks as close to the frame uprights as possible. Secure the clamps at the bottom of the unit to the frame uprights, ensuring the clamps are tight.



Step 3:

Fit a trap platform and plain platform on the 3rd rung down from the top.



Both methods - when properly executed - are equally safe. In general, the practical differences between the two systems of assembly are:

- 3T towers should generally be slightly more rigid.
- AGR towers are generally quicker to build.
- Although there are fewer components in an AGR tower than the equivalent size 3T tower, the AGR panel is a large welded unit and more difficult to transport compared to the braces it replaces.
- AGR towers can be more difficult to assemble in confined spaces due to the size of the advance guard rail panels.
- AGR towers are not generally suitable for complex tower structures.

ASSEMBLY & DISMANTLING

INSTRUCTION MANUALS

All manufacturers who claim their towers are designed to BS EN 1004-1:2020 must supply a comprehensive current instruction manual on the assembly/dismantling of their towers which complies with BS EN 1004-2:2021.

Suppliers & users must ensure that the manufacturer's current manual is available to those assembling and using the tower. Users should ensure that the number of operatives specified in the manual are used to assemble/dismantle the tower and that they are competent to do so. (See "Training" section below). The current ALTO manuals may be:

- Obtained from Lakeside Industries Limited tel - 01527 500577 or email sales@altoaccess.com
- Downloaded from the Alto website: www.altoaccess.com/downloads.html
- Downloaded from the PASMA website: www.pasma.co.uk/scaffold-towers/scaffold-tower-instruction-manuals/
- Found on the PASMA app if using a smartphone or tablet.

It is vital to the safe use of towers that the manufacturers manual is followed closely. The order of assembly and positioning of components has been carefully incorporated into the design of the tower. It is not safe to build a tower without access to the appropriate manual.

TYPES AND NUMBER OF COMPONENTS

The components used for the construction of a tower must be from the correct manufacturer. They must also be those recommended for the particular tower configuration. Suppliers usually provide a range of different types of towers and although some components are interchangeable between types, this is not always the case and unsuitable components or components not listed in the manual must not be used.

Before commencing to assemble the tower, make sure that the correct quantity and type of components are available and never attempt to make up deficiencies by the use of alternative suppliers' components or scaffold tubes, couplers, scaffold boards etc. Components used must always be as specified in the relevant manual.

GROUND SURFACE

Towers should be erected and used only on ground capable of bearing the applied loading e.g. with a surface of concrete, tarmacadam or similar. Where towers are required on soft uneven ground or stairways, base plates should always be used instead of castors, and these should be set on substantial boards or other decking which will provide a sufficiently firm foundation for the tower and its payload. Outriggers and stabilisers should be similarly supported.

CASTORS, BASEPLATES AND ADJUSTABLE LEGS

Assembly is usually commenced by fitting either castors or baseplates to four adjustable legs. The ALTO design includes a feature to prevent the castor or base plate from separating from the adjustable leg. The adjustable legs are fitted into the lower ends of the columns of two end frames. A mechanism prevents the adjustable leg from falling out of the end frame. Each leg has a threaded device to vary its height, so that the tower can be made level on uneven, sloping or stepped surfaces. The leg height adjustment is NOT a means of gaining additional height of any tower and the extension of the adjustable leg should be the minimum possible consistent with properly levelling the tower.

BASE ASSEMBLY

The base section, which is made up of the two end frames plus horizontal and diagonal braces, are assembled according to the manufacturer's current instruction manual. For ALTO towers make sure the pegs on the head fittings always point towards the middle of the tower.

When these components are assembled, the legs should be adjusted so the base section is vertical and the end frames are at the same level. Levelling the tower is vital to the safe build of the tower. Not only does it ensure that the tower is essentially vertical – and therefore having predictable stability as per the manufacturer's design, components in a tower that isn't properly levelled will simply not fit correctly.

If the tower is moved it must be re-levelled. If castors are fitted, they should now be braked. For tiered floor situations where the frames would be offset, you should consult your supplier for assistance or use the specialist manual for this type of application. At this stage, the correct size stabilisers or outriggers should be fitted, adjusted and secured.

UPPER ASSEMBLY

Upper sections of the tower can now be assembled following the sequence in the manufacturer's current instruction manual. Attention must be given to the following:

- For ALTO Towers make sure the holes located in each upper frame fit over the pegs in the lower frame
- Never stand on an unguard railed platform at a height sufficient to cause injury.
- Use the specified method of safe build for the tower type (3T or AGR)
- All components must be fitted in the specific sequence, without omissions or variations.
- Components should be lifted inside the base dimensions of the tower whenever possible using reliable lifting equipment such as the lifting strap or good quality rope tied securely with a reliable knot or proprietary fastening.

BRACES

Diagonal braces and horizontal braces have a locking hook mechanism which locks onto either horizontal or vertical frame members. When fitted to horizontal members locking hooks must have their aperture facing downwards. When horizontal braces are fitted to verticals ensure that locking hooks have their aperture facing outwards. In all cases when fitting braces, ensure that the hook mechanisms have operated correctly and that the brace is securely fixed to the frame. Always fit as shown in manual.

PLATFORMS

All tower platform deck units have hooks at each end which locate onto the horizontal rungs of end frames. Ensure that these are properly positioned and that the platform sits firmly and squarely in place. If platforms have an access hatch that opens sideways, make sure that this is correctly orientated with the hinge outboard. The wind lock devices at both ends of the platforms must be engaged. Platform decks are installed approximately every 2m in height from ground level, until working level is reached. There may be no more than 3.4m from the ground to the first platform. There must never be a gap of more than 2.25m vertically between platforms. All trap doors should be closed after ascending or descending.

GUARDRAILS AND TOEBOARDS

All working platforms must be fitted with appropriate guardrails and toeboards and care should be taken to see that they are correctly fitted in accordance with the suppliers' instructions, which will comply with the height requirements of BS EN 1004-1:2020, which specify:-

- Principal guardrail height 1000mm above platform level
- Intermediate guardrail gap to principal guardrail and platform or toeboard <470mm
- Minimum toeboard height 150mm

All intermediate rest platforms must be fitted with double guardrails to the same specification, and, if materials are being stored on intermediate rest platforms, then a toeboard must be fitted.

SCAFFOLD COUPLERS

Standard steel scaffold couplers can be used on ALTO Towers but NOT other brands of towers. Other towers have a larger diameter than standard scaffold tubes. Additionally, the thinner wall tube that they are invariably made from means they would deform if using standard scaffold couplers. If steel or aluminium scaffold tubes are connected to lightweight tower structures, e.g. to provide a stabilising tie, the user must ensure that an expensive special coupler is used i.e. one that will accommodate the two different sizes of tube and not crush the thin wall tower tube.

For more information on the Alto range of advanced structure solutions, please call **01527 500577** or email **sales@altoaccess.com**

In common with all advisory information provided in our technical briefing notes, this document provides only general guidance on the subject. It is not a substitute for appropriate training and qualification. If in doubt, seek advice. The company and the authors disclaim all responsibility for any use made of this information.

If you are using or considering using towers in applications which require adaptation in any way, we strongly recommend obtaining sufficient relevant training to ensure your competence and maximise your safety. You could consider contacting PASMA for more help and support or your tower supplier.

THE HEIGHT of SAFETY

For further information regarding our range of access products and services, please get in touch with us:

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