USING LIGHTWEIGHT AND POP-UP TENTS AT EVENTS

Operating guideline

Finnish Safety and Chemicals Agency (Tukes) &

Expert network of event safety, Rescue department partnership network

Index

1 Background

Various lightweight and pop-up tents have caused accidents and dangerous situations at public events as well as other types of events and services. These accidents and dangerous situations have partially been caused by insufficient manufacturer instructions, which have made the use of these temporary tents unsafe. The problems have occurred when lightweight or pop-up tents have shifted due to adverse conditions. In these guidelines, we present our view of the minimum recommendations for achieving an acceptable level of safety for the factors that need to be considered for these structures. A similar level of safety can be achieved by solutions other than those presented in these guidelines. These guidelines are also applicable indoors.

The Finnish Safety and Chemicals Agency (Tukes) and the expert network of the rescue department partnership network instruct the manufacturers, importers, renters and sellers of lightweight and pop-up tents, as well anyone using these tents, including rental companies and event organisers, to ensure their safe use. These guidelines describe factors that must be considered in the instructions, marketing and use of these products.

1.1 Who is responsible for safety?

Manufacturers, importers, renters and sellers are all responsible for, according to the Act on consumer safety (kuluttajaturvallisuuslaki), ensuring that tents and awnings are appropriate for their purpose of use, and that their instructions are sufficient to guarantee safe use. All instructions must be clear and understandable. As a rule, the instructions must be presented in Finnish and Swedish (according to the Language Act). These products are covered by the General Product Safety Directive (GPSD) and national product safety regulations.

Tent users are responsible for ensuring that the tent is safe to use for anyone working or doing business in the tent, as well as bystanders. “Tent user” refers to the operator who offers their products or services in said tent. The responsibilities of the tent users are laid out in the Occupational Safety and Health Act, Land Use and Building Act, and the Act on consommé safety.

Event organisers are responsible for, according to the Act on consumer safety, instructing and monitoring the tents and structures present at their event, including their use, according to their manufacturer’s instructions. Event organisers are responsible for ensuring that the tents pose no danger to people or property. According to the Rescue Act, event organisers must do their part to prevent fires and other dangerous situations. Any tents, awnings and similar structures used in public events must be appropriate for use in public events, standardised or otherwise achieve a level of safety equal to these guidelines at a minimum. Event organisers are responsible for all temporary structures at their event, and must hence ensure that the tents and other structures are suitable for the current use, purpose, location and conditions. If manufacturer instructions are unavailable, the tent user or event organiser must prepare the document to demonstrate the tent is fit for purpose and sufficiently safe – for example, by calculation and standards (EN 1990-1 and SFS-EN 13782) – or stop using the structure..

1.2 Guideline scope

In these instructions, “event” refers to the public events described in the Assembly Act, as well as events held at market squares, fairs, restaurants, shops and shopping centres.

These instructions may also be applied to and used for private events. In this case, private use excludes so-called private functions where external guests are present in addition to the personnel of a company or other organisation.

1.3 Suitable tents

Public events must only use tents that are suitable for such events and intended for this purpose. Products intended solely for consumers must never be used outside private events, such as celebrations organised by private individuals. The purpose of use must be verified from the manufacturer’s instructions. Consumer-grade products are not strong enough for use in larger events and may pose a danger to people or property.

The safety of temporary structures and lightweight and pop-up tents should primarily be ensured according to standard SFS-EN 13782:2015, especially at events where the combined total area of tents exceeds 50 m^2. An equivalent level of safety may be achieved by other means.

The event organiser and tent user must contact the local building control authority to verify the permits and supervision required by the Land Use and Building Act for the operating site or method when tents are used for events or other gatherings.

2 General principles of use for lightweight and pop-up tents

- The responsibility for the safety of tents and their structures lies with whoever erects or uses them or acts as the event organiser. They are further responsible for ensuring that these pose no danger to people or property.
- Tents must be used according to their manufacturer's instructions and the instructions and regulations of the competent authority.
- In all conditions, the structures of a tent must be secured by anchoring or counterweighing them with the appropriate locking fastenings to prevent any dangerous movement of the tent.
- Environmental conditions must be monitored from weather forecasts and in real time during use. As necessary, measures must be taken to eliminate hazards: additional weights or fastening may be added, for example, or the tent may be taken out of use (closed or dismantled according to the manufacturer's instructions).

3 Risk factors and conditions affecting tents and their structures and how to account for them

- Wind will act on the walls of a tent from the side, pushing the tent sideways. Tents must be secured and supported so that they cannot move.
- Wind flowing under the roof of a tent will produce lift and push the tent upwards. Tents must be secured with counterweights or anchored to the ground to prevent them from rising up into the air.
- Rain and snow may cause walls and roofs to give, increasing the stress on the structure of a tent. This increase in weight may cause the structure to collapse. Water, snow and ice loads must be regularly monitored and removed well in advance during use, according to the manufacturer's requirements.
- Insufficient reinforcement may leave tent structures too loose and susceptible to flexing, tilting or even falling over in adverse conditions. Wall openings and roof ridges may be stiffened with guy ropes and other extra structures, as instructed by the manufacturer. The purpose of reinforcement is to make tents stiffer and more robust.
- A tent's structure may be designed to collapse, break up or separate in a controlled and useful manner to prevent the tent from moving due to adverse conditions. Likewise, walls and roofs may be designed to come loose to prevent the forces acting upon them from moving or lifting up the tent in a dangerous manner. In practice, these features are only evident in situations where adverse conditions

would cause the tent to move even when counterweighed or secured as specified by the manufacturer. The manufacturer's instructions specify the values and limits for acceptable conditions when using different configurations and securing methods – once these are exceeded, the tent is unsafe to use. Limits indicate a danger that always requires the use of the structure to be stopped.

- As a rule, tents should always be erected on an even and stable foundation so that all their supporting points touch the ground evenly and the tent's weight is distributed among them equally. Anchoring must always be carried out according to the manufacturer's instructions. Sufficient anchoring is especially important when environmental conditions may compromise the stability of the surface, soil, snow or ice (flowing water, incline, loose soil, snowmelt, etc.).

4 Specific instructions and points to note in operating instructions and tent use

4.1 Operation and use

- Observe the instructions and regulations issued by the authorities and the event organiser when using tents in any kind of event, including public events.
- Apply the same safety and weather resistance requirements to the furniture, equipment and other items used in the tent as you would to the tent itself. Prepare for the possibility that the walls and roof may need to be removed in adverse conditions. Any structures and equipment under the tent must not pose a danger after this is done. For example, deep fryers, loose glass panes and unprotected electrical appliances may pose a danger if they are exposed to the elements. If a ground covering (tarpaulin, for example) is used, it must be secured with separate weights or by other means. Ground coverings may not be fixed to the tent's structure unless this is specifically instructed by the manufacturer.
- Never attach loose furniture or electrical wiring to a tent's structure if they may pose a danger when the tent or its structure moves or rises up and takes them with it. Note any and all manufacturer instructions regarding suspension and loads. Cords, leads and so on must detach from the structure if it moves.
- Never leave an erected tent without supervision. Event organisers and tent users are responsible for tents, their structures and the monitoring thereof whenever the tents are in use or left standing. This includes times outside the event's opening hours: construction, disassembly and nights, for example. Closing tents with side walls is usually a good way to reinforce the structure, if it is permitted by the manufacturer's instructions.
- Verify the fire safety of a tent – for example, keep a safe distance from other tents, buildings, structures, equipment and heat sources. Make sure that sufficient fire suppression equipment is available.

- Position tents so that they do not interfere with the escape routes, emergency access roads or service roads of the event or nearby buildings.
- Observe the maximum number of people specified by the authorities, event organiser or manufacturer during the use of each structure. According to the Ministry of the Environment's Decree on operational safety (käyttöturvallisuusasetus), the acceptable occupancy for meeting, exhibition and public tents is two people for each unobstructed square metre.

4.2 Inspections, maintenance and periodic measures

- A person or persons in charge must be assigned for each tent and structure. They are responsible for their erection, commissioning, inspections and monitoring during use.
- For every tent, log its erection, maintenance and servicing.
- Follow the manufacturer's instructions and carry out the daily maintenance and servicing, as well as long-term inspections.
- Check that the fastening, counterweights, tent structures and mounting points are locked during erection and at least once a day during use, especially if the conditions change.
- Store tents according to the manufacturer's instructions; temperature, protection, etc.

4.3 Preparing for different conditions

- Verify each tent's operational limits from the manufacturer's operating instructions and monitor the local weather forecast and conditions during use – also outside the opening hours of the event.
- Investigate and identify the common wind directions and forces at the use site and assemble and use the tent accordingly.
- Check the manufacturer's instructions for warnings about the effects of cold or hot temperatures on the tent's structures.
- Check the manufacturer's instructions for warnings about lightning and using the tent during thunderstorms: for example, does the structure need to be earthed, is it possible to earth in the first place, and who is responsible for the earthing.
- Check the manufacturer's instructions for warnings about erecting and securing the structure on snow and ice (melting in particular).
- Only use tents on even ground, make sure that the soil is sufficiently firm, and also consider the soil's potential shifting, erosion, water absorption capacity, irregularities and gradient. If these are not covered by the instructions, consult the manufacturer as needed.

4.4 Monitoring the conditions and responding to changes

- Tents with partially open walls are generally more vulnerable to wind. Check the manufacturer's operating instructions for operational limits in different configurations (all walls, no walls, etc.).
- Compare the operational limits of the tent to the conditions and take measures as instructed by the manufacturer to prevent the tent and structures from posing a danger or causing damage. For example, you should remove canvases, tarpaulins and other tent surfaces that may produce pressure or lift as a result of wind. In the case of an emergency, you can make holes in the material if the manufacturer's instructions permit this, but never hold on to the structures. In some cases, the roof and walls may be closed completely to stop the use of the structure and protect the property inside the tent (with no people inside). The closing or dismantling of a tent must be done sufficiently in advance and not when the conditions have already turned dangerous.
- In dangerous conditions, never go into, under or behind (downwind of) a tent for protection or allow others to do the same – these are the riskiest places if the tent moves. Your first priority is to evacuate people to a safe distance before any other measures are taken.
- Never hold on to the structures of a tent or attempt to hold them down during foul weather.

4.5 Weights and securing (wind loads, lift and surface area)

- Always secure structures with anchors or counterweights regardless of the current weather.
- Tents must be secured against sideways and upwards movement. This is often done by using tent pegs and counterweights. See the manufacturer's operating instructions for their correct number and use. In particular, note if these methods should be used separately or simultaneously.
- Fasten down tents by using the methods and tools indicated by the manufacturer's instructions. If you use third-party ropes, straps or other accessories, make sure that their strength and durability ratings meet the requirements of the manufacturer's operating and fastening instructions ("rated accessories" have been classified according to the relevant standard).
- Only use approved, locking and correctly rated hardware – hooks, shackles, etc. Always use tools and accessories according to their manufacturer's instructions. All fastening equipment must be rated to meet the load requirements of the tent manufacturer. Knots may weaken materials and even cause them to break under environmental stress. Never use hooks (including S-hooks) or other devices that cannot be locked – unlocked devices may work loose from lightweight structures and mounting points due to wind or other conditions.

- Check that mounting points are locked before use and daily, as necessary.
- Use a sufficient number of weights with regard to the tent's wind surface area, noting the number of wall elements and the current wind conditions. Check the manufacturer's operating instructions for the number and mass of counterweights in different conditions and for different structural configurations (all walls, no walls, etc.).
- Check the manufacturer's instructions to verify if additional weights or fastening may be added to the structure compared to the instructions' base value or if this will compromise the structure's integrity.
- All vertical poles must be fastened with pegs or counterweights, and these must be installed on all poles according to the manufacturer's instructions to create a balanced structure.
- Lock all counterweights to each other and to the structure so that they will not come loose if the structure shifts. Stacking weights, including crosswise stacks, is insufficient.
- Lock all structures to each other and check the locking of the joints and mounting points before use (telescopic poles, for example).

4.6 Loads (suspension and masses)

- During use, remove any extra snow and water off the tent, as required for the conditions.
- Check the manufacturer's operating instructions regarding suspension and other structural mounting techniques for lights and heating, for example. Observe the correct mounting points and their load ratings.

5 Definitions

Lightweight/pop-up tent

Lightweight and pop-up tents are often self-assembled and movable, and their assembly requires no professional skill or qualifications. In many cases, they are excluded from standard SFS-EN 13782:2015 (tents or tent groups under 50 m^2).

Guy (rope)

A rope, wire or similar item fixed to the ground or weights to secure a tent. Guys are typically installed at a 45-degree angle sideways from the tent's mounting point. A guy's nominal and ultimate strength must be sufficiently rated for the counterweights and mounting points used.

Guys may also be installed between the parts of a tent in the walls and roof to stiffen the structure.

Peg

Metal stakes for fastening guys. Typically, pegs are driven into the ground at a 90-degree angle relative to the guy, assuming the guy leaves the mounting point at a 45-degree angle. Pegs are usually light and short (20 to 30 centimetres) and used in suitable soil. When using pegs, make sure that the soil is suitable and that the pegs will not damage buried structures (insulation, cabling, pipes, etc.).

Poles may have loops at the base for holding down the corners and supporting points with pegs, which also stops any sideways movement. This is an unreliable method that is vulnerable to changing conditions.

Counterweight (ballast)

Weights that counteract the lift caused by wind. They act on a tent's vertical poles to counter movements up and down. Their purpose is to prevent the tent from lifting off the ground. Counterweights may not prevent the structure from moving sideways, so guys and extra weights should be used to prevent sideways movement. Extra weights can be placed close to the structure if they are sufficiently heavy or produce enough resistive force (friction).

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Appendix. Example pictures of good and bad practices

Figure 1. Two layers of weights in opposing directions lock the layers around the pole when a sufficiently large bottom plate is used.

Figure 2. The plate is too small and incompatible with the weight. In this case, a second weight is missing, so the lower weight is not locked in place.

Figure 3. The counterweights are not interlocked. In this case, only gravity holds them together.

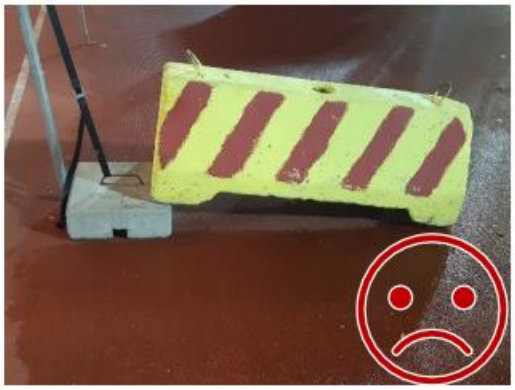

Figure 4. The rachet strap's locking mechanism is too weak. The smaller weight may shift and cause the larger weight to fall.

Figure 5. The strap is not bound or locked to the weights. The weights and strap may move and come apart.

Figure 6. The S hook will come loose as wind moves the tent.

Figure 7. The opposite weight is missing, which means the weight is not locked in place or to the pole. Gravity is not enough to lock the pieces together.

Figure 8. A shackle is present but not used for fastening. The hook will come loose as the structure flexes.

Figure 9. The strap will shear as it tightens.

Figure 10. The steel hook is unlocked. Steel will cut aluminium, making the fastening ineffective.

Figure 11. The strap has worn down.

Figure 12. The S hook will come loose as wind moves the structure. The fastening is not locked to the mounting point.