Telescopic/Retractable Seating

Architect/Project Manager/Client/OEM Manufacturer Considerations

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Telescopic Structure - Code Compliance

As a Global Supplier of Telescopic (Retractable) Seating Starena ensures compliance to a number of Internationally recognised standards, including but not limited to the following:

- BSEN 13200-5:2006 Part 5 Telescopic Stands
- Guidelines outlined in "Recommendations for the Specifications and Use of Tiered, Telescopic and Demountable Seating" document produced by British association of Spectator Equipment Supplies (BASES) for the Recreation and Leisure Trades Association (RALTA) UK.
- DIN (Deutsch Industrie Normen) – DIN 1050, DIN 4114, DIN 4115
- JIS (Japanese Industrial Standard) British Standard.
- AS.NZS – Australian/New Zealand Standard 1700-0-2002 Parts 0-5 inclusive
- United States National Building Code:
  - BOCA 1990
  - BOCA 1987
  - BOCA 1984
  - NFPA-102 1992
  - NFPA-102 1986
  - NFPA-102 1978
  - UBC 1991
  - UBC 1988
  - UBC 1985
  - SBCCI 1991
  - SBCCI 1988
  - SBCCI 1985
- Building Code of Australia & NCC Standards
- Building Code of New Zealand
- International Building Codes, as applicable
- ISO 9001-2000- Quality Systems Standards
- AS 1530:3 Fire Regulations

All Telescopic seating manufacturers should supply independent engineering certifications from a suitably licensed structural engineer with an understanding of Telescopic Seating Systems.

It is to the client’s risk if the selected seating supplier does not have independent engineering certification.
Telescopic/Retractable Seating

Starena manufactures in a number of International locations, utilising the specific skills of sub-contracting suppliers. All design is undertaken by Starena to the above codes as applicable, and manufacture is completed to the Starena design manufacturing drawings in accordance to these standards and independently certified by Bureau Veritas.
Starena designs its retractable seating products to the international standards as noted below and, where appropriate, to specific local standards.

**Starena’s in-house engineers prepare project specific plan and elevation drawings, along with detailed engineered component drawings.**

Starena does not produce/manufacture using “cookie cutter” drawings from other projects.

For the past few years Starena has developed an **exclusive OEM manufacturing relationship with:-**

Jiangsu Jinling Sports Equipment Co., Ltd (JLS)

[http://www.jlsports.com](http://www.jlsports.com)

- who are a **globally recognised supplier of retractable seating systems and sporting goods.**

JLS employ 800(+) personnel and are listed on the Chinese Stock Exchange.

In managing its relationship with JLS, Starena has two employees based in Haining and Shanghai who oversee the day to day manufacturing and quality control activities at the JLS factory.

Starena, as a further quality control overlay, utilises the services of **Bureau Veritas, an internationally accredited quality control company.**

In general product sourced from the above countries, unless in partnership with a Western original equipment manufacturer (such as Starena), do not have any Internationally recognised accredited Telescopic and Seating Standards or Certificates of Compliance.

Typically, their telescopic structures are a copy of western designed systems and their seating modules almost exclusively are either:

- Blow Moulded, or
- Poor quality injection moulded product.
The ability to supply independent test certification or any compliance documents to, as a minimum, the following standards, is almost non-existent creating a “buyer beware” position:

- BSEN13200-5:2006, part 5 Telescopic Stands
- National Building Code Compliance – all countries
- DIN 1050, 4114, 4115
- BSEN 12727:2000 Test Levels 3 and 4
- BS5852:2006 – Fire Test
- BSEN 1021-2-2006 – Fire Test
- BCA Code Australia & New Zealand plus relative NCC Standards

As a potential client, remember Quality and Standards compliance is long remembered after the price is forgotten. As a client you have both a regulatory and a corporate responsibility to your client to ensure that the Telescopic Seating Structure, and the seating which forms part of the structure, complies with all International and local applicable codes. Failure to ensure compliance to all relevant codes places a significant level of responsibility on the client, and/or their professional representative, should an event occur as a result of a system not being compliant and individually accredited by a certified engineer.
Floor Substructures Specifications and Survey Processes

It is the responsibility of the Architect, the Head Contractor or the Client to advise Starena in detail of the type and nature of the timber sports floor to be utilised on the contract and to confirm to Starena what the OEM Sports Floor supplier’s dead load per wheel is able to be accommodated by the specified floor in a rating of kilogram per wheel.

All floors must be finished to a FFL of ±3mm over a 1m square area.

On the basis that a very flat and level surface is required for the operation of the installation, the ±0.003 limit may be retained for the flatness assessment and be accompanied by a requirement that the finished surface be within ±0.003 of the specified level throughout the area for the installation.

The determination of compliance normally requires two processes – firstly, by measurement of a deviation below a straight edge (3m straight edge in any direction) of a nominated length and, secondly, by direct measurement of the level of the floor.

Alternate methods for assessing compliance have been developed in the USA, for the application on assessing super-flat floors within the trafficable lanes in warehouses, between high-rise racking: these involve the use of specialised instrumentation with tilt sensors that are pulled across the floor.

In practical terms, the assessment generally involves direct levelling only, due to the difficulty of documenting results from measurements of deviations, especially over large areas.

Please contact Starena for detailed information.
What a Client Needs to Understand

What is Retractable Seating?

Retractable seating is rows of multiple tiers of closed deck chair platforms that store away into a closed position when the area is required to be used for other purposes.

The platforms operate on the retractable principal stacking vertically under the one above, to minimise the floor area, when not in use.

All multiple tiers are mechanically locked, operable only on the opening and cycling of the first platform row.

Each platform row is comprised of a unitised deck component, a complete set of supportive frames and braces and such other mechanical designs as specified.

Specially designed folding seats, fit to the platform and remain stored in the closed fold down position when the retractable seating platform is in the stored position.
As noted elsewhere, it is the client, or their professional representative’s, responsibility to ensure compliance to the relevant International and local standards regarding the design of Telescopic seating structures. Clients also have the responsibility to ensure the fitness for purpose certification includes an independent engineer’s certification of the structural design and as built installation.

1. Arrangements should be made to ensure, by automatic locking devices or other suitable means, that each stepped platform or row in a telescopic unit is locked when open and in the fully extended position and cannot retract or close accidentally.

2. Arrangements should be made to ensure that by interlocking the structure at the top of the main column positions or front beam position, that when open and ready for use, one row of platform cannot disengage from the row below.

3. Each stepped tier or platform should contact the floor with sufficient number of wheels (if wheels are used) such that the resultant loading arising from spectator occupancy is compatible with the floor type the stand is placed upon. The recommended minimum diameter of each wheel is 100mm with a minimum width of 40mm.

4. To ensure stability, when stands are not attached to a building, the height to closed depth ratio of mobile (moveable) telescopic units when the units are closed and ready to be moved should not exceed 3,5:1. If this ratio is exceeded, documentary proof and a recorded risk analysis are to be in place.

5. All removable guard rails and all loose ancillary items should be locked securely in place.

6. All fastening devices shall be designed in a manner so that unauthorised opening is impossible.
7. Where electric gangway/aisle lighting and/or power operating is specified, it should comply with the relevant National Electrical Standards and specifications of the country where the product is to be installed.

8. A clearly visible label should be applied to each seating unit or block stating the name and logo of the manufacturer, the reference model, the design capacity (number of spectators), the year of manufacture and the reference number of this European standard.

9. Telescopic stands shall be used in accordance with the manufacturer’s instructions and deployed in accordance with layouts approved by the relevant Licensing authority. An operating manual is to be provided for each installation referenced to the actual installation providing the contractor’s logo and contact number, reference of the model, a parts list including part numbers, layout drawings, full operational detail (including how to open, close and move the stand) and maintenance information with maintenance instructions and frequency.

10. The design and suitability for use of Telescopic stands should be checked by an independent authority and certified by an independent qualified engineer.
Basic Specification

Telescopic seating structures must comply with the regulatory International and locally recognised standards for Telescopic seating and places of public assembly. If no specific local regulations exist, as a minimum, seating must comply with BSEN 13200-5:2006 Part 5, Telescopic Stands.

Telescopic stands shall fulfil the national regulations for fire regulations, escape rules and emergency exit rules.

Seats are to be a constant depth throughout the length of a row. Where seats tip-up automatically the width of the seat-way (clear-way) should be measured between the back of one seat unit and the maximum projection of the seat unit behind when the seat is in the upright position.

With respect to relative lateral positioning, seat centres should be a minimum of 450mm apart for seats without arms and a minimum of 500mm for seats with arms.

In tiered seating blocks the **maximum** Row Rise should not exceed:

1. 200mm (190mm) – where no half step is provided;
2. 400mm (380mm) – where one half step is provided.
3. 600mm (570mm) – where two half steps are provided.

In tiered seating blocks the **minimum** riser height or step height is 100mm. The dismount area adjacent to a stair shall provide a uniform riser height for the lowermost step.

In certain situations parabolic riser configurations can be specified. This is where a small increase in height from one riser to the next increases the riser height steadily towards the rear of the stand. Where this does not meet the standard, it should be dealt with by a risk assessment.
ROW DEPTH
Requirements and recommendations are given in EN 13200-1.

PASSAGEWAYS (AISLES)
Passageways (aisles) widths to be: 1 100mm minimum and 1 200mm recommended.

All vertical gaps in aisles, steps, guard rails, risers and decks shall be constructed in such a way that a sphere with a diameter of 100mm (recommended) and a maximum diameter of 120mm cannot pass through any part of the structure. National codes or legislation, where applicable, should be considered and applied.

All horizontal gaps in floors and decks should not permit the passage of a sphere exceeding 30mm in diameter. This gap shall not occur in any aisle space.

LOADING
Self Weight
Self weight is calculated from the unit weights given in EN 1991-1-1 or from the actual known weights of the material used.

Imposed Vertical Loads
The following loading ranges are given in EN 1991-1-1. The recommended values are given in bold numbers.

Category C concerns areas where people may congregate. In particular,
Category C2 concerns areas with fixed seats and the imposed loading is as follows:
   Uniformly Distributed Load (UDL)  3,0 to 4,0 kN/m²
Category C5 concerns areas susceptible to overcrowding and includes grandstands:
   Uniformly Distributed Load (UDL)  5,0 to 7,5 kN/m²

All floors should be designed to carry a uniformly distributed load derived using appropriate load factors.
Imposed loads shall be taken into account as quasi-static actions (see EN1990). The load models may include dynamic effects if there is no risk of resonance or other significant dynamic response of the structure (see Eurocodes standards). If resonance effects from the expected synchronised rhythmic movement of people dancing of jumping, the load model should be determined for special dynamic analysis.

**Concentrated loading** can arise from spectators jumping from a standing position on seats and may need to be considered as a design requirement. EN 1991-1-1 gives concentrated loads and their manner of application for categories C2 and C5. It is considered that in many cases the concentrated loads given in EN 1991-1-1 will not necessarily apply to telescopic stands. The appropriate concentrated loads for telescopic stands should derive from considering the intended use, a recorded risk analysis and national requirement.

**Isolated Loads**

The floor or bench components of a telescopic stand shall be capable of withstanding isolated loads of 1 kN spaced accordingly on a 0.50m orthogonal grid. For purposes of design, the area of application of an isolated load shall be 0.20m x 0.20m.

**Horizontal Loads**

Telescopic stands are subjected to horizontal loads induced by spectator actions.

A notional horizontal load of 6% of the vertical imposed load shall be applied for the design of all categories of use. Normal deflection criteria in terms of span and overhang shall apply. The ratio of deflection to appropriate span/overhang should not be more than 1:200.

**Note 1:** Partial factors for dead and imposed loads for use in the limit state design of stands should correspond to the structural code of practice relevant to the material. For notional horizontal loads, the partial factor should be 1.5 for the load combination case with factored values of vertical dead and imposed loads.

**Note 2:** The notional horizontal load should be combined with the operational wind load (exterior use only) for designing the structural elements of a stand.
The stated loads should be considered the minimum values to be adopted.

For design of structural elements the previously stated loading values should be used in accordance with the relevant standards.

**Note 3:** The uniformly distributed loads provide for the effects of normal use. Telescopic stands are frequently occupied by energetic audiences who subject the structure to dynamic excitation. Telescopic stands are relatively flexible structures which will respond dynamically to spectator movements. The manner in which the designer/manufacturer of any structure likely to be subject to dynamic excitation has considered this matter should be apparent in the design documentation. The possibility of resonant excitation should be considered and where appropriate specialist advice should be sought.

In this context the effect of seismic loads and excitation, if relevant to the country of installation, should also be considered.

**Wind Loading**

If telescopic stands are to be used outdoors, wind loading calculation shall apply.

**Provisions for People with Disabilities**

Requirements and recommendations are given in EN 13200-1.

**Note:** National building regulations or Disability regulations require provisions to be made for all people, including those with disabilities, at spectator events. It is necessary that these requirements be given due recognition in the provision of telescopic accommodation in all types of facilities.
Types of Retractable Seating

- **FIXED**
- **RECESSED**
- **MOBILE**
- **TRAVELLING**
- **FREE STANDING**
Seat Fold Down Options

**MANUAL**

Integrated foot bar mechanism that trips the chairs and allows for an easy fold. No spring assist with setting chairs up - 4 chairs per operation.

![Diagram](image)

Depress trip lever to unlock chairs for folding.

Gently fold chair to the deck. Do NOT let chairs free fall.

**MANUAL SEMI-AUTO**

Integrated foot bar mechanism that trips the chairs and allows for an easy fold. Spring assisted when raising the chairs to the upright position and dampening on lowering the chairs to the deck - 12 chairs per operation.

![Diagram](image)

Chairs fold in a controlled manner to the deck without assistance.

**SEMI-AUTOMATIC**

Spring assist with setting up chairs when the platform is open. Chairs automatically fold down as the system is closing - 12 chairs per operation.

![Diagram](image)

Depress trip lever to unlock chairs for folding.

Chairs automatically fold as the system is closed.
Platform Movement Options

INTEGRATED MOTORS
Integral power drives units provide the most cost effective operation options. Drive motors are fitted to the first row to open and close the seating system. The 3 phase motors are synchronised and seating system sections are joined together to form a single operational bank where appropriate.

Systems fitted with integral power require only one person to operate the drive control pendant and a second safety observer to ensure that people stay clear of the system during operation.

POWER TRACTOR
The portable power tractor eliminates the need for integral power on the smaller units. The 3 phase drive motor allows 1 person to open and close individual sections, with the 150mm diameter rubber drive wheels providing sufficient traction to open the seating units.

PORTABLE DOLLIES
Utilising a lightweight, portable self-contained Hydraulic system, these lifting units are specifically designed for use with Portable Telescopic Seating Systems, provide ease of use and many years of reliable service.

MANUAL
Small systems up to 6 rows can be manually opened and closed by 2 persons giving due regard to OH&S issues.

FORKLIFT
Larger portable units can have inbuilt forklift transoms integrated into the design of the platform system to enable ease of movement by forklift.
Which Seating? And How Does it Relate To The Telescopic Structure?

The choice of the correct seat is as important as the Telescopic Seating Structure and full consideration must be given to the code related issues for the seat itself.

As an absolute minimum, the seating component must comply with:

- BSEN 12727:2000 Test Level 3 and 4 Severe Use – Structural considerations
- BSEN 1021-2-2006 Match Flame equivalent upholstery
- BS5852:2006 Test Crib Level 5 Fire Test Seat
- ASTM 1929-96 – Ignition Test of Plastics
- ANSE / BIFMA Test Load Certification
- DIN (German) 402 Fire and Flammability
- BCA & NCC Codes Australia & New Zealand
- AS 1530.3 compliance
Scope BSEN 12727:2000 Strength & Durability

This European/British Standard specifies test methods and requirements determining the structural strength and durability of all types of ranked seating, (e.g. stadium and auditorium seating) which are permanently fastened to the floor and/or walls, whether in bench or individual seat form. A table of tests values with four choices of loads and cycles is included.

This standard applies to seating permanently fixed in ranks but does not apply to linked upright chairs not fastened to the floor and/or walls.

Assessment of ageing, degradation and the effect of ambient temperature are not included. For these, reference should be made to the appropriate standard (e.g. a standard is in preparation under the title “Spectator Facilities, product characteristics of seats”).

The tests are not intended to assess the durability of upholstery materials such as upholstery filling materials and upholstery covers.

The tests are designed to evaluate structural strength and durability of ranked seating without regard to materials, design/construction or manufacturing processes.
<table>
<thead>
<tr>
<th>TEST</th>
<th>LOADING</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example of application</strong></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>These are only examples to aid selection¹</td>
<td></td>
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<tr>
<td><strong>Type of Use</strong></td>
<td>Light</td>
<td>Moderate</td>
<td>General</td>
<td>Severe</td>
<td></td>
</tr>
<tr>
<td><strong>Example of application</strong></td>
<td>Churches Law Courts</td>
<td>Theatres Concert Halls Company Lecture</td>
<td>Stadium Sports Halls Theatres Cinemas Concert Halls</td>
<td>College Lecture Stadium Cinemas Airports</td>
<td></td>
</tr>
<tr>
<td><strong>6.3 Seat and back static load test</strong></td>
<td>Seat force, N 10 times</td>
<td>1300</td>
<td>1600</td>
<td>2000</td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td>Back force, N 10 times</td>
<td>560</td>
<td>760</td>
<td>760</td>
<td>760</td>
</tr>
<tr>
<td><strong>6.4 Horizontal forward static load to back</strong></td>
<td>force, N 10 times</td>
<td>-</td>
<td>760</td>
<td>760</td>
<td>760</td>
</tr>
<tr>
<td><strong>6.5 Vertical static test on back</strong></td>
<td>force, N 10 times</td>
<td>600</td>
<td>900</td>
<td>900</td>
<td>900</td>
</tr>
<tr>
<td><strong>6.6 Arm sideways static load</strong></td>
<td>force, N 10 times</td>
<td>400</td>
<td>600</td>
<td>900</td>
<td>1000</td>
</tr>
<tr>
<td><strong>6.7 Arm downwards static load</strong></td>
<td>force, N 10 times</td>
<td>800</td>
<td>900</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td><strong>6.8 Seat durability Test</strong></td>
<td>combined seat &amp; back durability test</td>
<td>50000</td>
<td>100000</td>
<td>150000</td>
<td>200000</td>
</tr>
<tr>
<td><strong>6.9 Seat front edge durability test</strong></td>
<td>cycles seat load 950 N back load 330 N</td>
<td>50000</td>
<td>100000</td>
<td>150000</td>
<td>200000</td>
</tr>
<tr>
<td><strong>6.10 Horizontal forward durability test</strong></td>
<td>cycles back load 330 N</td>
<td>-</td>
<td>20000</td>
<td>50000</td>
<td>100000</td>
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<tr>
<td><strong>6.11 Seat impact test</strong></td>
<td>drop height, mm 10 times</td>
<td>180</td>
<td>240</td>
<td>300</td>
<td>300</td>
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<tr>
<td><strong>6.12 Back impact test</strong></td>
<td>height, mm angle, degrees 10 times</td>
<td>210</td>
<td>330</td>
<td>620</td>
<td>620</td>
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<td></td>
<td>38</td>
<td>48</td>
<td>68</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td><strong>6.13 Arm impact test</strong></td>
<td>height, mm angle, degrees 10 times</td>
<td>210</td>
<td>330</td>
<td>620</td>
<td>620</td>
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<td></td>
<td>38</td>
<td>48</td>
<td>68</td>
<td>68</td>
<td>68</td>
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<tr>
<td><strong>6.14 Tipping seat operation test</strong></td>
<td>cycles</td>
<td>25000</td>
<td>25000</td>
<td>50000</td>
<td>100000</td>
</tr>
<tr>
<td><strong>6.15 Vertical static test on auxiliary writing surface</strong></td>
<td>force, N 10 times</td>
<td>150</td>
<td>200</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td><strong>6.16 Auxiliary writing surface durability test</strong></td>
<td>cycles</td>
<td>150 N</td>
<td>10000</td>
<td>10000</td>
<td>25000</td>
</tr>
</tbody>
</table>

¹ It should be emphasised that there are applications where moderate usage can be combined with high frequency of use and vice versa. Therefore the precise nature of the intended use of a ranked seating installation should be carefully considered before selecting the appropriate loads and cycles from Table 1.
By Smouldering and Flaming Ignition Sources

The above standards, in addition to other international standards, provide a benchmark for testing of seating for the above criteria. The following is an overall summation only.

OBJECTIVE

The objective of these standards is to measure the ignitability of upholstered furniture composites and/or complete pieces of furniture.

No method using realistic shapes yet exists for measuring levels of ignition on a continuous scale for these composites and consequently the methods used in this standard provide ignition/non-ignition results at a number of fixed levels. One smouldering source together with a range of flaming sources, whose energy rises by a factor of approximately two at each step, are used. Thus a level representing the boundary of ignition can be associated with a particular construction. Although the levels do not form a continuous series, they do provide more information than an arbitrary single go/no go result and so allow smaller variations in ignitability to be related to actual hazards.

This assessment is intended eventually to form part of a much fuller fire hazard assessment when work now in progress on fire development and smoke and toxic hazards in fire is completed.

TERMS AND DEFINITIONS

For the purposes of this British Standard, the following terms and definitions apply:

1. Ignition Source
   Source of energy which is used to ignite combustible materials or products.
   1.1 Types of ignition Source
      1.1.1 Smouldering ignition source 0 – cigarette
      Note: In normal use the smouldering ignition source most likely to be encountered by furniture is a smouldering cigarette. An untipped standard-sized cigarette has been selected as a representative of the most severe range of cigarettes on sale. This source is designated ignition source 0.
      The ignition source shall be specified in BSEN 1021-1.
      1.1.2 Flaming ignition sources 1 to 7 – butane gas flames and flaming wooden cribs
      General: A range of seven flaming ignition sources is provided, numbered in ascending order of severity from ignition source 1 to ignition source 7, approximating to the burning of four double sheets of a full-size newspaper.
      1.1.2.1 Butane gas flame, ignition sources 1, 2 and 3
      A burner tube consisting of a length of stainless steel tube, (8.0 +/- 0.1)mm outside diameter, (6.5 +/- 0.1)mm internal diameter and (200 +/- 5)mm in length, shall be connected by flexible tubing via a flowmeter, fine control valve, on-off valve (optional) and cylinder
regulator providing a nominal outlet pressure of 2.8 kPa\(^1\) to a cylinder containing butane (see BS 4250).

Note 1: such steel tubing might be marketed as 5/16 in outside diameter, 0.028 in wall thickness. Where tubing of these dimensions is not readily available stainless steel tubing of approximately similar dimensions may be used providing that the 50mm length at the “flame” end of the tube is machined to the given size.

Note 2: Possible variations in performance might occur when the gas cylinder is nearly empty.

1.1.2.2 Crib, ignition sources 4, 5, 6 and 7

Materials

The cribs shall be constructed from the following materials”

a) dry softwood *Pinus silvestris* (Scots pine) that has been stored in warm dry conditions for a minimum of 1 week;

b) BPC grade absorbent surgical lint, approximately 200 g/m\(^2\), cut into nominal squares 40mm x 40mm (each square having a mass of approximately 0.3g);

c) polyvinyl acetate (PVA) or other suitable wood adhesive for gluing together the sticks and lint.

*Note: Guidance on the selection of timber for crib construction is given in Annex A.*

2. Smouldering

Combustion of a material with or without the emission of light and generally evidenced by smoke and an increase in temperature but without a flame.

3. Progressive Smouldering

Smouldering that is self-propagating, i.e. independent of the ignition source.

4. Flaming

Undergoing combustion in the gaseous phase with the emission of light and heat.

5. Flammability

Ability of a material or product to burn with a flame under specified test conditions.

6. Ignitability

Measure of the ease with which a material, product or component can be ignited so as to flame or progressively smoulder.
Accessories and Finishes

DECK FINISHES

Clear Plywood
Shall be from 18mm structural grade plywood adhered by silicone resin with clear polyurethane finish to all edges and top surface of platform.

Painted Plywood
Shall be from 18mm structural grade plywood adhered by silicone resin with either black or dark brown polyurethane finish to all edges and top surface of platform.

Phenolic
Non slip deck flooring Koskicrown or similar, available in clear, black or brown finishes, all edges will be coated with a waterproof oil based stain.

Carpet
Available in a wide range of finishes, standards and colours to compliment the interior colour layout of your venue.

Vinyl
Available in a wide range of finishes, standards and colours to compliment the interior colour layout of your venue

SOLID PANELS/CURTAINS

Fascia Panels
Are available in a number of attractive timber finishes including a clear veneer or painted finish. When the platform system is retracted a uniform look applies to the unit. The fascia panel has the added advantage of giving additional protection to the front of the unit.
**Side Panels**

Timber panels provide a neat and efficient way of closing off ends of the Retractable Seating System, particularly Free Standing, portable and mobile units. Side panels limit access to the under structure of the system in the open and closed position to those persons unauthorised. Constructed from sturdy structural plywood, or client specified veneer timber, these panels provide both visual and a physical barrier.

**Rear Panels**

All Starena systems have the ability to be fitted with high quality timber safety rear panels in a variety of finishes. These panels can be fixed, removable or fold down depending on the building structure and client requirements.

**Side and Rear Curtains**

Side Curtains are available in a range of Fire Retardant fabrics to assimilate with the facility decor. Curtains provide a visual screen between the seating systems under structure and are fixed in such a manner as to facilitate easy removal for cleaning and unit cycling.

**NON SLIP TREADS**

All aisle step locations, including leading edge of half steps, to be fitted with a high visibility photo luminescent and anti-slip edge, Eco Glo or approved.
PLATFORM COVER STRIP
For all mobile units platform cover strips are inserted between each of the units for OH&S purposes.

LAST ROW CLOSURE
Rear closure board, is a flush mounted board mounted between the last row of seating and wall.

WHEELCHAIR SEATING
Notch Outs
For permanent Handicap seating, can be provided as required on the Architectural Drawing. The positions need to be confirmed by Starena so the under structure is not compromised in any fashion.

Recoverable Notch Outs
As located on the architectural drawing and as confirmed by the manufacturer.

Recoverable Truncations
Will provide a full section of Handicapped seating, including access ways.

OPERATIONAL PENDANT
Pendant controls for Starena fully automated retractable seating system are a standard feature. They allow for the eased of operation of the system by one qualified operator, with a safety observer watching for onlookers.
WRITING TABLES
Writing tablets are available but only on the manual seat fold down options.

AISLE LIGHTING
Aisle lights shall be fitted to each step and each riser. *Starena’s preferred product* is the Eco Glo luminescent aisle way step nosings. Alternative aisle lights shall be 12 volt 5 watt, 2000 hr, powered by 240 volt AC transformer with backup battery power source.
SAFETY RAILS

Self-Storing
Steel self-storing rails with a height of 1.0m above the deck, with 100mm vertical steel divider bars, provide aesthetically pleasing, compliant rails for safety. Rails are fitted to the end of each deck, where required and fold with the system to provide easy storage.

Folding
Like the self-storing rail system, these rails are aesthetically pleasing, whilst still providing full code compliance. The advantage of folding rails is the saving of the physical labour or removing and storage of rails. These rails fold down onto the platform.

Removable
Like the self-storing rail system, these rails are aesthetically pleasing, whilst still providing full code compliance. The advantage of removable rails is the ability to interchange the rails to different section ends, if only part of the system is to be used.

All rail systems can incorporate timber inserts for aesthetic purposed in lieu of the vertical steel divider bars.
**FLOOR OVERLAY BOARD**

It is recommended on carpet and soft synthetic surfaces that an overlay board is placed under the wheel system to minimise the rolling loads when operating on these surfaces.

The overlay boards are required to be placed in front of the wheels each time the seating is extended. When the seating is retracted the overlay boards are removed and stored.

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**SEAT ROW AND AISLE NUMBERS**

Numbers are supplied as per the architects determined sequence. Numbers are fitted to the seat in the pre designated areas and aisle numbers are generally located on the riser adjacent to the seating row or on the end row seat itself.
### Who is Responsible For What

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Spectator accommodation, both indoors and outdoors, provided by telescopic stands is required to provide levels of safety equal to permanent spectator accommodation.

The design of telescopic stands should be the responsibility of a competent person and the design should be independently checked by a chartered engineer of appropriate skill and experience.

Telescopic stands are generally constructed from steel, aluminium, plywood, timber and plastic, by factory manufactured sub-assemblies. This specialised product should always be installed by a competent person(s) who has been formally trained and authorised by the manufacturer to do so.
PRINCIPAL RESPONSIBILITIES

The procurement of telescopic stands and their use should be an integral part of the planning, management and supervision of the facility for which it is required. It is the client’s responsibility to provide telescopic stands that are fit for their purpose.

A risk assessment, including a fire risk assessment of the proposed use of the telescopic stands should be made. The contractor should undertake a risk assessment for all aspects of the provision of the structure.

Once the structure has been commissioned and handed over, responsibility for managing all aspects of the structure pass to the client.

The principal responsibilities of the client are to:

- Ensure that competent persons are employed to design, install and commission the telescopic stands.
- During the design stage, agree on the expected spectator activity.
- Provide the contractor with necessary information.
- Recognise the necessary regulatory requirements.
- Appoint a competent technical adviser.

SPECIFICATION OF REQUIREMENTS

- Site location and position of the telescopic stands within the facility.
- Type of events to be held in the facility.
- Timetable for supply of the telescopic stands.
- Seat type and number of spectators required on the structure.
- Site access.
- Associated risks.

The division of responsibility should be clearly understood by all parties involved in the design, installation and management of a telescopic stand. The responsibility for design and installation should rest with the manufacturer.

Design calculations and drawings together with the independent design check should be made available to the client.

After the telescopic stand has been commissioned and installed it shall be properly maintained so that it is fit for use at all appropriate times. The client should arrange for the recommended periodic inspections and where necessary, inform the manufacturer as to any necessary repairs or remedial measures.

The client is responsible for satisfying any regulatory conditions relating to the use of the telescopic stands.

Ready availability of documentation can assist all parties and Table A.1 provides a document checklist.
Use of Telescopic Stands

Spectators should not be admitted to the telescopic stands for its first use until the client or the client’s agent, who should be a competent person, is satisfied that the structure has been properly installed and complies with the design criteria.

Spectators should not be admitted to the telescopic stands for subsequent events until the client is satisfied that the structure has been opened and set in accordance with the manufacturer’s instructions.

The numbers and distribution of spectators for which a grandstand has been designed should not be exceeded and consideration should be given to the access and egress arrangements. During all events a sufficient number of stewards should be present in order to safeguard spectators.