



**SLOVENSKI STANDARD**  
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**Prostori za gledalce - 10. del: Izračun varne zmogljivosti v sili**

Spectator facilities - Part 10: Calculating of safe capacity in case of emergency

Zuschaueranlagen - Teil 10: Berechnung der Sicherheitskapazität im Notfall

Installations pour spectateurs - Partie 10 : Calcul de la jauge de sécurité en cas d'urgence

**Ta slovenski standard je istoveten z: prEN 13200-10**

**ICS:**

91.040.10	Javne stavbe	Public buildings
97.200.10	Gledališka, odrska in studijska oprema ter delovne postaje	Theatre, stage and studio equipment
97.220.10	Športni objekti	Sports facilities

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## Spectator facilities - Part 10: Calculating of safe capacity in case of emergency

Installations pour spectateurs - Partie 10 : Calcul de la jauge de sécurité en cas d'urgence

Zuschaueranlagen - Teil 10: Berechnung der Sicherheitskapazität im Notfall

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## European foreword

This document (prEN 13200-10:2023) has been prepared by Technical Committee CEN/TC 315 “Spectator facilities”, the secretariat of which is held by UNI.

This document is currently submitted to the CEN Enquiry.

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**prEN 13200-10:2022(E)**

## **Introduction**

This document has been prepared in order to specify the general criteria for spectator safety management.

Attention is drawn to the fact that in certain Countries additional/different requirements may be applicable due to existing national regulations or equivalent.

This document starts from the Council of the European Union Resolution of 4 December 2006 and has been prepared in order to specify the technical general criteria for the planning and safety of the management in spectator facilities.

The principal objective of this document is to provide guidance on the assessment of how many spectators can be safely accommodated within the viewing accommodation of spectator facilities used for a sporting event.

The assessment to determine the safe capacity of spectator facilities is the most important step towards the achievement of reasonable safety.

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## 1 Scope

This document specifies general characteristics regarding infrastructures of safety and emergency management in spectator facilities.

It specifies the method of calculating a safe capacity for the planning of the any event. e.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 13200 (all parts), *Spectator facilities*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **activity area**

area where the event takes place

### 3.2

#### **barrier**

any element of spectator facilities, permanent or temporary, intended to prevent people from falling, and to retain, stop or guide people

Note 1 to entry: Types of barriers used at spectator facilities are further defined in EN 13200 "Spectator Facilities".

### 3.3

#### **circulation**

free movement of spectators within spectator facilities

### 3.4

#### **crush barrier**

barrier which protects spectators from crushing, positioned in areas of standing accommodation

### 3.5

#### **design capacity**

total number of spectators for which a spectator facility or some division of a spectator facility (block or sector) is designed

### 3.6

#### **event**

occurrence of a particular set of circumstances

**prEN 13200-10:2022(E)****3.7****entry system**

set of different types of entrances, linked to form a passage for spectators

**3.8****exit**

stairway, gangway, passageway, ramp, gateway, door, and all other means of passage used to leave the spectator facilities and their accommodation

**3.9****spectator facilities management**

management will normally be either the owner or lessee of the spectator facilities, who may not necessarily be the promoter of the event

**3.10****(P) factor**

term used for the assessment of the physical condition of an area of viewing accommodation

**3.11****(S) factor**

term used for the assessment of the safety management of an area of viewing accommodation

**3.12****spectator accommodation**

area of a spectator facilities or structure in the spectator facilities provided for the use of spectators; including all circulation areas, concourses and the viewing accommodation

**3.13****spectator facilities**

place where sports or other competitive activities take place in the open air and where accommodation has been provided for spectators, consisting of artificial structures or of natural structures artificially modified for the purpose

**3.14****infrastructure**

basic physical and organizational structures needed for the operation

**3.15****safe capacity**

number of people who can be safely accommodated in a specific space

**3.16****risk assessment**

overall process of risk analysis and risk evaluation

**3.17****risk analysis**

systematic use of information to identify sources and to estimate the risk

**3.18****risk**

combination of the probability of an event and its consequence



### 3.19

#### **risk criteria**

terms of reference by which the significance of risk is assessed

### 3.20

#### **risk evaluation**

process of comparing the estimated risk against given risk criteria to determine the significance of the risk

## **4 Characteristics**

### **4.1 Safe capacities**

The most important condition for spectator facility safety is to set the maximum number of spectators that may be accommodated. At spectator facilities, the safety management team should prescribe the capacities for the premises as a whole and for each separate section of the viewing accommodation.

This standard provides guidance on how to determine the safe capacity within every kind of spectator facilities. It emphasises that this capacity depends not merely on the available viewing accommodation and the capacities of the entrances and exits, including the emergency exit capacity, but on the physical condition (the (P) factor) and the quality of the safety management (the (S) factor) of the spectator facilities. The safe capacity of a seated stand may be lower than the number of seats within it.

Another important aspect of the process is the type of event. Ground management will be used to preparing for all the issues presented by the usual activity or event at the spectator facilities. However, it needs to be recognised that different events will have their own unique circumstances, requirements or audience profile. Where another sport or different event, such as a musical performance, is planned, the additional considerations will include the possible requirement for a special safety certificate plus new contingency plans or appropriate alterations to the existing plans.

The management of the spectator facilities should take responsibility for assessing the (P) and (S) factors and calculating the safe capacity. These should take account of all the recommendations in this standard, not merely those with which the spectator facilities already comply. The (S) factor and to a lesser extent the (P) factor will reflect the operations manual and its underlying risk assessments (see EN 13200-8 Spectator facilities - Part 8: Safety Management). The Authority issuing the safety certificate should be satisfied that the proposed (P) and (S) factors are reasonable and that the methodology and calculations are correct.

In calculating the permitted capacity, the spectator facilities management should set a single (P) factor and a single (S) factor for each separate area of the spectator facilities. It should then use whichever is lower to determine the capacity of that area. It should neither multiply the two factors by each other nor adopt the average. Both these approaches would distort the final figure.

### **4.2 Physical categorisation (P) factor**

#### **4.2.1 General**

It is the responsibility of management to assess the (P) factor for each section of viewing facilities. An important indicator to be used when determining the (P) factor is the standard of spectator facilities maintenance (see EN 13200-8 Spectator facilities - Part 8: Safety Management).

If all structures, installations and safety-related components at the spectator facilities are maintained in good condition and working order, a (P) factor of 1,0 should be applied.

Where there are deficiencies, the (P) factor should be reduced accordingly.

If appropriate, the (P) factor could be set as low as 0,0, and therefore the capacity of the area in question will be zero.

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It is imperative therefore that maintenance procedures for both new and existing structures are properly understood. It is further recommended that a system of planned maintenance be adopted. Where necessary professional advice on this matter should be sought from competent persons.

It is also essential that maintenance is carried out in accordance with the written instructions provided by the designer or manufacturer.

For new construction, the provision of operating and maintenance manuals detailing the expected life cycles of components should be a necessary part of the completion of any new project. This is notwithstanding any separate tests and inspection periods which may be recommended below or form part of the annual inspection.

The maintenance of new structures may be equally, or even more onerous than that of existing structures. Management should be aware that the provision of a new structure does not reduce its responsibility for the maintenance of a safe structure.

A planned preventative maintenance schedule and its implementation demonstrate that the management is taking its responsibilities for maintenance seriously.

Good housekeeping is a fundamental part of fostering and maintaining a safety culture at the spectator facilities.

Management should therefore demonstrate a positive attitude in this respect, and in doing so, encourage a conscientious, co-operative and vigilant attitude among all members of staff.

In particular, all staff must identify and report to management at an early stage any problem which might compromise safety, be it relating to the structures at the spectator facilities, their systems, facilities or equipment.

Their efforts and, if appropriate, suggestions, should always be acknowledged, and they should be informed of any resultant remedial action.

A positive attitude towards good housekeeping should also be communicated to visiting personnel and outside contractors.

**4.2.2 Structures and installations**

All structures at spectator facilities should be safe, serviceable and durable at all times during their use, and where necessary, fire-resistant. They should comply with statutory requirements, including those for health and safety at work.

In order to be safe, a structure should be capable of resisting all loads in service (including sporting and non-sporting use) with an adequate reserve of strength and without motion that would cause alarm to people on or in the structure.

Specialist advice from a competent engineer should be sought to assess the adequacy of all load-bearing elements in spectator facilities.

Designers should pay particular attention both to minimising the risk of progressive or disproportionate collapse from unforeseen incidents, and to the dynamic response of structures. In doing so, designers should:

- a) Systematically assess conceivable hazards to structures and design the structures to be stable and robust in the light of a risk assessment.
- b) Adopt structural forms which minimise the effects of the hazards identified.
- c) Provide spectator facilities management with manuals which define the key elements and components of the structure requiring regular inspection and maintenance.

### 4.2.3 Structural dynamics for permanent structures

In addition to the ability to resist static loading, structures at spectator facilities may also need to resist dynamic loading. Permanent structures particularly sensitive to dynamic loading include those with long spanning or cantilevered seating decks.

### 4.3 Safety management categorisation (S) factor

The assessment of a spectator facilities capacity should take into account the quality of safety management that is the (S) factor. An important indicator to be used when determining the (S) factor is the standard to which the safety management structure, as outlined in this chapter, is implemented.

For example, it is not enough to have a written safety policy for spectators. That policy must be fully implemented and understood by all staff. Similarly, a safety officer may have a detailed job description, but may fail to meet its requirements on event days.

Contingency plans may have been drawn up, but never tested.

If all the management's safety-related responsibilities are fully met, and the stewarding is of a high standard, an (S) factor of 1,0 should be applied.

Where there are deficiencies in any aspect of the safety management, the (S) factor should be reduced accordingly. If appropriate, the (S) factor could be set as low as 0,0, and therefore the capacity of the area in question will be zero.

Management should therefore be aware, that where a safety certificate is in force, its own performance in safety-related matters will have a direct effect on the calculation of the spectator facilities capacity.

Adverse weather conditions could affect both the (P) or (S) factors.

## 5 Calculating the safe capacity of a spectator facilities

### 5.1 The importance of calculating a safe capacity

The purpose of this chapter is to outline the main factors which must be considered in making an assessment, leading to a calculation of the final safe capacity of each section of the spectator facilities.

Clearly the assessments made will differ according to the unique spectator facilities and to the type of spectator accommodation being assessed; primarily whether it is for seated or standing accommodation. But the factors to be applied in each case are the same for every spectator facilities, regardless of the sport being staged.

To further illustrate the methods of assessment and calculation, worked examples are also provided in Annex A. However, the details of each step can only be fully understood by a thorough reading of the whole EN 13200 (All parts).

The assessment and calculation process will require properly detailed plans of the spectator facilities, where practical drawn to a scale of 1:200. Wherever possible the physical dimensions should be verified on site.

At the majority of spectator facilities, the capacities of each section will be added to establish the final capacity of the spectator facilities as a whole. However, as explained in EN 13200-8 Spectator facilities - Part 8: Safety Management, there are certain spectator facilities including, for example, those staging horse racing or golfing events where it may be difficult to calculate the overall capacity of the whole spectator facilities. In such cases, however, the final capacities of individual sections of viewing accommodation must still be calculated and occupation levels of all areas determined so that, where necessary, numbers are controlled to ensure they do not compromise safety.

Management must undertake a series of risk assessments (see EN 13200-8 Spectator facilities - Part 8: Safety Management). These must be taken into account when assessing the (P) and (S) factors.

**prEN 13200-10:2022(E)****5.2 Applying the capacity calculation**

Once the final capacity of a section or of the whole spectator facilities is determined, in no circumstances should a larger number of spectators be admitted.

If the final capacity is lower than the level management ideally requires, it can only be raised after the necessary remedial work has been completed, and/or the quality of safety management improved, and the area in question then re-assessed.

Similarly, if part of the spectator facilities is required to be closed, this must be done. It must not be re-opened for spectator viewing for any reason until the necessary remedial work has been completed to remove the deficiencies which led to its closure, and not before these measures have been approved by the relevant authority.

**5.3 Factors to be considered**

The common factors which apply to both seated and standing accommodation can be summarised as follows.

## a) The entry capacity of the section

The entry capacity is the number of people who can pass through all the turnstiles and other entry points serving the section, within a period of one hour. Historical data may be used to determine a value.

## b) The holding capacity of the section

This is the number of people that can be safely accommodated in each section.

In the case of seats, this will be determined by the actual number of seats, less any that cannot be used safely owing to seriously restricted views or their inadequate condition (see EN 13200- 8 Spectator facilities - Part 8: Safety Management) and an assessment of the (P) and (S) factors.

(P) and (S) factors are explained in EN 13200-8 Spectator facilities - Part 8: Safety Management.

In the case of a standing area, this will be determined by a number of features, including crush barrier strengths and layouts (see EN 13200-3 Spectator facilities - Part 3: Separating elements - Requirements), areas which offer restricted views, and a further assessment of both the (P) and

(S) factors.

## c) The exit capacity of the section

This is the number of people that can safely exit from the viewing area of the section under normal conditions.

## d) The emergency evacuation capacity

This is determined by the emergency evacuation time, which is based largely on the level of risk of the section and its associated emergency evacuation routes.

The emergency evacuation capacity is the number of people that can safely negotiate the emergency evacuation routes and reach a place of safety within that set time.

## e) The final capacity

Having established all the above figures, the final capacity of the section, and hence of the whole spectator facilities, will be determined by whichever is the lowest figure arrived at for (a), (b),

(c) or (d).

*Diagrams 2.1 and 2.2 summarise the main steps outlined above.*