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Wisconsin
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Evaluation #

200422-B
(Replaces 200089-B)

Safety & Buildings Division
201 West Washington Avenue
P.O. Box 2658
Madison, WI 53701-2658

Wisconsin Building Products Evaluation

Material

Telescopic Bleachers

Manufacturer

Irwin Telescopic Seating Company
610 E. Cumberland
Altamont, IL 62411

SCOPE OF EVALUATION

GENERAL: This report evaluates the interior telescopic bleachers manufactured by Irwin Telescopic Seating Company.

This review includes the cited **International Building Code (IBC)** requirements below in accordance with the current **Wisconsin Amended IBC Code**:

- **Egress Width (general):** The interior telescopic bleachers have been evaluated for conformance in accordance with **ss. IBC 1003.2.3** and **1003.2.8**.
- **Egress Required Aggregate Width for A-4 Assembly:** The interior telescopic bleachers were evaluated in accordance with **s. IBC 1008.5**.
- **Guardrails:** The interior telescopic bleacher guardrails have been evaluated in accordance with **s. IBC 1003.2.12, Exception 7,** and **s. IBC 1008.12**.
- **Bleacher Foot-boards:** The interior telescopic bleacher foot-boards were evaluated in accordance with **s. IBC 1008.13**.
- **Bench Seating:** The interior telescopic bleacher bench seating was evaluated in accordance with **s. IBC 1008.14**.
- **Bleacher Structure:** The interior telescopic bleachers are designed and constructed in accordance with **s. IBC 1604.1, s. IBC 1604.2** and **s. IBC 1607.1**.

DESCRIPTION AND USE

Irwin Telescopic Seating Company offers interior telescopic bleacher seating in a variety of sizes and configurations. Irwin Telescopic Seating Company offers bleachers with either 10 or 12 inch row to row rise. The twelve inch rise bleacher uses a deck support beam that is two inches deeper than that used for the 10 inch rise

bleacher. The support columns for a 12 inch rise bleacher are longer than the support columns of 10 inch rise bleacher with the same number of rows. Because the support columns for 12 inch rise bleachers have larger unbraced lengths than those of a 10 inch rise bleacher with the same number of rows, the total number of rows offered in 12 inch rise is less than that offered in the 10 inch rise. For example, the bleacher investigated in this evaluation is an 18-row, 10 inch rise bleacher. The elevation of the 18th row deck would be 180 inches. A 12 inch rise bleacher with the same configuration would only be offered with a maximum of 15 rows. A 15-row, 12 inch rise bleacher would have a 15th row deck elevation of 180-inches. By observing this restriction the unbraced length of the support columns used in the 12 inch rise bleacher never exceeds the unbraced length of the support columns designed for use with the 10 inch rise bleachers.

Irwin Telescopic Seating Company also offers bleachers with a horizontal row spacing of 22, 24, or 26 inches. The support structure for the different row-to-row spacing is almost identical. The different spacing bleachers have the same decks. The deck support structures for the 22 and 24inch spacing bleachers are restricted from opening fully. This allows the same components to be used on bleachers with different row-to-row spacing. For the purpose of design verification, the 10inch rise, 26inch spacing bleacher configuration will be analyzed in this evaluation. The larger the row-to-row horizontal spacing is the greater the design load on the structure. The 26 inch row spacing is the largest standard row spacing.

The bleachers are offered with one of two seating surfaces. The bleachers will either have contoured blow molded plastic seat modules, or Southern Pine seat and riser boards. The plastic seat modules are 18 inches long and are supported at both ends with metal seat brackets. The same metal seat brackets on 36 inch centers support the seat and riser boards. The metal seat brackets are bolted to the nose beam of the bleacher deck. All bleacher decks are completely enclosed.

Design example utilizing one bleacher group: This group consists of two, 18 row sections. All rows have a vertical spacing of 10 inches. All sections utilize a row-to-row spacing of 26 inches. Both sections are 20'-0" long. All sections are wall attached. The main load supporting components of the wall-attached sections are the same.

Load specifications: The decks and the supporting structure will be designed for a vertical live load of 100 pounds per square foot plus dead load. In addition, the structure will be design to resist a sway load of 24 pounds per linear foot applied parallel to deck length. The structure will also be designed to resist a 10 pounds per linear foot sway load applied perpendicular to seat length. The seat boards and seat brackets will be designed for 120 pounds per foot load applied vertically along the length of the seat boards.

Load transfer to building floors and wall: The bleacher assembly must support live and dead loads in the open position, as well as dead loads in the closed position. In the open position live and dead loads will be transferred through the seats and decks to the rear and nose beams of the bleacher/. The decks will be supported by deck supports and support post cantilevers. The deck supports also provide bracing for the rear beam. The decking continuously braces the rear and nose beams. The loads from the beams will be transferred through the cantilevers to the posts. The posts will transfer their loads to the wheel channels. The wheel channels will transfer the load through axles and wheels to the floor. The weak axis of the posts in rows 2 and higher is braced against lateral loads with knee style bracing. The bracing resists the 24 pound per linear foot sway load on the bleacher. The bracing can take load in compression and tension. The 10 pound per linear foot load acting perpendicular to the platform will be transferred through the platform supporting components and into the wall for wall-attached bleachers. The lateral load will be transferred into the floor on the forward fold bleachers.

Design considerations: The support structure for every row is virtually identical. The only relevant variables are the length of the two support posts, the distance they are separated, and the distance the deck overhangs the support post locations. Since there is a common section for all posts, and a common section for all beams, certain post and deck configurations will govern the design of the beams and posts. These design critical load combinations will be analyzed to verify the adequacy of the design. Both sections are the same size and utilize the same support structure. One section will be analyzed to verify the adequacy of the bleacher design.

Guardrails are constructed to prevent the passage of a sphere larger than 4-inches in diameter. In accordance with **s. IBC 1008.12**, when bleachers have more than one pull out section, the plan submittal shall show end guardrails per section (or sockets for installation of guardrails per section), or designed such that individual bleacher sections

cannot be extended without extending the rest of the sections. Guardrail design and placement shall comply with the requirements of **s. IBC 1008.12**. Guarding between the foot boards and seat boards is also required.

All bleachers with contoured seats must be provided with aisles, in accordance with **s. IBC 1008.7.6**. **Exiting via the seat boards is not permitted with contoured seats.**

The occupant capacities of buildings and rooms within buildings are established by exit width, toilets and the class of construction of the building. The capacity of the bleachers **cannot exceed** the allowable capacity of the room or building.

The exit width indicated in **s. IBC 1008.7.1** through **s. IBC 1008.9** applies only to the aisles and exit paths within the perimeter of the bleachers. It does not apply to the exit width from the room in which the bleachers are located nor from the building. Exit width requirements from the room and building are determined by **s. IBC 1008.1** through **s. IBC 1008.6**.

This approval does not address barrier-free requirements. Accessible seating in accordance with the applicable requirements in **IBC Chapter 11** shall be reviewed during building plan review.

This approval is not for an individual project, but for the design concept only. Plans are required for each project showing the approval number, member sizes, wall and floor anchoring information, guardrail details, size and location of bleacher aisles and construction details required to construct the bleachers from the plans.

CALCULATIONS

Static load analysis will correspond with applicable design procedures in **IBC Chapter 16** of the **International Building Code (IBC)** requirements below in accordance with the current **Wisconsin Amended IBC Code**. See **IBC Table 1607.1** and NFPA 102 for static loads for the bleachers and railings (also **s. IBC 1607.7**). Allowable stresses for beams, posts, cantilevers, deck supports, and wheel channels will be determined with the AISI Cold Formed Steel Design Manual. A computer program based on the CFSDM will be used to determine section properties and the allowable stress for most components of the bleacher support structure. The design will be by Allowable Stress Design Method unless noted otherwise.

Design Loads:

- As specified in **IBC Chapter 16** of the **International Building Code (IBC)** requirements below in accordance with the current **Wisconsin Amended IBC Code**.
- Dead Load: Weight of bleacher.
- Live Load: A uniformly distributed vertical live load of not less than 100 pounds per square foot of gross horizontal projection.
- Horizontal Sway: 24 pounds per lineal foot, parallel to deck length.
10 pounds per lineal foot, perpendicular to deck length.

Structural calculations for Irwin Telescopic Seating Company, telescopic bleachers were prepared (signed and sealed) and drawings are on file with the department. Deck performance calculations are also on file with the department.

LIMITATIONS OF APPROVAL

The **IBC** limitations below are in accordance with the current **Wisconsin Amended ICC Code**:

Except as noted below, calculations and drawing details shall be submitted on a job-to-job-basis showing floor and or wall anchorage loads and how attached, respectively, in accordance with **s. Comm 61.30**.

In accordance with **s. Comm 61.30**, anchorage details shall be shown on the plans indicating how folding bleachers are attached to the wall and floor. If installation is in an older building, (more than 4 years old), bleacher plans shall show the construction of the wall and/or floor to which the bleacher section will be anchored. This material

approval also waives floor anchorage calculations to solid concrete walls and lightweight concrete block only (see **DESCRIPTION AND USE** section). Both wall/floor anchorage details shall be shown on plans on a job-to-job basis. Wall anchorage details and calculations are required for wall anchorage to wood stud/drywall, etc., on a job-to-job basis.

Irwin interior telescopic bleachers are approved for plan submittal without structural calculations showing that dead and live load support for open or partially opened and dead load in the closed position, can be safely carried by the supporting structure in accordance with **s. Comm 61.30**.

Forward-folding bleachers must be securely bolted to the floor to prevent overturning in the closed position. Movable bleachers shall have stops so that it is not possible to move the bleacher when it is being used. Tier catches, which impede this movement, shall be supplied on all sections and all rows.

Additional information required with plans submitted on a job-to-job basis:

1. Details of row locks, wheels and wheel channels with calculations showing that they stop front-to-back movement when seating is partially or fully opened;
2. Floor anchorage calculations and details for bleachers installed in a permanent telescoped position, in accordance with **s. Comm 61.30**.

Where the rise of a seat exceeds 11-inches, intermediate steps shall be provided the full width of the aisles. The steps shall have a rise of not more than 11-inches and a tread of not less than 10-inches nominal width. In no case shall the angle of seating exceed 45 degrees.

This approval will be valid through December 31, 2009, unless manufacturing modifications are made to the product or a re-examination is deemed necessary by the department. The product approval is applicable to projects approved under the current edition of the applicable codes. This approval may be void for project approvals made under future applicable editions. The Wisconsin Building Product Evaluation number must be provided when plans that include this product are submitted for review.

DISCLAIMER

The department is in no way endorsing or advertising this product. This approval addresses only the specified applications for the product and does not waive any code requirement not specified in this document.

Revision Date:

Approval Date: August 16, 2004 By: _____

Lee E. Finley, Jr.
Product & Material Review
Integrated Services Bureau