

# IIHF SPECIFICATIONS FOR ICE HOCKEY RINK DASHER BOARD AND PROTECTIVE SHIELDING SYSTEMS FOR SOCHI 2014 OLYMPIC WINTER GAMES

## BOLSHOI ICE PALACE, MALY ICE PALACE AND ICE HOCKEY PRACTICE ARENAS

### Introduction

The SOCHI 2014 Olympic and Paralympic Winter Games ice hockey tournaments will bring together the best hockey players in the world for three very intense hockey tournaments. For several years now, the IIHF has actively promoted and supported activities to increase safety of the participants. One of the initiatives has been the operation of an Injury Report System (IRS) during world championships and international ice hockey tournaments gathering data on the number, type and severity of injuries resulting from competition at all level of the Game. Furthermore, the IIHF has adopted new rules and provided new interpretation of rules and regulations to further prevent injury. The IIHF has promoted fair play amongst the participants and has supported the development and use of more appropriate and enhanced ice hockey rink and players' equipment.

During the 2010 Vancouver Olympic Winter Games ice hockey tournaments, the analysis of the data from the IRS indicated a significant reduction of injuries. Although this reduction can be attributed to several initiatives, the design and the superiority of the dasher board and protective shielding system available in the Olympic Ice Hockey Venues in Vancouver was identified as one of the important factors in the prevention, decline in number and reduction of the severity of injuries. With that in mind, the IIHF has now established new standards for Olympic Winter Games ice hockey tournaments with the intention of extending these high standards to all new arenas being built for major World Championships and future Olympic Winter Games.

The IIHF rules book provides general guidelines with regards to the building of dasher board and protective shielding system for ice hockey arena in general. Although these guidelines are excellent for every day training and competition rinks around the world, the level of competition and, the quality and intensity of play at the Olympic Winter Games now demand that the IIHF establishes and implements specific standards for top level competition in order to make the games safer for the players.

Newer and creative technology and material provide opportunity to create a safer environment for the high performance athletes participating in top level competitions such as Olympic Winter Games ice hockey tournaments. For these high level contests, the combination of a dasher board and protective shielding system shall provide optimum flexibility and absorption of intense physical contacts along the boards. The design shall be done in a way that reduces both the risk, quantity and/or the seriousness of injuries. The systems require absorbing a huge amount of energy from the impact to players and in the process reducing the potential for injury.

Therefore, it is crucial that the combination of dasher board and protective shielding systems shall be designed and constructed with proven safer high quality material and methods in order to insure greater safety and efficiency creating the best environment for the players to perform at the best level possible for the enjoyment of all fans around the world. The following provide high standards guiding principles in the development of the dasher board and protective shielding systems. The IIHF also recognizes the importance of the Olympic Winter Games to help establishing newer and safer standards for the future benefit of the Game.

## **General Specifications**

For the 2014 SOCHI Olympic Winter Games the following specifications shall be applicable and respected. The IIHF reserve the right to review and approve the design, shop drawings, material and construction methods of the dasher board and protective shielding systems therefore design, shops drawings, material and construction methods shall be approved by IIHF Technical delegates prior to any contract awarded or construction begins.

### **1. DIMENSIONS OF THE RINKS (Competition and Practice)**

Maximum size: 60 metres long by 30 metres wide.

The corners shall be rounded in the arc of a circle with a radius of 7 to 8.5 metres.

## **Section 1**

### ***SPECIFIC STANDARDS FOR COMPETITION RINKS***

#### **1. GENERAL DESCRIPTION**

The competition rinks dasher board system shall be conversion friendly system with flush kick plate and impact absorbing caprail. The protective shielding shall be an acrylic shielding system or equivalent system providing optimum flexibility and reducing risk of injury to the players.

#### **2. BOARDS**

- a) The rink shall be surrounded by plastic wall known as the "Boards" which shall be white in colour.
- b) They shall be 1070mm in height above the level of the ice surface.
- c) The boards shall be constructed in such a manner that the surface facing the ice shall be smooth and free of any obstruction that could cause injury to the players and the protective screens and gear used to hold the boards in position shall be mounted on the side away from the playing surface.
- d) The gaps between the panels shall be minimized to 3mm
- e) The dasher boards shall be installed on an ice dam. The ice dam should have a design that allows backward flex of the dasher panel.
- f) Dasher board framework shall be made of aluminum allowing acting as a spring, flexing and returning in position without backlash effect. The quality of the properties of the aluminum shall allow some flexing without failing.
- g) Arena panels shall be factory prefabricated in demountable sections. The design of all panels whether straight, curved or in which a gate is located shall be similar. Each panel to be between 1070mm in height, and shall be made of extruded structural aluminium box sections assembled into frames using high strength fasteners, and /or channels assembled into frames using welding by certified welders. Aluminium to be mill finished. Frames shall allow for fastening of the HDPE facing and anchoring at base. Ensure flush mating of the HDPE facing at arena panel joints.
- h) Panels to be clad with 12.5mm white High Density Polyethylene (HDPE) facing the full height of each panel, and with 19mm colour impregnated HDPE cap rail allowing for a 10mm groove-in keeping the acrylic in place. Colour of the cap rail to be available from standard options (red, blue, white and yellow). Both edges of cap rail shall have a smooth impact absorbing and radius edge. Kick plate, yellow in colour, to be inlaid, flush with white facing, include for additional horizontal stringer.
- i) The HDPE facing shall be attached to the arena board framing with 6mm diameter screws. Screws to be zinc-plated or stainless steel. Heads of screws shall be painted to colour match the facing, kick plate or top cap as appropriate. Spacing of the screws shall not exceed 225mm on centre. Screw heads must be recessed so they do not project beyond the face of the HDPE

#### **3. MATERIALS**

- a) It is highly recommended that the board be constructed with aluminium Extrusions: equivalent to ASTM B221, 6005-T5 or T6 alloy and temper or equivalent material.
- b) The board surface shall be of high quality High Density Polyethylene (HDPE): High impact, integrally coloured, high-density polyethylene, bright white and other colours as specified, 12.5mm thickness.

#### **4. KICK PLATE**

- a) At the lower part of the boards shall be fixed a "Kick Plate", yellow in colour, 150 to 250mm in height above the ice surface level. The kick plate shall be flush to the HDPE white facing.

#### **5. DOORS (GATES)**

- a) All doors giving access to the ice surface must swing away from the ice surface. The gaps between the door and the board shall be minimized to 5mm.
- b) Gate latch shall be a single latch type.
- c) Players' gates shall be built into standard 2400 mm sections and shall be 760mm wide, left or right hand swing.
- d) Gate with protective shielding shall provide a flush mounted push-button latch release in the cap rail on the ice entrance gates where shields would otherwise prevent latch operation. The push-button shall be designed to be simple to operate from both sides of the shielding (suitable for opening gates with hockey glove on hand), yet prevent accidental opening.
- e) A minimum of one set of doors (equipment gate) must provide clear access into the rink area by ice resurfacing machine, forklift or other types of vehicles for access in locations as shown on drawings. The threshold top to be 25mm stress relieved white Polypropylene and the bottom 40mm to be galvanized steel tubing.
- f) Equipment gates shall be double gates with a minimum – 3050mm overall opening depending on location.
- g) Each equipment gate unit shall be equipped with one locking clamp or sliding bar and two retractable flush bolts into the threshold or floor.
- h) Each equipment gate unit shall be equipped with adjustable heavy duty spring loaded casters per side, with the direction of travel fixed to the arc of the door.
- i) Access gates shall be 920mm wide, left or right hand swing. They should hinge off of the adjacent dasher panel and latch to the dasher section on the other side
- j) Double access gates shall have locking hardware similar to equipment gates. They should hinge off of the adjacent dasher panel

#### **6. PLAYERS, PENALTY, AND OFFICIALS' BOXES/BENCHES**

- a) Boxes shall consist of arena board enclosures similar to rink arena boards.
- b) Boxes shall consist of two (2) team boxes, two (2) penalty boxes and one (1) officials' / timekeeper's box;
- c) Interior finish of boxes shall be of similar construction as ice-side of arena boards, utilizing 10mm thick HDPE, to height of mid-stringer on front side, full height on other sides. Framing shall be similar construction as arena boards. Provide a water bottle shelf.
- d) Player boxes shall be 10m long by 1600mm deep. Access via two gates per box on ice side, and one gate at the back or end of each box
- e) Penalty boxes shall be 4m long by 1600mm deep with access via one gate on ice side, and additional gates.
- f) Timekeepers' box shall be approximately 6m long by 1600mm, accessed at the back of the box by one gate, and with two side gates, one to each penalty box (if possible the gates should open outside of the timekeeper box). Timekeeper table with supports, 400mm x full width of box. (exact configuration TBC)
- g) Benches shall be approximately 9000mm long in player boxes according to the design of the player's boxes and full box width in penalty boxes. Benches shall be a nominal 240mm deep. Benches shall be extruded anodized aluminium with the seating surface being clad with 12mm HDPE. Benches to be mounted on socket-mount pedestals at 740mm above floor.
- h) Bench pedestals shall be of 6mm zinc plated steel base plate with 38mm x75mm steel post. Bench pedestal locations to be positioned along the length of the bench as required. The front and sides of the pedestal supports are to be covered with HDPE with recessed screws so players skate blades cannot come in contact with metal.
- i) Provide aluminium framed floors, with 12mm rubber mat cut to size and loose laid in the boxes. 19mm Plywood, exterior waterproof type.
- j) Provide coaches walkways, 200mm high with 12mm rubber mat on top and exposed sides covered with 10mm white HDPE.
- k) All metal exposed in the players' and penalty boxes that can easily come in contact with players skates shall be covered with rubber mat or HDPE

## **7. PROTECTIVE SHIELDING (Spectator Shielding)**

- a) The protective shielding (spectator shielding) shall be an acrylic shielding system or equivalent system providing optimum flexibility without backlash effect in order to reduce risk of injury to the players.
- b) The protective shielding located above the boards shall be 2400mm in height on the ends and shall extend 4m from the goal line towards the neutral zone and shall be 1800mm in height along the sides, except in front of the player benches.
- c) The gaps between the shielding panels shall be minimized to 5mm.
- d) No openings are allowed in the protective shielding with the exception of the players' boxes.
- e) At any interruption of the protective shielding there shall be protective non-branded high quality padding to prevent the injury of the players.
- f) The protective shielding shall have a thickness ranging from 12.5 to 15mm of top quality acrylic or an equivalent flexible shielding system providing optimum flexibility and being acceptable to the IIHF.
- g) If required by design and at the gates only, the support may be a two piece with a screw-applied face plate.
- h) The protective shielding support system must facilitate the replacement of shields from the ice side without requiring additional support or securing of the adjacent shields.
- i) Protective shielding and supports shall be designed for easy removal without tools for events when arena boards will remain in place but shielding and shielding supports are to be removed. It is recommended that the standard acrylic supports posts be made from clear polycarbonate and not require a separate gasket, "Clearvision" posts or similar product, posts should be on 1520mm centres on the ends and corners and 2450mm on sides. The top of the posts are to be within 150mm of the top of the shielding and be equipped with HD support clips that extend the shield containment for a minimum of 50mm beyond both sides of the posts.
- j) Protective shielding shall provide a 45 degree angle acrylic roof over the timekeepers' and penalty boxes.

## **8. END ZONE PROTECTIVE NETTING**

- a) At both end zones there shall be a protective netting system with Kevlar® nets. It is recommended that the system be retractable and shall be power operated, with remote control feature.
- b) The colour, size and texture of the mesh shall be discussed and agreed between with IIHF (international Ice Hockey Federation), OBS (Olympic Broadcast System) and SOCHI 2014 according to the requirements for broadcast and spectators in the particular buildings. The netting shall be hung on the square side (fibre shall be horizontal and vertical – not in diamond shape).

## **9. ANCHORS (FOR DASHER BOARD FRAMES OR ICE DAM)**

- a) All arena ice dam shall be tightly fastened to the refrigerated slab by means of zinc plated bolts.
- b) Anchors: Galvanized Steel or Zinc plated pre-cast concrete anchor bolt system for securing to concrete substrate. Anchors shall be adjustable using an internally threaded coupling nut. Anchors are to be installed prior to pouring concrete rink slab.
- c) The dasher board manufacturer shall be responsible for supply and installation of anchors. Snap-in plugs or threaded plugs with flush tops to fill the anchors when the boards are removed are provided with removable systems.

## **10. CONVERSION PRODUCTS**

- a) Ice Dam: Provide 50mm high x 153mm inverted U-shaped steel channel at underside of dasher board system for use when dasher boards are removed while the ice remains in. Ice dam is to be anchored independently of dasher board frame anchors into concrete; dasher board frames to be anchored to ice dam. Voids to be filled with Styrofoam insulation. Ice dam to be coated with an electro statically applied paint finish or be hot dipped galvanized after fabrication.
- b) Provide storage pallets to accommodate all arena dasher panels and "A" frame racks for acrylic shielding, 6 (six) shielding racks and 18 (eighteen) dasher board frame pallets. 1 (one) "attic" stock rack.
- c) Provide "Quick Release 10mm white HDPE backer panels where required.
- d) Provide "slide out" one piece shielding supports at the gates.

## **11. MAINTENANCE - EXTRA MATERIALS**

- a) Supply, in addition to quantities required for the work, extra materials and products to be stored by the owner as follows:
  - i. Eight sheets of 12.5mm clear acrylic of each "standard" size piece
  - ii. Two sheets of 12.5mm clear acrylic of each "special" size piece

- iii. Six of each support post c/w gasket if applicable
- iv. Two pieces of Puck Board, Kick Strip and Top Sill
- v. Fifty additional painted screws of each colour required for fastening of HDPE facings
- vi. Misc hardware package ( a couple of every type of bolts and nuts, etc)
- vii. "attic" stock storage rack
- viii. Deliver extra stock to Owner in cartons or wooden crates clearly labelled to identify contents

## **Section 2**

### **SPECIFIC STANDARDS FOR PRACTICE RINKS**

#### **1. GENERAL DESCRIPTION**

The dasher board system can be from tubular extrusions tempered aluminum alloy or steel. The protective shielding shall be an acrylic to provide a more flexible and shock absorbing on impact.

#### **2. BOARDS**

- a) The rink shall be surrounded by plastic wall known as the "Boards" which shall be white in colour.
- b) They shall be the same height as the competition rinks at 1070mm in height above the level of the ice surface.
- c) The boards shall be constructed in such a manner that the surface facing the ice shall be smooth and free of any obstruction that could cause injury to the players and the protective screens and gear used to hold the boards in position shall be mounted on the side away from the playing surface.
- d) The gaps between the panels shall be minimized to 3mm.
- e) Dasher board framework shall be made of aluminum or hot dipped galvanized HSS steel tubing.
- f) Arena panels shall be factory prefabricated in demountable sections. The design of all panels whether straight, curved or in which a gate is located shall be similar. Each panel to be between 1070mm in height, and shall be made of structural box sections assembled into frames using high strength fasteners, and /or channels assembled into frames using welding by certified welders. Frames shall allow for fastening of the HDPE facing and anchoring at base. Ensure flush mating of the HDPE facing at arena panel joints.
- g) Panels to be clad with 12.5mm white High Density Polyethylene (HDPE) facing the full height of each panel, and with 19mm colour impregnated HDPE cap rail and kick plate, colour to be available from standard options (red, blue, white and yellow). Both edges of cap rail shall have a smooth radius edge. Kick plate yellow in colour to be inlaid, flush with white facing, include for additional horizontal stringer.
- h) The HDPE facing shall be attached to the arena board framing with 6mm diameter screws. Screws to be zinc-plated or stainless steel. Heads of screws shall be painted to colour match the facing, kick plate or top cap as appropriate. Spacing of the screws shall not exceed 225mm on centre. Screw heads must be recessed so they do not project beyond the face of the HDPE.

#### **3. MATERIALS**

- a) It is recommended that the board be constructed with aluminium extrusions or hot dipped galvanized HSS steel tubing. The board surface shall be of high quality High Density Polyethylene (HDPE): High impact, integrally coloured, high-density polyethylene, bright white and other colours as specified, 12.5mm thickness.

#### **4. KICK PLATE**

- a) At the lower part of the boards shall be fixed a "Kick Plate", yellow in colour, 150 to 250mm in height above the ice surface level. The kick plate shall be flush to the white boards.

#### **5. DOORS (GATES)**

- a) All doors giving access to the ice surface must swing away from the ice surface. The gaps between the door and the board shall be minimized to 5 mm.
- b) Gate latch shall be a single latch type.
- c) Players' gates shall be built into standard 2440 mm sections and shall be 760 mm wide, left or right hand swing.
- d) Gate with protective shielding shall provide a flush mounted push-button latch release in the cap rail on the ice entrance gates where shields would otherwise prevent latch operation. The push-button shall be designed to be simple to operate from both sides of the shielding (suitable for opening gates with hockey glove on hand), yet prevent accidental opening.



- e) A minimum of one set of doors (equipment gate) must provide clear access into the rink area by ice resurfacing machine, forklift or other types of vehicles for access in locations as shown on drawings. The threshold top to be 25mm stress relieved white Polypropylene and the bottom 40mm to be galvanized steel tubing.
- f) Equipment gates shall be double gates with a minimum – 3050mm overall opening depending on location.
- g) Each equipment gate unit shall be equipped with one locking clamp or sliding bar and two retractable flush bolts into the threshold or floor.
- h) Each equipment gate unit shall be equipped with adjustable heavy duty spring loaded casters, with the direction of travel fixed to the arc of the door.
- i) Access gates shall be built to be 920mm wide, left or right hand swing. They should hinge off of the adjacent dasher panel and latch to the dasher section on the other side
- j) Double access gates shall have locking hardware similar to equipment gates. They should hinge off of the adjacent dasher panels

## **6. PLAYERS, PENALTY, AND OFFICIALS' BOXES/BENCHES**

- a) Boxes shall consist of arena board enclosures similar to rink arena boards.
- b) Boxes shall consist of two (2) team boxes, two (2) penalty boxes and one (1) officials' / timekeeper's box;
- c) Interior finish of boxes shall be of similar construction as ice-side of arena boards, utilizing 10mm thick HDPE, to height of mid-stringer on front side, full height on other sides. Framing shall be similar construction as arena boards. Provide a water bottle shelf.
- d) Player boxes shall be approximately 10m long by 1600mm deep. Access via two gates per box on ice side, and one gate at the back or end of each box
- e) Penalty boxes shall be approximately 4m long by 1600mm deep with access via one gate on ice side, and additional gates.
- f) Timekeepers' box shall be approximately 6m long by 1600mm, accessed at the back of the box by one gate, and with two side gates, one to each penalty box. Timekeeper table with supports, 400mm x full width of box. (exact configuration TBC)
- g) Benches shall be approximately 9000mm long in player boxes according to the design of the player's boxes and full box width in penalty boxes. Benches shall be a nominal 240mm deep. Benches shall be extruded anodized aluminium with the seating surface being clad with 12mm HDPE. Benches to be mounted on socket-mount pedestals at 740mm above floor. The front and sides of the pedestal supports are to be covered with HDPE with recessed screws so players skate blades cannot come in contact with metal.
- h) Bench pedestals shall be of 6mm zinc plated steel base plate with 38mm x75mm steel post. Bench pedestal locations to be positioned along the length of the bench as required.
- i) Provide 6170mm high raised aluminium framed floors, with 12mm rubber mat cut to size and loose laid in the boxes with 19mm –plywood exterior waterproof type.
- j) Provide coaches walkways, 200mm high with 12mm rubber mat on top and exposed sides covered with 6mm white HDPE.
- k) All exposed metal in the players' and penalty boxes that can easily come in contact with players skates shall be covered with rubber or HDPE.

## **7. PROTECTIVE SHIELDING (Spectator Shielding)**

- a) The protective shielding (spectator shielding) shall be an acrylic shielding system or equivalent system providing optimum flexibility without backlash effect in order to reduce risk of injury to the players.
- b) The protective shielding located above the boards shall be 1800mm in height on the ends and shall extend 4m from the goal line towards the neutral zone and not less than 1200mm in height along the sides, except in front of the player benches.
- c) The gaps between the shielding panels shall be minimized to 5mm.
- d) No openings are allowed in the protective shielding with the exception of the players' boxes.
- e) At any interruption of the protective shielding there shall be protective non-branded high quality padding to prevent the injury of the players.
- f) The protective shielding shall be with 12.5 mm acrylic or an equivalent shielding system acceptable to the IIHF.
- g) The protective shielding support system must facilitate the replacement of shields from the ice side without requiring additional support or securing of the adjacent shields.

## **8. END ZONE PROTECTIVE NETTING**

- a) End zone netting system shall be suspended above the end zone boards and shielding. It shall include the

corners and go up 6000mm above the top of the shielding. It should be attached to a steel or aluminum tubing framework that has the same shape and size as the dasher boards. This netting frame should be suspended by 4mm aircraft cable from the roof structure above.

#### **9. ANCHORS FOR DASHER BOARD FRAMES**

- a) All anchors or arena ice dam, shall be tightly fastened to the refrigerated slab by means of zinc plated bolts or threaded rods and nuts.
- b) Anchors: Galvanized Steel or Zinc plated pre-cast concrete anchor bolt system for securing to concrete substrate. Anchors shall be adjustable using an internally threaded coupling nut. Anchors are to be installed prior to pouring concrete rink slab.
- c) The dasher board manufacturer shall be responsible for supply and installation of anchors. Snap-in plugs or threaded plugs with flush tops to fill the anchors when the boards are removed are provided with removable systems.

#### **10. MAINTENANCE - EXTRA MATERIALS**

- a) Supply, in addition to quantities required for the work, extra materials and products to be stored by the owner as follows:
  - i. Two sheets of 12.5mm clear acrylic of each "standard" size piece
  - ii. Two sheets of 12.5mm clear acrylic of each "special" size piece
  - iii. Two of each support post c/w gasket if applicable
  - iv. Two pieces of Puck Board, Kick Strip and Top Sill
  - v. Fifty additional painted screws of each colour required for fastening of HDPE facings
  - vi. Misc hardware package ( a couple of every type of bolt and nut etc)
  - vii. Deliver extra stock to Owner in cartons or wooden crates clearly labelled to identify contents

### **Section 3**

#### ***ADDITIONAL DIRECTIONS AND CONDITIONS (applicable to all rinks)***

##### **1. FABRICATION**

- a) As far as practical, execute fitting and assembly in the shop with the various parts or assemblies ready for erection at the project site.
- b) Accurately fit together all joints, corners and intersections. Match components carefully to produce continuity of line and design.
- c) Provide devices for anchoring the assemblies to the substrate with adjustment to permit correct and accurate alignment.
- d) Fabricate anchoring devices required to secure the work. Supply anchors and layout drawing.
- e) System components shall be numbered for ease of installation, disassembly, and reinstallation.

##### **2. SUBMITTALS**

- a) Shop Drawings
  - i. Shop drawings shall bear the professional stamp and signature of a professional engineer licensed to design structures in the jurisdiction of manufacture.
  - ii. Shop drawings shall show, in appropriate scale, dimensions, details of arena board system, glazing assemblies, methods of joining, fastening, joint locations, methods of anchoring, sizes of anchorage's, glazing details and glazing methods, hardware, details of other pertinent components of the work, and adjacent constructions to which work of this section will be attached.
  - iii. Shop drawings shall indicate dimensioned layout and placement drawings for installation of floor anchors.
- b) Samples
  - i. Submit samples of materials, finishes and colours for review.
- c) Operation and Maintenance Data
  - i. On completion of installation, supply three copies of instructions covering removal and replacement of panel system, reglazing, adjustments and other relevant operating and maintenance data.

### 3. QUALITY ASSURANCE (recommendation)

- a) Qualifications:

Arena board system shall be provided by a firm having satisfactory experience (recommend at least 5 installations of similar nature within the past 3 years) in manufacturing and installing arena boards, using persons trained and skilled in the type of work required for both manufacturing and installing. Provide references and a completed jobs list that match the scope of this project
  - b) Proposal and Project Assessment Plan:

Vendors shall submit a cost proposal and a two-page Risk Assessment and Value Added plan, which relates to the project being proposed. (The two-page assessment allows the vendors to differentiate themselves based on their expertise rather than marketing information).
  - c) Interviews:
    - i. Interviews should be performed with previous customers. The supplier should submit all contact information on 5 projects completed over the last 3 years as similar as possible in scope to this project.
    - ii. The manufacturer's critical project individuals should also be interviewed. Past performance information should be collected on all critical team components which may include the project manager, the site superintendent, and key subcontracting firms.
  - d) Pre Award Period:

The potential best-valued vendor should be required to carefully preplan the project in detail, and to prepare a quality control document that addresses all of the risks they do not control.
  - e) Weekly Risk Reporting System and Final Rating:

Once the award has been made, the vendor should be required to submit a weekly report that documents any risks that impact time or schedule. Upon completion of the project, the client should evaluate the performance of the vendor, and the rating will be incorporated into the vendors PPI database (to be used on all future projects).
- ### 4. WARRANTY
- a) The supplier shall provide warrant against defects in materials and workmanship for a period of two (2) years from the date of substantial completion of the contract.

## **Section 4**

### ***EXECUTION (applicable to all rinks)***

#### **1. INSTALLATION**

- a) General  
Provide a **complete installation of the board system** by the manufacturer or manufacturer approved installer in accordance with the drawings and specifications.
- b) Gates  
Provide quantity and location of equipment and access gates as indicated on the drawings.
- c) Protective shielding (Spectator Shielding)  
Spectator shielding glazing shall be installed along side of the rink but not in front of team boxes. At protective shielding external corners on ice side, an easily replaceable protective corner non-branded bumper pad shall be provided to a height of not less than one meter above boards.
- d) Resilient Flooring at Boxes  
Cut rubber flooring (minimum thickness 12mm) neatly to fit around fixed objects and perimeter. Provide flush surfaces at sills of gates. Flooring is to be loose laid or minimally stapled at the four corners over plywood substrate.

#### **2. ADJUSTING**

- a) Upon completion of the work, inspect, test and adjust installation.
- b) Test all operable elements and ensure easy and smooth operation.
- c) Upon completion of installation do a general cleanup.



### **3. CLEANING**

- a) Final cleaning to be carried out as part of General Conditions.

### **4. MAINTENANCE/OPERATIONS**

- a) Provide clear anodized finish on aluminium shielding supports (if applicable).
- b) Provide 10mm white HDPE backer panels where shown on drawings. Where elevated seating is adjacent to the boards, use half-height backer panels.
- c) Provide stainless steel or electro plated gate hardware.
- d) Provide stainless steel or standard electro plated steel anchors, bolts and nuts.

### **5. TIMEKEEPER AND GOAL JUDGE BOX**

- a) Provide and install a 45 degree angle acrylic roof over the timekeepers' box of the competition rink.
- b) Provide goal judge boxes, complete with chair, table, casters, access door, acrylic roof and side walls for the competition rinks.

## **Section 5**

### ***PARALYMPIC WINTER GAMES ICE SLEDGE HOCKEY***

#### **NOTES**

Maly Ice Palace and one practice arena shall be designed and delivered with provisions to easily converting players and penalty boxes for **Ice Sledge Hockey**.

- a) The supplier shall provide six (6) additional "ice sledge hockey" gates to replace the standard ice hockey gates in the penalty and players' boxes.
- b) The Ice Sledge hockey gates into the players and penalty boxes shall be 915mm wide.
- c) In the competition rink, the Ice Sledge Hockey gates shall have no threshold allowing for building real ice in the players boxes for easy transition on a ice hockey sledge between the ice surface and the penalty and players' boxes.
- d) In the practice rink, the threshold of the gates must have a polypropylene top surface that projects no higher than 75mm from concrete ice slab.
- e) The framework of the players and penalty boxes must be skinned with a 12.5mm clear polycarbonate panel in place of the traditional white HDPE panel.
- f) All raised floors and benches used in standard ice hockey mode shall be easily removable allowing fast and easy conversion to Ice Sledge Hockey mode. The standard players and penalty box benches and raised floor must be easily removed and stored during use for sledge hockey.
- g) In the practice arena, there shall be a synthetic "ice surface" layout on the entire floor surface of the players and penalty boxes suitable for the sledge hockey players to move around easily within the boxes. (Note: This synthetic ice surface will be replaced by real artificial ice in the competition rink).
- h) In the practice arena, the sledge hockey flooring shall be a minimum of HDPE 30mm thick so there is no more than a 12mm lip to get over when exiting the boxes to the ice surface. Both sides of the polypropylene thresholds should be sloped to make the transition to and from the ice surface as easy as possible. The panels need to interlock with each other as to not allow for any uneven surface at the joints between panels. The flooring needs to run from wall to wall within the boxes and wedged to insure there is no possibility of panels separating or spaces being created that would allow for a sled blade to get caught.
- i) Two movable coaches walkways (pedestals) per players' box, (size:1250mm long, 300mm deep, 250mm high) with 12mm rubber mat on top and exposed sides covered with 6mm white HDPE shall be provided. A non-slippery (spikes, nails, rubber system shall be installed underneath to avoid slipping on ice or polypropylene surface.

Please refer to IPC, Hockey Canada, USA Hockey and SOCHI 2014 for more directions, guidelines, photos and expertise if required.