

Innovation on ice: improving hockey rink dasher systems

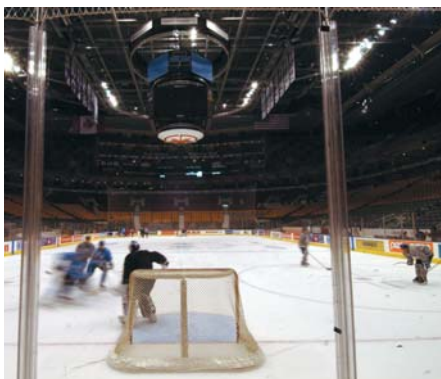
PLASTICS IN
RECREATION

by Evonik CYRO LLC

People always say that being at a hockey game is an entirely different experience from watching one on television. Though most fans can't say exactly what it is about being rink-side that makes the experience so much more enjoyable, a number of recent changes at the Air Canada Centre (ACC) have definitely enhanced the hockey experience.

Home of the Toronto Maple Leafs, the ACC teamed up with Evonik CYRO and Aimcon, Orillia, ON, to engineer a breakthrough in flexible hockey shielding and dasher systems. Aimcon specializes in the design and installation of dasherboards, and accessories and has previously worked with the ACC. Using acrylic sheet for hockey shielding, the collaboration has spawned one of the most efficient hockey shielding systems to date, improving and impacting all facets of the game from the players and fans, to facility maintenance personnel.

"What began as an effort to solve one problem quickly erupted into a team effort that worked to resolve several issues, and improve the overall performance and ease of use of our hockey shielding," comments Diego Roccasalva, director of building operations, Air Canada Centre.



Evonik CYRO's ACRYLITE RinkShield™ acrylic sheet is the first acrylic engineered specifically for the hockey industry.

Improving performance

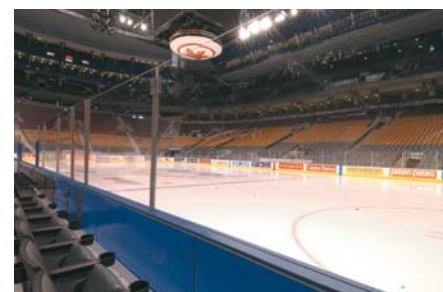
In order to comply with an NHL mandate that all rinks must install a flexible shielding system, the ACC transitioned from tempered glass to acrylic shielding toward the beginning of the new millennium. After the initial switch to acrylic shielding, the ACC experienced an exorbitant amount of panel breakage, which sparked a consultation with Evonik CYRO on how to resolve the problem. Carmen Mammoliti, sheet products sales manager at Evonik CYRO and Roccasalva determined, after careful examination, that the abundant panel breakage was due to manufacturing inconsistencies in sheet thicknesses.

"The previous acrylic shielding used in the ACC came from various manufacturers and would range in thickness as low as .425 inches in areas, significantly reducing the overall impact strength. We felt a sheet manufactured to more consistent thickness tolerances would aid in solving the breakage issues they were experiencing," comments Mammoliti.

The acrylic sheet used for this application is the first one engineered specifically for the hockey industry, meeting ASTM and NHL regulations. Manufactured to tight thickness tolerances, there is a more consistent thickness throughout the acrylic panel with a guaranteed minimum thickness of .500 inches. The sheet's uniform thickness improves the acrylic shielding's impact strength.

While the increased thickness of the acrylic solved the breakage issue, Roccasalva and Mammoliti did not want to stop there. While working to improve the acrylics' durability, the team began to examine other elements of the dasher system in an effort to forge new improvements.

"After we determined the sheet's tighter thickness tolerances would address the breakage issue, we began to experiment with other improvement ideas," comments Roccasalva. "We thought, if we had a better acrylic shielding, then why not increase the width of the panels for better viewing and easier handling? The end



The Air Canada Centre, home of the Toronto Maple Leafs, recently switched to a flexible hockey shielding and dasher system incorporating ACRYLITE RinkShield™ acrylic sheet from Evonik CYRO.

result is the most efficient shielding system to date."

Bigger is better

The new system developed at the ACC uses one standard size panel for both the sides of the rink and behind the goals to increase ice visibility and reduce the number of pieces needed to shield the rink. In the past, the ACC shielding panels measured 5' x 6' along the sides (other NHL arenas measure only 4' x 5') and 4' x 8' behind the goals. Breaking new ground, the ACC increased the width of the panels to use a standard 5' x 8' acrylic sheet mounted horizontally along sidelines and the same sized panel mounted vertically behind the goals. The larger acrylic panels went through an intensive battery of tests to ensure their performance.

The sheet panels were installed for game ready conditions and subjected to impact and flexibility tests. The first "soft hit" test simulated a player's head impacting the shielding. A 15-pound bag filled with lead shot was suspended from above by a length of cable. The bag was elevated and released, impacting the acrylic shielding 20 inches above the dasherboard. The second "hard hit" test simulated a full body impact. In this test, a 200-pound bag filled with lead shot was elevated and released in the same fashion.

Several panels located along the sides and behind the goals were tested. The flexion of the acrylic shielding was measured and recorded after each impact.

The NHL flexion benchmarks are based on the United Center (UC) in Chicago. The new system installed showed that ACC outperformed the United Center flexibility by a wide margin in every test; in some cases doubling the flexibility. NHL officials who attended the tests were impressed with the results, as the acrylic sheet system flexed as much as 6.56 inches during a hard impact, compared to the UC's highest flexion of 2.99 inches. To demonstrate a higher level of safety, a 320-pound test bag was elevated to a higher height and released, with no recorded damage to the sheet. Previously, when this extreme test was performed on the old system, the 320-pound bag blew the shielding out of its supports, a potential safety hazard to fans.

"Because we were doing something that had never been done before, we drew a lot of interest from the league and other arenas. Our tests often had an audience as people couldn't believe we were doubling the size of the panels," adds Mammoliti.

"Once the new system was in place and after being thoroughly tested, the skeptics quickly became converts and everyone was anxious to see it perform during its first real game," adds Roccasalva.

In the weeks following the installation, the ACC hosted 10 games and dozens of practices without breaking a single panel. In the past, the ACC could experience as many as two broken panels per practice.

"Since breakage was the initial reason for starting us on the path to improvement, the fact that we went through this many games and practices without breaking a single panel says that we've achieved our goal," says Roccasalva.

Impacting the fans

The clear polycarbonate mullions the ACC used previously were causing a distorting effect in the viewing angles for fans. Evonik CYRO recommended switching to aluminum mullions to allow the eye to easily discriminate between panels and eliminate the distortion. These sightline improvements yielded very positive results from fans, directly impacting a few thousand screaming Maple Leaf season ticket holders in the first five rows surrounding the rink. The new larger panels reduced the number of mullion supports in the rink by 30 percent and provided larger uninterrupted viewing for fans.

Because the ACC publicized its intention to modify the shielding system, one season ticket holder with a vested interest in ice visibility was present during various

stages of the process. As a long-time ticket holder, fan input was invaluable to help compare the improvements to the previous system. Roccasalva reports how the fan reacted when the project was finished.

"He was shocked," comments Roccasalva, "All he could say was it was better than he could have ever imagined. Before his view of the opposite goal was often obscured, but now he could see clear to the other side. It was very satisfying to see such a positive reaction to our efforts."

Easier material handling

With the new shielding system based on one larger sized acrylic sheet, the ACC has realized a number of benefits to both facility staff and fans. Maintenance personnel, accustomed to handling 4' x 8' panels behind the goals, made an easy transition to the larger sheet size. With the Maple Leafs, Toronto Raptors and the Toronto Rock Lacrosse Club using the facility, the ACC implements a changeover every second day, resulting in over 175 changeovers a year. Each changeover takes approximately six-and-a-half-hours to complete, including the assembly and breakdown of the shielding system.

The new ACC system uses fewer sheets and fewer supports and therefore there is less material handling for changeover staff. The reduced number of sheet and supports has also increased the speed of changeovers by 15 percent, saving about 45 minutes for each changeover. Aside from specialty panels for penalty box gates and rink entrances, the rink is encased in 5' x 8' acrylic shielding.

What the ACC did not count on was the ease of working with acrylic. When using tempered glass a facility must stock two of every size panel in the event one breaks. Because the acrylic is easy to fabricate, facility personnel at the ACC are able to customize the shielding as needed in house, routing out camera ports or trimming the sheet to smaller sizes for rink entrance gates. The ability to customize shielding allows the arena to cut down on the amount of replacement stock they maintain and because the entire shielding system is based on one size, ordering replacements is easier.

"The difference between acrylic and tempered glass is night and day from a material handling and safety standpoint. Acrylic is more durable if it's banged during a changeover, whereas tempered shatters fairly easily," adds Roccasalva.

Impacting the game

The driving force behind the NHL's mandate on flexible shielding systems was that player injuries were attributed to rigid

shielding. Both players and coaches prefer acrylic shielding for its flexibility and reduced injury rate. As demonstrated in the flexibility tests, the new shielding system at the ACC has much greater impact absorption than any NHL arena to date. This results in safer impacts for players as the acrylic works to absorb much of the force from collisions.

"Players have commented on changing their style of play because of stiff shielding. They will play more of a conservative game due to the harder impact from glass shielding systems," comments Roccasalva.

Known for their intensity and missing teeth, hockey players welcome a challenge. Once the new system was installed, players literally threw themselves at the opportunity to test the cushioning flexibility. Experiencing softer collisions with the larger shielding, players have subsequently stepped up their level of play.

"We spoke with a few players after the first game with the new shielding system in place and they absolutely love it! I feel we've succeeded in developing the best shielding system available," concludes Roccasalva. ■

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