



Stadium roof: highlight of the modernised BayArena

Futuristic roof made of Makrolon®- multiwall sheets for new BayArena roof



Project: BayArena
Client: Bayer 04 Immobilien GmbH
Location: Leverkusen, Germany
Market segment: Construction
Product: Makrolon® Multi UV 3X/25-25ES white S 146
Architects: HPP Hentrich-Petschnigg & Partner GmbH & Co.KG
Implementation planning and installation of roof structure made of Makrolon® multi-wall sheet: Hans Börner GmbH & Co. KG



makrolon®

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The new disc-shaped roof, 217 meters in diameter, reaches impressively over the updated stands. Transparent Makrolon® polycarbonate is highly suitable for roofs of such great dimensions as it provides the required extreme material properties and high aesthetics.

Imposing protection from sun, wind and rain

The new perfectly circular 217 meter diameter roof structure of the stadium stretches over the playing field and spectator seating at a height of about 30 meters and is a sight worth seeing. The area of the roof totals some 28,000 sqm and its load-bearing structure is based on the principle of a spoked wheel. In this design for widespan roofs, an outer thrust ring holds an inner tensioning ring via radial steel cables up to 70 mm in diameter. The enormous forces in the structure are apparent from the following figures. The thrust ring of the roof of the new Bayarena is supported by eight 40 tonne V-shaped pylons anchored in concrete foundations weighing many tonnes. With such huge amounts of steel and concrete, the roof covering needs to be lightweight but must meet the most exacting demands in terms of break resistance, impact strength, temperature and heat resistance, formability and processability.

The choice fell on Makrolon®, which is lightweight, break resistant, able to withstand high mechanical stress and is weather resistant. This plastic has already proved itself as an ideal material for large roofs in stadiums around the world.

From curved to angular

A particular challenge for the developers at Bayer MaterialScience and also for the contractors on site was the fact that the roof is circular at its outside perimeter and transitions to a rectangular shape at its inner edge. The available time window for installing the roof covering was short and commenced some 3 months prior to completion in May. The very good processability and low weight per unit area of the plastic panels proved to be decisive advantages during this phase of construction. The translucent white triple wall panels which were made to measure (width: 1.5 m, length: 4.5 to 12 m, thickness: 25 mm) were fixed to a steel structure while on the ground which was then hoisted by cranes to a height of 30 m and then mounted on the cable structure by specially trained industrial climbers suspended above the site.

The polymer material has already proved itself in the BayArena since the 1990 s. Even then the designers chose Makrolon® for the roofing over the stands thus ensuring that the stadium's appearance differed greatly to that of other sports venues. Since then, properties such as the light transmission of the plastic panels of the new roof covering have been further optimized to suit stadium conditions. The Makrolon®- panels filter the sun light in such a manner that spectators are protected from strong solar irradiation while ensuring that the grass receives sufficient light for growth.



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MF0239 e - February 2010



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