



## SOCCER STADIUM KRASNOĪARSK, SIBERIA

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ArcelorMittal Dofasco Steel Design  
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### DESIGN AND CONSTRUCTION TEAM

**OWNER:** Soccer Club "Enisey"

**ARCHITECT:** PSO MIR Ltd.

**STRUCTURAL ENGINEER:** Urban  
Engineering

**GENERAL CONTRACTOR:** PSK  
Premium Ltd.

**BUILDING ERECTOR:** Stroikon  
Ltd.

**BUILDING SUPPLIER:**  
BEHLEN Industries LP

**PHOTOGRAPHER:** Andreas Riffel

## Housing the beautiful game in Krasnoyarsk, Siberia



Krasnoyarsk is the third largest city in Siberia. It is east of Kazakhstan and north of Mongolia, in the south-central area of the region nestled on the banks of the Yenisei River that flows northward to the Arctic Ocean. Like many Russian cities its inhabitants love the "beautiful game" of soccer. And, like all soccer fans, they want their team to be the best. And that takes practice. Lots of it. Big problem: from November to March there was no facility for training on a full-size field.

Enter the Russian Ministry of Sport and a general contractor for building construction, Mezhr regionalnaya Torgovaya Assotsiatsia Ltd., (MTA). As with their newer hockey arenas, the Russians wanted an international-size indoor soccer stadium with the best sight-lines possible, without interference from support columns. This involved two significant challenges, building with unprecedented clear spans, and finding a qualified supplier, given no Russian suppliers were capable.

Behlen Industries LP, headquartered in Brandon, Manitoba, is Canada's largest manufacturer of steel building systems. After submitting a successful bid for the new stadium, Behlen has demonstrated once again its experience and expertise in taking over large and unusual international projects. It's also important to say that since the project started, Behlen has been dealing with MTA who erected this massive structure in Siberia.

Behlen's point man was Project Manager Andreas Riffel, based in Brandon, who speaks fluent Russian. He says, "The most challenging aspects of the project related to its size. Firstly we'd never fabricated a frameless convex-style building that big, with such large clear spans and secondly because of that we had to gain the trust of local authorities that it was even possible. It was unique for us, imagine for someone who never saw a structure like that, it's difficult to believe it's going to work!"

And that brings up the issue of testing and ArcelorMittal Dofasco (AMD)'s contribution

besides supplying the steel itself. AMD conducted diaphragm shear testing on 3.05m to 7.62m (10 ft. to 25 ft.) panels connected as they would be in the field, loading them, measuring the deflection and then crunching the numbers to determine the shear capacity of the building. As Riffel points out, "The test results gave us the confidence that the stadium could be built and it would be able to withstand local snow loads, and we reassured local authorities accordingly."

The stadium's overall size is 120m long x 115m wide (395 ft. x 377 ft.) It comprises a 4-storey admin. and commercial area with a 12m x 35m (40 ft. x 115 ft.) footprint. The soccer arena is 120m x 80m (394 ft. x 262 ft.) with a clear ceiling height of 23m (75.5 ft.) Z275(G90) galvanized steel is used throughout for sidewall panels 1.925mm (0.0758"), end wall panels 1.31mm (0.0516"), roof 2.38mm (0.0937") and the ceiling is a mix of 2.38mm (0.0937") and 1.93mm (0.0758"). The largest roof and ceiling panels had a rolled dimension of approximately 1m x 10m (3.28 ft. x 32.8 ft.).

The project took Behlen a year-and-a-half from first negotiations to final delivery. That becomes impressive when you know the actual fabrication and shipment occurred within a 4-month period and required 63 shipping containers. Overall completion was scheduled for August 2014. At the time of going to press Behlen had obtained a further five contracts for steel buildings in Russia and opened an office in Moscow.



CORR-SPAN technology delivers lower energy costs due to its uniquely versatile roof system. The CORR-SPAN roof and ceiling system consists of corrugated roof and ceiling panels, joined by a lightweight, bolt together truss. The roof system provides a ventilated attic that lowers energy cost and eliminates the potential for wet insulation caused by condensation and leaks. The attic trusses can be designed for varying loads by simply changing the gauges.



Behlen's entire panel and wall system is manufactured from heavy gauge engineered panels with an exclusive roll form corrugation that provides structural integrity. The wall system uniformly transfers the load to the foundation – eliminating expensive heavy foundations, piers and piles.



Natural ceiling, providing a bright clean interior, allows for fewer light units and lower energy bills. Natural ceiling means no exposed roof trusses, while providing a bright clean interior with high reflectivity. In this case the ceiling panels are 1.93mm (0.0758") Z275(G90) galvanized panels. The structural red iron in the photo is wind bearing.



Club Enisey Soccer players had to practice in small gymnasiums during the winter months. They really needed an international-size, indoor, soccer stadium with the best sight lines possible, without interference from support columns.



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