A soaring high-rise with innovation at its core

ADVA® 408 High-range water-reducing admixture ASTM C494 Type A and F and ASTM C1017 Type I Admixture

Project	Spire, Denver, CO
Owner	Nichols Partnership Inc., Denver, CO
Architect	RNL Design, Denver, CO
General Contractor	JE Dunn Construction, Denver, CO
GCP Solution	ADVA® 408 High-range water-reducing admixture

Overview

One of the tallest residential towers in the Western United States, Spire, a $175 million residential high-rise building, stands 41 stories with 503 condominium units. At the building's heart are two massive concrete cores that structurally support concrete elevated decks and house the lift units. With the thick core walls containing heavy steel reinforcement, it created an ideal application for self-consolidating concrete (SCC) – a highly flowable concrete that can be placed without vibration and segregation.

"With SCC we didn't have to vibrate the concrete and saved time with continuous pours rather than pouring separate lifts for each core wall form."

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Eric Snelling, JE Dunn

The high-rise contains two massive concrete cores with walls up to three-feet thick which were created using approximately 8,000 cubic yards of SCC and a new stateof-the-art admixture technology, ADVA®408.

To get the job done right, the general contractor, JE Dunn, requested that a high-performance SCC be utilized to ensure complete consolidation while producing an outstanding surface finish. At the same time, the SCC had to be consistent from batch to batch with no segregation, yet providing a range of high compressive strengths. At the time of project inception, conventional superplasticizers were used to achieve the desired performance characteristics. However during the project's construction, a new chemical admixture technology became available from GCP, ADVA® 408, a product that promised greater consistency with improved hardened properties. After an initial evaluation the choice was clear and the switch was made to ADVA®408.

"JE Dunn and their construction team were very satisfied with the SCC product and were able to see the benefits right away compared to conventional concrete."

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Eric Snelling, JE Dunn

The overall benefits were wide ranging including improved consistency from batch to batch, improved consolidation and surface finish, increased compressive strength, and improved water tolerance and pumpability. In addition the in-place cost to provide the SCC was reduced and ADVA®408 enabled the SCC mixture to have consistent 120-minute flow-ability from the concrete plant to the job site.

“The use of this SCC helped reduce labour and placing costs", said Eric Snelling, General Superintendent of the Spire Project for JE Dunn. “Our ready mix suppliers were able to deliver a consistent SCC product to our jobsite”.

That kind of consistency adds up on a job like this, with two massive core walls up to three feet (0.9 metres) thick requiring 80 core wall pours at 100 cubic yards (76.4 cubic metres) a piece. Conventional concrete would have required far more pours and far more manpower and equipment.

Using SCC with ADVA®408 increased the concrete’s compressive strength to over 13,000 psi and improved consistency as well as slump retention. With the Spire building promising to bring new vitality to downtown Denver, this residential high-rise is an important part of the city’s transformation and the construction team is pleased that it’s built around a strong core.

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