

CONCRETE CHATS

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Mix Design Parameters

Various combinations and proportions of these components are listed in all concrete mixture design submittals. These combinations and proportions of concrete components (aggregates, cement, water, admixtures, and supplementary cementitious materials) are listed in all concrete mixture design submittals. While mixture designs often show the weight of each component, those weights are based on the volume of each component with the sum total of those components being 27 cubic feet (one cubic yard).

Compressive Strength: The design-compressive strength (3,000 psi, 4,000 psi, etc.). It is a target strength reached at 28 days from initial placement. This is the timeframe for hydration to be mostly completed although strength gain frequently continues beyond that time.

Water-Cement Ratio (W/C): This is the ratio of water to total cementitious material (cement + SCMs) by weight. Typically, larger W/C ratio numbers with higher water content correlate to lower total strength gain. The most effective mixtures contain enough water for successful placement without being so much as to adversely impact strength gain.

Slump: Measured in inches, this is the difference between the height of concrete with a slump cone and where the top of the concrete ends up once the cone is removed. It is intended to be an indicator of water content in a mixture. Since slump is impacted by admixtures, the test is best used to track consistency of concrete mixtures throughout a project.

Air Content: Total air content in concrete is a combination of entrapped air and entrained air. Entrapped air exists naturally and results from batching and transport. Entrapped air is also influenced by maximum aggregate size. Entrained air is added through air entraining admixtures and is intended to increase concrete durability and resistance to freeze-thaw damage.

While compressive strength is the primary focus of most concrete mixture design conversations, each of the other parameters listed above will impact that value. Higher W/C ratio lowers strength. Higher slump can mean higher water content, leading to lower strength. Higher air contents also reduce compressive strength. It is important that the design process considers how each of these parameters impacts overall performance of the concrete mixture.

QuicTip▶ [Products - BoMetals Inc.](#) offer a variety of options for use with fresh concrete during placement as well as with in-place concrete. For additional information [contact-us](#).

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