



INFORMATIONAL BULLETIN

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Approved: *[Signature]*
Chief Building Official

REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS OR SOILS

Concrete to be exposed to sulfate-containing solutions or soils shall conform to the requirements of UBC Table 19-A-3 listed below. The sulfate concentrations, that have been determined by soil tests made by an engineer licensed by the state to practice as such, are specified in the site specific soil report.

For normal-weight aggregate concrete, the minimum concrete compressive strength, the cement type and the maximum water-cementitious materials ratio shall be specified in accordance with the requirements of the table.

For lightweight aggregate concrete, the concrete shall be made with the cement type and has a minimum concrete compressive strength set forth in the table.

Mixing water shall be a maximum of 5.6 gallons per 94# sack of cementitious material [or a 0.50 maximum water-cementitious materials ratio] if Type II cement is used and shall be a maximum of 5.0 gallons per 94# sack of cementitious material [or a 0.45 maximum water-cementitious materials ratio] if Type V cement is used. The mix shall be based on the weight of dry materials. The amount of mixing water shall be reduced to account for water occurring as surface moisture on the aggregates.

The requirements in this bulletin shall be applicable to all concrete works in the City of Irvine.

TABLE 19-A-3—REQUIREMENTS FOR CONCRETE EXPOSED TO SULFATE-CONTAINING SOLUTIONS

SULFATE EXPOSURE	WATER-SOLUBLE SULFATE (SO ₄) IN SOIL, PERCENTAGE BY WEIGHT	SULFATE (SO ₄) IN WATER, ppm	CEMENT TYPE	NORMAL-WEIGHT AGGREGATE	LIGHTWEIGHT AGGREGATE CONCRETE
				Maximum Water-Cementitious Materials Ratio, by Weight, Normal-Weight Aggregate Concrete ¹	f _c , Normal-Weight and Lightweight Aggregate Concrete, psi ² x 0.0069 for MPa
Negligible	0.00-0.10	0-150	—	—	—
Moderate ²	0.10-0.20	150-1,500	II, IP(MS), IS (MS)	0.50	4,000
Severe	0.20-2.00	1,500-10,000	V	0.45	4,500
Very severe	Over 2.00	Over 10,000	V plus pozzolan ³	0.45	4,500

¹A lower water-cementitious materials ratio or higher strength may be required for low permeability or for protection against corrosion of embedded items or freezing and thawing (Table 19-A-2).

²Seawater.

³Pozzolan that has been determined by test or service record to improve sulfate resistance when used in concrete containing Type V cement.