

## CONCRETE PROPORTIONING AND ADMIXTURE QUALIFICATION

As authorized by LABC Section 1905.4.1, the following alternate method of proportioning concrete is approved.

### Arbitrary Mix:

The arbitrary mix herein specified may be used without the performance of preliminary tests when complying with the following conditions:

- a. The combined grading of aggregate shall be within the limits set forth in Table No. 1 of this Bulletin.
- b. The amount of portland cement shall not be less than that specified in Table No. 2 of this Bulletin. Straight line interpolation of cement contents is permitted for values between aggregate sizes or strengths listed.
- c. The maximum water content shall not exceed that specified in Table No. 2, and shall be adjusted so that the slump shall not exceed six inches when measured at point of discharge from the mixer.
- d. The required average compressive strength  $f'_{cr}$  of concrete produced with materials similar to those proposed for use shall be at least 1,200 psi greater than the specified compressive,  $f'_c$ .
- e. This arbitrary mix shall not be used for specified compressive strength greater than 4,000 psi.
- f. Approved admixtures may be used, provided that the water content is adjusted so as to limit the slump to a maximum of six inches.

**Exception:** When an approved water reducing admixture is used, the cement content specified in Table No. 2 below may be reduced by 0.6 sack per cubic yard, provided the cement content is not reduced below five sacks per cubic yard.

**TABLE NO. 1 - GRADATION REQUIREMENTS FOR COMBINED AGGREGATES**

Percentage By Weight Of Aggregates Passing Sieve			
Sieve Size	3/8" Size Aggregate	1" Size Aggregate	1 1/2" Size Aggregate
2 in.			100
1 1/2 in.		100	90 to 100
1 in.		90 to 100	60 to 85
3/4 in.	100	70 to 90	50 to 75
3/8 in.	92 to 100	45 to 65	39 to 55
No. 4	42 to 60	35 to 52	32 to 44
No. 8	33 to 47	22 to 42	23 to 35
No. 16	27 to 37	17 to 33	17 to 27
No. 30	17 to 25	11 to 25	10 to 19
No. 50	6 to 11	4 to 17	3 to 10
No. 100	1 to 5	1 to 8	1 to 6
No. 200	0 to 3	0 to 3	0 to 3

**(Section on Laboratory Design Mix -Alternate Method is deleted as it is covered in the code)**

**TABLE NO. 2 - ARBITRARY MIX PROPORTIONS**

Assumed Compressive Strength (psi)	Maximum Aggregate Size (In.)	Minimum Cement Content Sacks per Cubic Yard	Maximum Water Content Gallons per Sack
5000	1	8.5	4.5
	3/8	9.2	5.0
4000	1 ½	7.1	5.3
	1	7.3	5.5
	3/8	7.9	5.7
3000	1 ½	6.0	6.2
	1	6.2	6.2
	3/8	6.8	6.2
2500	1 ½	5.4	7.0
	1	5.5	7.0
	3/8	6.3	7.0
2000	1 ½	5.0	8.0
	1	5.2	8.0
	3/8	5.8	8.0

II As authorized by LABC section 1903.6 the following method for qualifying admixtures is approved.

**Admixture Qualification Alternate:**

Alternate Admixture Qualification Method utilizes two concrete mixes: one with one-inch maximum aggregate and one with 3/8-inch maximum aggregate. Both mixes are to be tested with the admixture and with a control mix of identical proportions except for omission of the admixture.

**Exception:** For classification as a water reducing admixture, the cement content in the mix containing the admixture shall be reduced by 0.6 sack per cubic yard of concrete. The water content shall be adjusted so that the water/cement ratio is equal to that of the control mix. If the resulting slump is less than that of the control mix, additional water shall be added to provide equal slump.

The one-inch maximum aggregate mix shall have a cement content of 5.6 sacks per cubic yard, and the 3/8-inch maximum aggregate mix shall have a cement content of 7½ sacks per cubic yard. Cement used shall be a uniform blend of cements obtained from four separate mills and shall conform to Type I, Type II or a blend of Type I and Type II cement.

The combined aggregate gradation shall conform to that specified in Table 1. Water content of the control mix shall be adjusted to produce a slump of four inches.

Compression tests shall be performed in accordance with ASTM Specifications C39 and C192 on standard 6" X 12" cylinders at the age of 28 days, one year and two years. Tests shall be conducted on at least three specimens for each age for each mix. The average strengths of the specimens containing the admixture shall at least equal the average strength of control specimens at each age.

**Note:** Fly Ash may be combined with other admixtures and requires an approved L.A. City Research Report.