



**DETERMINING CONCENTRATION OF
CALCIUM CHLORIDE SOLUTIONS BY HYDROMETER**

SCOPE

This method is intended for determining the concentration of calcium chloride solutions used with pavement repair work.

PROCEDURE

A. Apparatus

1. Hydrometer, **Either:**
 - a. **In increments of percent calcium chloride, calibrated at 77°F.**
 - b. **In specific gravity increments.**
2. Thermometer capable of reading liquid temperatures from 40°F to 150°F within 5°F.

B. Test Procedure

1. Lower the hydrometer gently into the solution and allow **it** to float freely.
2. Depress the hydrometer about two scale divisions into the liquid, and then release it. Allow sufficient time for the hydrometer to come to rest, and for all air bubbles to come to the surface.
3. When the hydrometer has come to rest, floating freely away from the walls of the container, estimate the hydrometer scale reading to the nearest 0.5 percent calcium chloride. **For the specific gravity hydrometer, read to the nearest 0.002.** The correct reading is that point on the hydrometer scale at which the liquid surface cuts the scale.
4. **Immediately determine the temperature of the test solution to the nearest 5°F. Use Table 1 to determine the correct percent calcium chloride. Go down the first or second column for the hydrometer reading. Go across the top row for the temperature reading. Where the hydrometer row intersects with the temperature column is the correct percent calcium chloride. Some interpolation will be necessary to determine the reading to the nearest percent.**

TABLE 1
PERCENT CALCIUM CHLORIDE CORRECTED TO 77°F

Hydrometer Reading at Test Temp.	Hydrometer Reading at Test Temp.	<u>TEST TEMPERATURE, in °F</u>						
		Spec. Gravity	%	40	60	80	100	120
1.298	30.0	29.0	29/6	30.1	30.6	31.1	31.8	32.6
1.304	30.5	29.5	30.1	30.6	31.1	31.6	32.3	33.1
1.310	31.0	30.0	30.6	31.1	31.6	32.1	32.8	33.6
1.316	31.5	30.5	31.1	31.6	32.1	32.6	33.3	34.1
1.322	32.0	31.0	31.6	32.1	32.6	33.2	33.8	34.5
1.328	32.5	31.5	32.1	32.6	33.1	33.7	34.3	34.9
1.334	33.0	32.0	32.6	33.1	33.6	34.2	34.8	35.4
1.340	33.5	32.5	33.0	33.5	34.1	34.8	35.4	36.0
1.345	34.0	32.9	33.6	34.1	34.7	35.3	35.9	36.5
1.351	34.5	33.4	34.1	34.6	35.1	35.7	36.3	36.9

Examples of Table Use

1. Percent calcium chloride indicated by hydrometer is 31.0% at a test temperature of 120°F. Find the 31% line in the left column and read 32% in that line under the 120°F test temperature column.
2. Percent calcium chloride indicated by hydrometer is 31.5% at a test temperature of 105°F. Find corrected result of 32.1% for 100°F and 32.6% for 120°F. Estimate the corrected value for 105°F to be about 32%.
3. The calcium chloride specific gravity indicated by hydrometer is 1.332 at a test temperature of 120°F. Find the line closest to 1.332 (the 1.332 line) in the left column and read 34% in that line under the 120°F test temperature column.
4. The calcium chloride specific gravity indicated by hydrometer is 1.306 at a test temperature of 105°F. Find line closest to 1.306 (the 1.304 line) in the left column and read a result of 31.1% for 100°F and 31.6% for 120°F. Estimate the corrected value for 105°F to be about 31%.