



## **19-8 LIGHTWEIGHT CELLULAR CONCRETE FILL**

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- **Caltrans upgraded the LCC Non-Standard Special Provision to a Standard Special Provision**

**Replace section 19-8 with:  
19-8 LIGHTWEIGHT CELLULAR CONCRETE FILL**

**19-8.01 GENERAL**

**19-8.01A Summary**

Section 19-8 includes specifications for constructing lightweight cellular concrete (LCC).

**19-8.01B Definitions**

**cast density:** wet density of LCC at the point of placement.

**19-8.01C Submittals**

**19-8.01C(1) General**

Submit a certificate of compliance for cementitious materials under section 90-1.01C(3). Include the source name and location.

Submit certificate of compliance for proposed admixtures under section 90-1.01C(4).

**19-8.01C(2) Mix Design**

Submit a mix design that produces a maximum cast density at point of placement and a minimum compressive strength for the class described. Include laboratory data using the mix design verifying compliance with density and strength requirements.

**19-8.01C(3) Quality Control and Placement Plan**

Submit a quality control and placement plan. Include:

1. Construction sequence showing each lift and schedule.
2. Type of equipment and tools to be used.
3. Location of equipment and batching areas.
4. List of materials.
5. Manufacturer's specifications, including mixing, delivery, placement, finishing, and curing of LCC.
6. Organization chart of names, contact information, certifications, roles, and responsibilities of those involved in the quality control program.
7. Copy of AASHTO accreditation for the laboratory conducting compressive strength testing of LCC cylinders.

**19-8.01C(4) Mitigation Plan**

If requested, submit mitigation plan for repair of damaged areas for review prior to repair work.

**19-8.01D Quality Assurance**

**19-8.01D(1) General**

Not Used

**19-8.01D(2) Quality Control**

Each cast density test represents no more than 300 cu yd of LCC or 1 day's production, whichever is smaller.

**19-8.01D(3) Department Acceptance**

The department accepts LCC based on cast density and compressive strength requirements specified in section 19-8.02A.

Remove and replace LCC that does not meet the cast density or the compressive strength requirements unless corrective measures are authorized for the LCC to remain in place.

Cast density must be calculated under ASTM C796/C796M using the formula for design density.

Prepare LCC test specimens and test compressive strength under ASTM C495/C495M as preformed foam, except:

1. During molding you may raise and drop the mold 1 inch, 3 times on a hard surface after placing each layer to close voids and release entrapped air.
2. Specimen must be moist cured in the molds from day 2 to day 7.
3. Specimen must be air dried after 7 days.
4. Specimen must be capped at both ends for testing.

## 19-8.02 MATERIALS

### 19-8.02A General

LCC is designated as Class I through Class IV as shown in the following table:

LCC class	Cast density (max, pcf)	Compressive strength at 28 days <sup>a</sup> (min, psi)
I	30	40
II	36	80
III	42	120
IV	50	160

<sup>a</sup>Compressive strength is determined using ASTM C495/C495M as modified in section 19-8.01D(3).

Materials used for LCC must be delivered, stored, and handled under the manufacturer's recommendations.

Cement treated permeable base must comply with section 29-3.

Underdrains must comply with section 68-2.

Filter fabric and plastic pipe must comply with section 68-4.

Geomembrane must comply with section 69-2.

### 19-8.02B Cement

Cement must comply with the specifications for Type II or Type V portland cement or Type IL cement in section 90-1.02B. Pozzolans and other cementitious materials may be used if recommended by the manufacturer of the foaming agent.

Fly ash and natural pozzolans must comply with AASHTO M 295.

GGBFS must comply with AASHTO M 302, Grade 100 or 120.

### 19-8.02C Water

Water must:

1. Comply with section 90-1.02D with water for mixing concrete.
2. Be potable.
3. Be free of deleterious amounts of acids, alkali, salts, oils, organic materials, or other impurities that would affect the setting or strength of the LCC.

Non-potable water may be used if the mix design is prepared in the laboratory using the non-potable water on site.

### 19-8.02D Foaming Agent

Foaming agent must comply with ASTM C869/C869M and be tested under ASTM C796/C796M. **19-8.02E Admixtures**

Chemical admixtures must comply with ASTM C494/C494M.

Admixtures for accelerating set time may be used under the manufacturer's recommendations.

## 19-8.03 CONSTRUCTION

### 19-8.03A General

Not Used

### 19-8.03B Preparation

Subgrade to receive LCC must be:

1. Free of loose and extraneous material.
2. Uniformly moist but free of standing or flowing water.

Forms must comply with section 51-1.03C(2).

Drainage installed through the LCC must be secured and have watertight joints.

### **19-8.03C Placement**

Cement and water may be premixed and delivered to the job site.

Foaming agent must be mixed with cement and water at the job site using specialized equipment certified by the manufacturer of the LCC to produce a homogenous mixture. Place LCC immediately after mixing cement and water with the foaming agent.

Complete each batch of LCC placement within 1 hour of mixing cement and water.

Do not place LCC whenever the ambient air temperature is forecast by the National Weather Service to be less than 40 degrees F within 24 hours after placement. If approved by the manufacturer of the foaming agent, you may place LCC that is mixed with heated water.

Do not place LCC on frozen ground.

The nozzle distance from the final point of application must be 50 feet or less. Direct the nozzle perpendicular to the receiving surface while building the required thickness whenever possible.

Place LCC uniformly to maintain homogeneity of the mix. Fill to the lines, grades, and dimensions shown. Segregated areas must be removed and replaced.

Each lift must not exceed 3 feet in thickness unless authorized. Vertical joints in adjoining or between lifts must be staggered at least 10 feet apart. Surface stepping to achieve grade and superelevation must be at least 6 inches thick.

You may place LCC at grades up to 5 percent by adding a thickening agent to the mix under the manufacturer's instructions.

Curing of LCC must follow the manufacturer's recommendation. A minimum of 12 hour curing period is required after placement. Do not disturb the newly placed LCC during this period.

Before placing the next LCC lift, remove any debris and loose material from the receiving surface. The receiving surface must be free of soil, debris, and standing water.

The surface of the final LCC lift must be free of foreign and loose materials, depressions, and sharp edges.

Longitudinal construction joints in the LCC lift immediately under the pavement sections are not allowed. If stepping is required to meet grades shown, stepping of the final lift must:

1. Be at least 2 inches thick
2. Have at least 6 inches of cement treated permeable base between LCC and pavement section

Do not operate construction equipment on LCC until it has attained the specified compressive strength. Remove and replace LCC that is compressed, cracked, or damaged as determined by the Engineer.

Remove all temporary forms and plastic sheet linings after LCC has cured.

### **19-8.04 PAYMENT**

Not Used