



ICC-ES Evaluation Report

ESR-4830

Issued September 2022

Revised October 2022

This report is subject to renewal September 2023

DIVISION: 03 00 00—CONCRETE
Section: 03 37 00—Specialty Placed Concrete

REPORT HOLDER:

LATICRETE INTERNATIONAL, INC

EVALUATION SUBJECT:

LATICRETE 3D-M120 AND 3D-M68 3D PRINTING MORTARS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021 and 2018 *International Building Code*® (IBC)
- 2021 and 2018 *International Residential Code*® (IRC)

For evaluation for compliance with codes adopted by Los Angeles Department of Building and Safety (LADBS), see [ESR-4830 LABC and LARC Supplement](#).

Properties evaluated:

- Physical
- Durability
- Interior Finish

2.0 USES

The LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars are proprietary 3D Concrete mixtures to be used with 3D automatic construction technology under the IBC and IRC, as permitted by Section 104.11 of the IBC or R104.11 of the IRC.

3.0 DESCRIPTION

3.1 General:

The LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars are proprietary single-component dry-mix mortars packaged in 50 pounds (22.7 kg) plastic bags or 2500 pounds (1134 kg) bulk sacks to be mixed on-site and extruded in layers using 3D automated construction technology.

3.2 LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars:

The material properties of LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars are indicated in the table below.

MATERIAL PROPERTY	TEST STANDARD	3D-M68 ¹	3D-M120 ²
Average 28-day Compressive Strength, psi (MPa)	ASTM C109	6600 (45)	6840 (47)
Slump, in (mm)	ASTM C143	3.00 (75)	3.25 (85)
Average Flow, %	ASTM C1437	74	81
Air Content, %	ASTM C231	10.5	13.0

¹ Reported values are for 2.20 pounds (1 kg) of powder mixed with 0.44 pounds (0.2 kg) of water.

² Reported values are for 2.20 pounds (1 kg) of powder mixed with 0.37 pounds (0.17 kg) of water.

All materials must comply with the approved specifications outlined in the LATICRETE International, Inc. quality documentation.

3.3 Interior Finish:

When LATICRETE 3D Printing Mortars are used as an interior finish, the LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars have a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 with maximum thickness of 1 ½ inch (38.1 mm).

4.0 INSTALLATION AND SPECIAL INSPECTION

4.1 Installation:

A copy of the manufacturer's published installation instructions must be available at all times where the LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars are to be mixed.

4.1.1 Mixing Instructions:

For 3D-M68, 4.6 to 4.8 quarts (9.5 to 10 pound or 4.3 to 4.5 L) of water are added to a 50 pounds (22.7 kg) bag of 3D-M68 and mixed in accordance with the manufacturer's recommendations until the mixture is homogeneous.

For 3D-M120, 3.6 to 4.1 quarts (7.5 to 8.5 pound or 3.4 to 3.9 L) of water are added to a 50 pounds (22.7 kg) bag of 3D-M120 and mixed in accordance with the manufacturer's instructions until the mixture is homogeneous.

4.1.2 Application Instructions:

The mixing and pumping must be carried out by a system that is able to mix the material homogeneously at the prescribed water-to-powder ratio and subsequently pump the material to the extruder at the printer head.

Delivery time (time from finish mixing to extruding) must not exceed the suggested open time per installation instructions.

4.1.3 Curing after printing:

LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars must be wet cured for a minimum of 24 hours after printing. Wet curing can be achieved by covering the whole structure with wet burlap as early as 25 minutes after printing. In addition to covering with wet burlap, spraying sprinkling water on the printed structure is recommended to minimize evaporation and reduce cracking.

4.2 Special inspection:

Special inspection must be in accordance with Sections 1705.1.1 and 1705.3 of the IBC, as applicable, during the mixing, printing, placing, and curing of the LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars.

5.0 CONDITIONS OF USE

The LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions. In case of conflict, this report governs.

- 5.1 The LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars are to be extruded in layers using 3D automated construction technology.
- 5.2 Construction and structural design of 3D concrete walls printed with 3D automated construction technology using LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars is outside the scope of this report and can be evaluated in an ICC-ES Evaluation Report in accordance with ICC-ES Acceptance Criteria for 3D Automated Construction Technology for 3D Concrete Walls (AC509).

5.3 Installation of LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars must be in accordance with Section 4.1 of this report, the manufacturer's instructions.

5.4 Special inspection must be provided in accordance with Section 4.2 of this report

5.5 Interior finish applications must comply with Section 3.3 of this report.

5.6 When applicable and requested by the authority in charge of the construction, water-soluble chloride content of proprietary 3D Concrete mixture must be shown to be in compliance with the limits of ACI 318-19 (2021 IBC) or ACI 318-14 (2018 IBC).

5.7 LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with Sections 3.3, 4.2, 4.3 and 4.4 of the ICC-ES Acceptance Criteria for 3D Automated Construction Technology for 3D Concrete Walls (AC509), approved December 2021.

7.0 IDENTIFICATION

7.1 Packaging of LATICRETE 3D-M120 and 3D-M68 3D Printing Mortars must be identified with a label including the name of the report holder (LATICRETE International, Inc), address of the report holder, product name, and the ICC-ES evaluation report number (ICC-ES ESR-4830).

7.2 The report holder's contact information is the following:

LATICRETE INTERNATIONAL, INC.
1 LATICRETE PARK NORTH
BETHANY, CONNECTICUT 06524
(800) 243-4788
www.laticrete.com
3Dprinting@laticrete.com

DIVISION: 03 00 00—CONCRETE**Section: 03 37 00—Specialty Placed Concrete****REPORT HOLDER:****LATICRETE INTERNATIONAL, INC****EVALUATION SUBJECT:****LATICRETE 3D-M120 AND 3D-M68 3D PRINTING MORTARS****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68, described in ICC-ES evaluation report [ESR-4830](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68, described in Sections 2.0 through 7.0 of the evaluation report [ESR-4830](#), comply with the LABC and the LARC, and are subject to the conditions of use described in this supplement.

3.0 CONDITIONS OF USE

The LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68 described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-4830](#).
- The design, installation, conditions of use and identification of the LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68 are in accordance with the 2018 *International Building Code*® (IBC) or 2018 *International Residential Code* (IRC)®, as applicable, provisions noted in the evaluation report [ESR-4830](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapter 17, as applicable.

This supplement expires concurrently with the evaluation report, issued September 2022 and revised October 2022.

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1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68, described in ICC-ES evaluation report ESR-4830, have also been evaluated for compliance with the code(s) noted below.

Applicable code editions:

- 2022 and 2019 California Building Code (CBC)

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) AKA: California Department of Health Care Access and Information (HCAI) and the Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2022 and 2019 California Residential Code (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68, described in Sections 2.0 through 7.0 of the evaluation report ESR-4830, comply with the CBC, provided the design and installation are in accordance with the 2021 and 2018 *International Building Code*® (IBC) provisions, as applicable, noted in the evaluation report and the additional requirements of CBC Chapter 17, as applicable.

2.1.1 OSHPD: The applicable OSHPD Sections and Chapters of the CBC are beyond the scope of this supplement.

2.1.2 DSA: The applicable DSA Sections and Chapters of the CBC are beyond the scope of this supplement.

2.2 CRC:

The LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68, described in Sections 2.0 through 7.0 of the evaluation report ESR-4830, comply with CRC Part III, Chapter 3, provided the design and installation are in accordance with the 2021 and 2018 *International Residential Code*® (IRC) provisions, as applicable, noted in the evaluation report and the additional requirements of CRC Part III, Chapter 3.

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1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68, recognized in ICC-ES evaluation report ESR-4830, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68, described in Sections 2.0 through 7.0 of ICC-ES evaluation report ESR-4830, comply with the *Florida Building Code—Building* and *Florida Building Code—Residential*. The design requirements shall be determined in accordance with the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4830 for the 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* or the *Florida Building Code—Residential*, as applicable.

Use of the LATICRETE 3D Printing Mortars 3D-M120 and 3D-M68 for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* or the *Florida Building Code—Residential* has not been evaluated, and is outside the scope of this supplemental report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

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