



# LP-20, 20M, 20S, 20HSD Lime Putty Products

LP-20 Series Products are based on non-hydraulic lime dispersions created from limes of various chemistries and sources.

LP-20 is a series of pure lime putty products.

LP-20M is a series of ready-to-use lime putty mortars.

LP-20S is a series of lime putty plasters and stucco mixes.

LP-20HSD is a high-speed dispersed lime putty for use in crack repair.



## Lime Putty

Lime Putty is a non-hydraulic binder used primarily for Historic Restoration and plastering work. Lime was the primary masonry binder material used prior to the 1800's, and its use continued, along with other systems, into the 19<sup>th</sup> and 20<sup>th</sup> centuries. In these later periods, it was more commonly used in combination with various types of cements and pozzolans, rather than as the solitary binder.

Lime putty was typically prepared by slaking quicklime at the job site. In the early 20<sup>th</sup> century, dry hydrated lime powder became widely available, and it was favored for its ease of use and transportation.

*Photo: Edison Coatings LP-20 lime putty was used in the repointing of the masonry base of the U. S. Capitol dome.*

## Chemistry:

Lime Putty is made by burning limestone at temperatures range from 1650°F (900° C) to 1900° F (1025°C). The resulting quicklime is then slaked with water to form a hydrated lime. Dispersion in additional water forms lime putty. The resulting lime putty product complies with the requirements of ASTM C1489.

**Limestone + Heat –CO<sub>2</sub> → Quicklime**

**REF: ASTM C5**

**Quicklime + Water → Hydrated Lime**

**REF: ASTM C207**

**Hydrated Lime + Excess Water → Lime Putty**

**REF: ASTM C1489**

## After Application:

**Lime Putty or Hydrated Lime + CO<sub>2</sub> → Carbonated Lime (Limestone)**

In the United States and Canada, lime has been produced from a variety of sources. In most areas, it was produced from limestone with a high magnesium content. Though seashells provided a limited source of calcium carbonate for so-called “high calcium” lime in certain coastal areas during the colonial period, and some limestone deposits in North America are in the high calcium category (<5% magnesium carbonate), most lime used on this continent was produced from dolomitic lime (>35% magnesium), just as it is today. Lime Putty of either variety offers low compressive strengths and high vapor permeability, extended working times, and excellent workability. Edison Coatings lime putty products are **MADE IN THE USA**.

### Where to Use

Lime Putty was traditionally used in masonry mortar, interior and exterior plasters, limewash and other applications. The primary advantages of using lime putty revolve around its enhanced workability.

### Alternative Products

**Spec Joint 46 Type L:** Lime-sand mortars, where the convenience and economy of a dry mortar mix are desired.

**BioMix 20, 35 and 50:** Hydraulic lime mortars, where positive hydraulic setting characteristics and earlier resistance to rain and frost are desired. Based on BioLime® NHL 2, 3.5 and 5, respectively.

### Composition

**LP-20** is prepared to order from either dolomitic or high calcium limes as specified by the purchaser. **LP-20**, in turn, can be compounded at the factory with precisely proportioned selected aggregates and mineral pigments as required to replicate historic mortars (**LP-20M**) and stuccos (**LP-20S**). These are also prepared to order to meet particular project specifications.

**LP-20HSD** is produced from dolomitic lime. It is dispersed at high speed and high shear, providing smaller particle size, heightened reactivity and more rapid strength development for use in crack repair and injection applications. It is a stable 50% solids dispersion with particle size of 99% passing a 0.15 mm (US #100) screen.

### Strength

**LP-20** mortar and stucco strengths are dependent on aggregate size grading and proportioning. A typical dolomitic lime putty mortar with 2½:1 aggregate to binder ratio and with well graded sand will develop compressive strength on the order of 2 MPa (approx. 300 psi) in 35 days.

**LP-20 HSD** typically develops compressive strength of 3.2 MPa (465 psi) in 35 days.

## APPLICATION

### Preparation

For Masonry Construction: Protect work from harsh direct sunlight, wind and rain, and freezing temperatures. Protect sills, ledges, windows, doors, and projections from droppings and splatters. Do not use tape or adhesives on any masonry surface. Prevent mortar from staining the face of the masonry and or other surfaces to be left exposed.

For Masonry Repointing: Remove all existing cement mortar and deteriorated lime mortar. Rake to the depth required to reach sound mortar, leaving a clean square face at the back of the joint, to which ever depth is greatest (1 inch, 1 ½ times the width of the mortar joints, or until cohesive existing mortar is encountered). Care should be taken not to damage historic masonry surfaces and masonry joints should

not be widened. Debris should be removed by brushing, vacuuming, and/or pressurized air. If there is evidence of moisture retention or rising damp, it may be necessary to allow the structure to “dry out” before repointing. If this is not done, lime leaching may occur, causing failure of the placed mortar and staining of the masonry.

For Stucco & Plaster Applications: Control substrate absorption by wetting masonry units or surfaces prior to application. Surfaces and/or units should be cool and damp (but not glistening wet or “holding water”) to prevent premature drying of plaster. On highly porous substrates, dampening should begin on the day prior to application. Control absorption by thoroughly dampening substrate by fine mist spray (depending on conditions this may entail dampening for additional time). Ensure there is no standing water or over-saturation before application. If, prior to dampening, the substrate is retaining moisture, it may be attributed to various conditions which would need to be corrected before work begins. Issues such as roofing, masonry detailing, gutters and drainage, etc. should be addressed prior to product application.

For Crack Injection: Successful full-depth crack injection requires care in the placement of injection ports. These are typically drilled with a small diameter masonry drill bit to 1/2 the depth of the masonry or stone being repaired. (Superficial crack repair can be performed without drilling.) Frequency of spacing will depend on crack dimensions, and is best determined empirically through on-site testing. Following preparation of ports, water is injected into cracks to flush loose dust and debris to the greatest possible extent, and to confirm flow from port to port.

### **Mixing Directions**

**LP-20M, LP-20S and LP-20HSD are provided in Ready-To-Use form and require no further additions of other materials.** Materials should be agitated prior to use to assure that no segregation or settling has occurred.

**LP-20:** Mix 1 portion of Lime Putty with determined portions of clean, well-graded sand (Do not exceed 1 part lime to 3 parts sand.) Using a shovel or hoe, chop the two components together until lime putty is coarsely distributed throughout the mix. Beat or ram the lime putty and sand together with a pestle or “beater” and turn until the mix is to desired consistency. Take care when adding water as too much water will expand the mix and may cause potential problems such as shrinkage cracking and diminished freeze-thaw resistance.

For mechanical mixing in a roller pan mixer: Add sand, then lime putty followed by additional water if necessary to achieve desired consistency. Due to the level of water retention in lime putty, in most circumstances additional water will not be necessary. **Lime Putty Mortars should not be mixed in a standard paddle mortar mixer. See “Reworking” below.**

### **Application**

For Masonry Repointing: Joints greater than 3/4” should be re-pointed with an initial lift to bring the joint depth to a uniform thickness. Pack mortar firmly against the previously placed, pre-dampened mortar by applying firm pressure to ensure close contact between the lifts. If pointing in lifts, roughen the surface to provide keying between applications and allow mortar to become thumbprint hard prior to reapplication. When finishing mortar joints it is often preferable to match the original joint profile.

For Plaster/Stucco Application: Scrub a water-thinned mixture of **LP-20M** (10-25% water addition) into the pre-dampened surfaces to improve bond and follow immediately with application of a first lift on undiluted material. Lifts should not exceed 1/2". Maintain the plaster in a damp condition to avoid plastic shrinkage and cracking. Apply subsequent lifts as required once the prior lift has achieved thumb-print hardness.

For Crack Injection: Grouting procedures can vary considerably from one application to another. The following are

some general guidelines:

1. Loose materials, such as unbonded masonry mortar, loose bricks or delaminated concrete must be removed and replaced prior to crack injection.
2. For full-depth repairs, injection holes should be drilled to enable delivery of grout to the full length and depth of the cavity to be filled. For transverse (perpendicular to surface) crack-filling and for void injection, injection holes are typically drilled into the face of the crack at a downward angle to a depth of ½ the masonry thickness. For filling of lateral cracks (parallel to surface, e.g., delaminating layers of sandstone or stucco), holes are generally drilled near the top and bottom of the area to be filled, beginning at the upper and lower corners and then every 3 to 9 inches along the upper and lower edges of the cavity. The lower row may be drilled square with the surface (at 90° to the wall surface). The upper row of holes should be drilled at a downward angle.
3. Seal the face of the crack with temporary non-staining clay, sealant or mortar.
4. All crack and void cavities must be thoroughly flushed with clean water to remove as much dirt, debris and contaminants as possible and to pre-saturate the areas to be grouted. Continue flushing until clean water runs from the lowest port. A minimum of 20 minutes of pre-wetting should be performed prior to grouting. Repeat pre-wetting if either drying occurs prior to injection or if more than two hours elapse from the time of pre-wetting.
5. Some methods of grouting involve injecting from the lowest port, followed by plugging of the injection port once grout flows from the port above. Other methods involve injection from the upper port, plugging the lower port once grout begins to flow from the port. **LP-20 HSD** products are compatible with a variety of good grouting practices and equipment.

**Reworking:** It is possible for Lime Putty products to be re-worked and reused for extended periods of time, if properly stored in tightly closed, air-tight containers, with no direct product contact with the empty head space. If material has been exposed to air for too long, it may have already carbonated, making it unusable. To re-work lime putty mortars, chop and beat the mortar until the material reaches a workable consistency. Lime Putty Mortars can be re-worked in a standard paddle mortar mixer if necessary.

**Curing Time:** Mortar and plaster work should be protected from sun, wind, and rain for at least 7 days. All work should be protected from freezing temperatures for at least 28 days. In some cases mortar work may need to be protected from freezing temperatures for several months.

**Coverage:** Each 5-gallon pail contains approximately 0.6 cubic feet of material.

### Clean Up

Ensure that all work is properly protected prior to cleaning. Maintain clean surfaces on the face, sills, ledges, and projections of masonry on a daily basis, and with a trowel, strike off minor dabs of adherent mortar from masonry faces. After mortar has achieved thumbprint hardness, lightly brush masonry to remove small mortar burrs from joints and masonry edges. Manual cleaning of masonry can be effective by using water and soft bristled brushes to remove mortar smears. After the mortar has been allowed to cure light pressurized spray (less than 300 PSI) can be used with caution due to the fact that over saturation of the masonry could lead to moisture migration. If chemical cleaning is necessary, contact cleaning compound manufacturer for directions and test the treatment in small inconspicuous areas to determine effectiveness and to ensure no damage occurs. Tools can be cleaned using conventional methods. Protect any unused product from moisture and freezing. Opened containers of lime putty should be stored by pouring one inch of water to “seal” the putty, in the pail. This putty should last indefinitely.



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