



clay & earth plasters



what are they?

Clay or earth plasters are blends of unfired clays mixed with fine sand to provide a natural, breathable finish for internal walls. They have been used all over the world for thousands of years, and still exist in lots of traditional vernacular buildings. They were often used in old buildings in the UK as a base coat, with a top coat of lime, as clay is cheaper than lime.

Clay is a better description than earth, as earth contains aggregates (stone, gravel) and also living material. Clay is formed from the chemical weathering of feldspar rock, and is found in every country. It's clayey subsoil that's used, not topsoil. Clay plaster can be used as a base coat when mixed with coarse sand, with hemp or straw binder chopped into it, and can be used with finer sands to produce a top coat. The best plasters will be hard and hygroscopic (see benefits), and often the best way of achieving that is by blending clays. Clay plasters fell out of favour in the 20th century, but we're seeing the beginning of a revival now with more interest in natural homes for environmental and health reasons. Clay plasters are for internal use only, but can be used externally as a base coat for a lime top coat.

what are the benefits?

Environmental benefits

- material can be sourced locally, with lower or no transport costs / emissions
- unlike gypsum, no firing required, so lower energy use / emissions
- totally biodegradable
- clay doesn't set chemically; so at least for the base coat, if it dries, you can wet it and knock it back up again, which means less waste
- no nasty chemicals

Benefits for the building

- breathability: clay plasters prevent excess moisture. Clays are hygroscopic - they absorb moisture if humidity is high, hold it without being damaged, and when humidity falls, release moisture back to the air. So they maintain a consistent humidity, and minimise damp, and moulds caused by condensation
- gypsum on the other hand absorbs moisture, but it's not breathable, as it doesn't let moisture out again, and gets damaged in the process - it moulds, and / or the plaster can blow / fall off
- clays can be used with / over other breathable materials without taking away their breathability
- clay is soft, pliable, and can move without cracking; it can cope with situations where you get minor movements, so is good in old houses

- gypsum on the other hand is not flexible, and cracks with any minor movements
- lime absorbs moisture through capillary action, but clay has a chemical attraction that draws moisture in - and as clays absorb moisture faster than lime or timber, they take moisture away from the timbers of the building, protecting them from damp, mould, rot and insects
- as clay absorbs moisture, it seals and prevents water from passing through into the structure of the building. Moisture is held and released when the air around it dries. This is why clay can be used to line a pond - clay allows so much moisture in and then provides a barrier
- aesthetic: clay plasters are beautiful in their texture and the way they reflect light, and they have an organic, natural feel

Health benefits

- clay plasters maintain a consistent relative humidity of around 50-60%, which is beneficial for people with asthma or other respiratory problems, but detrimental to dust mites, which reduces problems associated with allergies
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- they contain no nasty chemicals, and are able to absorb toxins and thus improve indoor air quality. Of course, you'll try not to use toxic cleaners or buy toxic household products, but



Clay pigments, tools and binder.

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Clay plasters add an extra (gorgeous) dimension to living areas.

in this day and age, it's difficult to avoid toxins completely, and so clay plasters can help

- you have to be in a room with a clay plaster to understand how beautiful, sensuous, natural, earthy they are. They just make you feel good

what can I do?

You can buy plasters, or you can have a go at making a base coat (bought plaster is much finer, so it may be better to buy the top coat). First test whether you have clay. The field test is that clay is sticky and can be rolled into a sausage shape. See *Using Natural Finishes* for more detailed tests, plus lots more information on making and applying plasters. Dig the clayey earth out of the ground then soak and sieve to remove aggregates. What's left is clay. Let that stand and keep taking water off the top until it dries. Clays are not uniform, so they will differ in composition depending on locality. This may take a little experience. For a base coat mix roughly 3 parts coarse sharp sand: 1 clay (and chop in straw or hemp for binder, which helps with shrinkage and stops it cracking when it dries). Then add water until you have the right consistency for a plaster. For a top coat, use the same ratio of sand and clay, but use a finer grade sand, like silver sand. Apply 10-15mm of base coat, and 3mm of top coat. Apply the top coat in thin layers, and don't over-trowel, as it brings the moisture to the surface, which makes it liable to crack as it dries. Lay the base coat on with a steel float, then scour

with a wooden / plastic float, which compresses the surface and gives a good hard surface for top coat. Apply the top coat with a metal float, then burnish with a plastic trowel - steel might mark the pigment, but plastic doesn't (and it doesn't bring water to the surface as much either). If you're plastering over 2 different surfaces, e.g. brick and cob, to prevent cracking, it may be a good idea to use hessian or glass fibre mesh. Apply the base coat, then push the mesh in, and trowel over it. See lowimpact.org (below) for more details on application and maintenance of clay plasters. Clay plasters can be painted with breathable paints, but nowadays you can also buy more refined top coats that will provide a finer finish and can be bought already containing coloured natural pigments, saving time and money. Clay plasters have good impact resistance - but not to constant banging / rubbing, so they may not be ideal for areas of high traffic, or for hospitals or schools. But they can be used if there's a handrail to stop too much contact. They would certainly be a good idea in public buildings, because of their health benefits.

resources

- <http://www.lowimpact.org/clay-earth-plasters/> for info, courses, books, inc:
- Weismann & Bryce, *Using Natural Finishes*
- Guelberth & Chiras, *the Natural Plaster Book*
- buildingconservation.com/articles/earth/earth.htm – advice on repairing earthen buildings
- [youtube.com/watch?v=MpGVMg_Wh1s](https://www.youtube.com/watch?v=MpGVMg_Wh1s) – how to mix and apply clay plaster



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