

Recommendations of use and laying for Facing Bricks



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General Recommendations

General

This is a series of basic usage recommendations to ensure that face brick wall assemblies prove satisfactory for the purchaser and that the best possible use is made of the bricks selected.

They follow no particular order of importance, because we feel that all of the suggestions-recommendations listed may influence the final result of the construction project:

The size, shape, texture and colour of the joints, both vertical and horizontal, should be studied in detail. They exert a major influence on the formal appearance of the facade. It must be remembered that jointing may account for 20% or more of the wall's total surface. Visually, the sum of the colours of the two components which make up the facade are synthesized, and very different results can be obtained using the same brick but altering the appearance of the joints.

The successful outcome of the crucial joint-brick combination will to a great extent depend on the professionalism of the project designers and job supervisors. Their decision will be based on the variables specific to each job, such as: the drawings, volumes and elements to be highlighted, the relationship with other materials used in the facade, the surroundings ...etc. Personal taste will also inevitably influence the outcome.

Our bricks come in a wide range of colours, tones and finishes. We are always willing to share the knowledge gained from our long experience and to suggest solutions to our customers requirements.

Mixing bricks

Colour harmony on facades is generally a major objective, due to its influence on the aesthetic result of the project. Aware of the importance of this factor, we offer the following recommendations regarding specific models:

- The beauty of the Sevilla Malpesa model lies in its combination of salmon, or chuff, tones, which bring the facade to life. For the optimum aesthetic result we recommend using bricks from three packets at the same time.

Wall assemblies built using the Cartuja model are especially attractive thanks to a combination of slightly pinkish salmon tones, which bring the facade to life. For the optimum aesthetic result we recommend using bricks from three packets at the same time.

- The beauty of the Sevilla Santa Justa model lies in its combination of light and slightly pinkish salmon tones, which bring the facade to life. For the optimum aesthetic result, we recommend using bricks from two packets at the same time, working downwards through each one.

- This practice of using bricks from two or three packets at the same time is generally recommended for all our bricks.

- On sites where owing to the specific circumstances of work organization openings are left in wall assemblies to be closed up later, it is advisable to leave the packet(s) of the bricks used around the opening as near as possible to each opening.

Hydrofuged and klinker bricks

The three basic recommendations for the correct employment onsite of hydrofuged bricks are:

1) Lay the brick as dry as possible. To do so, the plastic wrapper must be removed from the packet at least two days before use.

2) Use packaged factory made mortars if possible, either pre-dosed wet-mix or pre-mixed dry, of M-7.5 grade or above. If this is not possible, we recommend adding a plastifier to mortar mixed onsite, according to the manufacturer's instructions for use.

3) If the wall assembly contains wet bricks as a result of not having followed the first recommendation, they should be left to dry for as long as possible before applying rough finish to their rear face. This precaution is particularly important if polyurethane foam is to be employed.

Regarding klinker bricks, there are just two suggestions:

1) Do not wet the bricks before laying them on-site.

2) If possible, use pre-dosed or premixed mortar, of M-7.5 grade or over. If this is not possible, add a good plastifier to the mortar.

Thinbrick

Another important factor to be considered to obtain a good result on the facade is the correct handling of the Thinbrick placed in gaps in concrete slabs and columns. Here we suggest the following:

- If the bricks are light, salmon or grey in colour, the thinbrick should be cut from the bricks that are being used, with three packets being used at the same time, as they are with the other bricks.

- Thinbrick should preferably be cut on cutting tables equipped a disc cutter with water. This allows them to be cut to the maximum size needed for the project, and does not involve a great increase in costs considering the breakages produced when they are cut manually.

• If the brick being cut is water resistant, two things should be remembered:

- 1) It should be cut completely dry, if a disc cutter with water is employed.
- 2) Allow the moisture produced by the cutting of the insert to dry for one or two days.

The first consideration is crucial. If the second cannot be followed because of work rhythm requirements, it is not so important because any humidity which may appear on the facade will disappear after a short period of time.

Treatment of joints

The size, shape, texture and colour of the joints, both horizontal and vertical, should be studied in detail. They exert a major influence on the formal appearance of the facade. It must be remembered that jointing may account for 20% or more of the wall's total surface. Visually, the sum of the colours of the two components which make up the facade are synthesized, and very different results can be obtained using the same brick but altering the appearance of the joints.

With narrow, flush mortar and apparently dry joints, the dimensional tolerances of the selected brick model must be taken into account when deciding the minimum width of the joint. If the brick is extruded, the thickness of the column face must also be considered.

Particular attention should be paid to "loose-laid" vertical joints, employed to give the bricks an appearance of horizontal continuity. The achievement of this aesthetic effect does not mean that vertical mortar joints completely disappear; a minimum distance should remain between the units to accommodate the tolerances of both the

brick and its position. It is materially impossible to lay brickwork with touching header faces and at the same time maintain perfectly true vertical joints, regardless of the model or manufacturer that has been chosen. Furthermore, brick-to-brick contact is not advisable from the technical perspective because any material movement in the facade (slab deflection, thermal dilatation and retraction, etc) may produce load concentration at these points of contact between bricks, and result in damaged edges.

As can be seen in any brickwork executed following this procedure, the visual effect of continuity in a course of brickwork can be achieved by establishing nominal vertical joint thicknesses of between 2 and 4 mm (depending on the tolerance of the model chosen). It will also depend on the dimensions of the horizontal joints (the wider the horizontal joint, the more noticeable the effect will be).

In this type of brickwork, the construction manager must decide whether to prioritize the precision of the vertical joints, which involves accepting slight variations in joint thicknesses, or retain a uniform spacing between bricks, which will involve accepting a slight deviation in joint alignment. Here, the professionalism of the face bricklayers becomes particularly important, since they must have the skill necessary to balance both factors to produce the desired results.

Our recommendations for loose-laid brickwork are as follows:

- 1) Take into account the bricks' dimensional tolerances in order to establish a suitable joint thickness.
- 2) Take special care with the preliminary layout, and establish the tolerances of the joint widths according to the desired result.
- 3) To minimize the effect of grade differences, use bricks from two

or three packets at the same time, working downwards through each batch.

Regardless of the type of brick being used, if the mortar joints are to be pointed remember that the operation must be carried out to the same criteria throughout the job in terms of the mortar's hardness when pointed. This is especially important when using low-suction bricks, because the differences that may be produced in the colour of the joints are usually very noticeable.

When laying low-suction bricks, any soluble salts contained in the mortar will concentrate on the surface of the joint because the water used for mixing evaporates mostly through this surface, rather than through the brick. This usually results in a lighter mortar joint colour than if a conventional brick had been used.

All this would not affect the uniformity of the facade were it not for the fact that incorrect pointing may make this lightening of the joint colour more marked in some parts of the facade than in others. Consequently, alternating light and dark horizontal strips may appear marking the areas where the mortar was softer or harder when it was pointed.

If pointing is always done while the mortar is still fresh, therefore, the resulting colour will be lighter, but more uniform; the facade, however, will get dirty more easily. If the pointing is done when the mortar is half-dry, the joint will be a little darker with a cleaner finish, but work on the last stretch of the day must be organized so that bricklaying stops in time to allow the last courses to harden before pointing. On each job, the procedure that best meets the project's needs must be chosen, but during the execution stage the same criteria must be followed throughout.



The successful outcome of the crucial joint-brick combination will to a great extent depend on the professionalism of the project designers and job supervisors. Their decision will be based on the variables specific to each job, such as: the drawings, volumes and elements to be highlighted, the relationship with other materials used in the facade, the surroundings ...etc. Personal taste will also inevitably influence the outcome.

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Cleaning

Finally, if it is considered necessary to clean the facade this is best done as late as possible, preferably immediately before delivery of the building. This will ensure that it will not be dirtied again during other work processes.

Our recommendations for effective cleaning are:

- Employ brick facade cleaning professionals.
- A high-pressure water jet gives the best cleaning results.
- To guarantee the desired result, satisfactory preliminary tests should be carried out to provide a contrast with the final appearance.

These procedures, together with proven bricklaying skills, have led to the building of brick facades on a huge scale in the UK, USA, Scandinavia and Northern Europe, with aesthetic results of the very highest quality.

Dry Press Bricks

Our dry press bricks offer exceptionally smooth, squared faces which, together with their uniformity with respect to their grades, permit the construction of superbly finished facades. The introduction of continuous frogs and notched header faces has facilitated brickwork with very thin, usually sunken, mortar joints (“loose-laid” brickwork). It is precisely in this kind of brickwork where our dry press bricks are most clearly distinguishable from other types of bricks, and where their use is fully justified.

By way of clarification, the expression “loose-laid” refers to brickwork in which the extreme thinness of the joints, whether vertical, horizontal or both, gives the visual impression of continuity between brick units. Under no circumstances does it mean that the mortar joint between bricks can be omitted. Joints for our dry press bricks have to be of at least 2-3 mm, enough to allow the minimal grade differences between the units to be absorbed and to have a margin of tolerance in the brickwork. These mortar joints, together with the corresponding expansion joints when required by the dimensions of the facade, also guarantee the behaviour of the assembly when subject to material movements between the different constructed elements, which may result in chipping and cracking if the bricks are laid in direct contact with each other.

These high quality bricks deserve to be laid in the best possible way, although this certainly does not imply that they are difficult to use. Below we present a series of practical recommendations for improving finishes and facilitating construction. Most of them are

merely reminders of normal good building practice:

- Malpesa dry press bricks are supplied waterproofed; like other waterproofed models, they should be laid using well bonded fresh mortar, mixed with little water. Sections 3 and 4 contain recommendations concerning the mortar to be used with these bricks.
- Take special care with the positioning of units and levelling on the first course, especially if the joints are very narrow. It should also be remembered that at corners, units without continuous frogs are going to be used. These may project a little above the others, and they should not, therefore, be taken as a reference for levelling the row nor as a base for laying separators when these are to be applied.
- With thin joints, construction is improved by using small strips, pins or braces of the desired thickness as separators. For sunken joints in the horizontal course, continuous strips can be used of a maximum length of one metre, with handles for withdrawal. Whatever kind of separators is used, care should be taken to remove them as the facade gets higher, about every half-metre, this is to prevent their becoming too enclosed, which could cause chipping of the brick’s cants and edges when they are withdrawn.
- Bricklaying performance is improved by placing plumb bobs at intervals of between one and a half metres and two metres, to maintain the verticality of the joints. This also facilitates the positioning of the bricks.
- The brick is supplied stacked in packets, but for the best final results it is advisable to use units from several pallets at the same time.
- To ensure the impermeability of the wall to rainfall, the frogs in the horizontal course and the notches between the vertically laid bricks should be correctly filled. Enough mortar should be applied to fill the

frog completely and, when the brick is pressed, to fill the 2 or 3 mm tilt without overflowing. Later, to imitate empty joints, the mortar is touched up with a suitable tool, taking care not to damage the edges of the brick.

To improve the sealing of the vertical bonds, the mortar can be flattened with the trowel handle to ensure that the notches in the header faces are completely filled.

If the inside of the wall is to be rough coated, it should be remembered that the surface of these dry press bricks is smooth and waterproofed, and will therefore first require a preliminary coating in line with the recommendations of the mortar product manufacturer. Alternatively, a rough surface may be produced by grouting with cement one or two days beforehand.

Following these recommendations it is easy to produce brickwork with empty joints of a “loose-laid” appearance where the bricks “float”, as can be seen in numerous buildings of great prestige constructed with dry press bricks since the end of the last century. In most of them, the joints between brick units can be seen to be usually of about 5 mm in width.

Mortar For Low-Suction Brickwork

Introduction

The advantages of low-suction bricks have been described above, but it should not be overlooked that this material differs in its properties from traditional brick. Its laying therefore requires modifications to some of the other components which influence the brickwork. The mortar used must achieve satisfactory on-site performance and finishing.

The main difference between a low-suction brick and a traditional brick in terms of its use in construction is that the former absorbs a very small amount of the water contained in the mortar compared with the latter. Because it is crucial to avoid the premature dehydration of mortar, which would prevent its correct setting, it is obligatory to wet bricks with a suction of over 1Kg/(m²·min) prior to laying. This sound building practice is not, however, applied as strictly as is necessary, and in many projects bricks of medium to high suction are laid dry or incorrectly wetted.

Bricklayers, no longer accustomed to wetting brick, have had to use mortar with a greater water content, because otherwise the workability time of the case mix once spread on the tilt would be very short. This system does not ensure good adherence to the bricks, since at the point of contact between mortar and brick the cement particles may dehydrate and lose the moistness necessary to set correctly. Furthermore, it is well known that an increase in the water/cement ratio reduces mortar strengths and increases its porosity and its retraction on drying.

When working with low-suction bricks, the ceramic unit hardly alters the water content of the mortar mix, and the mortar only therefore requires the amount of water necessary to moisten the aggregate and cement correctly. An excess of water in the mix can only have negative consequences, because apart from worsening the properties of the hardened mortar the surplus water not absorbed by the brick causes delays in setting time and therefore in the work schedule (especially in cold weather and with high atmospheric humidity). It also dirties the facade by running down the brick facings.

Reducing the water in the mortar mix, however, has a negative effect on its plasticity, or its handling qualities and ease of laying, and it is therefore necessary to adopt measures concerning other influential factors in order to restore the balance. The aim is to obtain mortars which are easily workable but which at the same time contain less water, to give them greater bonding properties when fresh without making their setting time too long and to avoid stains on the facade.

Materials

There are two factors which can be addressed in order to reduce the water content in mortar while maintaining sufficient plasticity: firstly, the amount of fine aggregate contained in the mortar mixture and secondly, the use of plasticizing additives. The amount of fine aggregate in the mortar depends on the cement dosing (and sometimes the amount of lime). It is also affected by the amount of fine sand that has been added. Each of these components is analyzed below:

• Sands

Mortar can be made using river sand, stone sand, pit sand or combi-

nations of these types. Beach sand is not recommended because it may cause efflorescence.

When choosing the type of sand it must be remembered that river sand is more rounded, and this is an advantage in terms of plasticity. However, if the sand is too clean – that is, if its percentage of fine aggregates is very low -, the effect may be just the opposite of what was expected. Stone sand usually has a larger percentage of fine aggregate, although it also contains sharp edged grains.

Limestone sand, because of its nature, usually gives better results than silica-based sands when used to make mortar for laying low-suction bricks.

Nevertheless, the factor which most influences sand suitability is its grading curve; the sands with the best performance are those which possess uniformly distributed grading. As mentioned previously, the percentage of fine particles should ideally be around 15%. However, this does not mean that the sands used should not contain any large particles at all, because if the joints are wide a considerable amount of such particles will be necessary. Nevertheless, the medium sized particles should be well distributed.

• Cements

Masonry cements are recommended due to their lower sulphate content. If they are not available, common cements of a maximum strength of 32.5 (except CEM I and CEM IIA) are used.

It is inadvisable to use cements with strengths exceeding 32.5 because while the mortar strength remains the same, this will reduce the percentage of fine aggregate in the mixture, and therefore its plasticity. Neither is it advisable to use cements with high initial

strength, because the theoretical advantage in strengthening time may be accompanied by loss of control with respect to the mortar mix handling time, which the bricklayer may attempt to offset by increasing the water dosage.

An exception to this occurs when the joints are intended to be white or light coloured. In this case, although it is advisable to use BL-22.5 X masonry cement, white cements with a strength of up to 42.5 can also be used (except for BL-I and BL-IIA). With the correct dosing, this type of cement performs well with low-suction bricks and tends to reduce the appearance of salts.

Mortar performance varies depending on the brand of cement being used, and it is therefore advisable to study which of those available in the area is the most suitable. It is also important to analyse the properties of the cement in order to counter the possible influence of efflorescence. To this end it is not advisable to use cements with a high soluble salt content, especially those containing high levels of sulphate.

Note that masonry cements have maximum sulphate contents lower than that of common cements.

Whatever type of cement is used, it is important to follow the instructions laid out in the Cement Delivery Note with regard to the monitoring of the material's reception and storage on-site.

- Limes

The use of lime in mortar increases the proportion of harmless fine aggregate in the mixture. This improves plasticity and has a very beneficial effect when laying walls with low-suction bricks.

The most usual technique is to use aerial limes together with cement

to make gaged mortars. It is preferable for this type of mortar to arrive on-site already quenched, packaged and labeled in compliance with the precepts of Standard UNE 41.067. Both types CA.1 and CA.2 can be used.

Hydraulic limes can also be used. Again it is advisable for them to arrive on-site correctly packaged and labeled in compliance with Standard UNE 41.068. Types CH-2 and CH-5 can be used, the latter displaying greater strength.

- Additives

The possibilities of improving mortar plasticity by adjusting its traditional components and working with less water have been described above. The most efficient method to achieve this objective, however, is to use purpose designed additives. There is a wide range of plastifying, fluidifying additives on the market which allow the quantity of water to be greatly reduced when mixing the paste.

The tests carried out suggest that it is advisable to use air entrainer-plastifiers, which do not act as setting delayers. These are the most suitable additives for laying walls with water resistant and clinker bricks. Except for those cases in which gaged mortar or BL-42.5 cement is used, these additives are almost essential if a good rhythm of work is to be achieved, especially during cold weather or in high atmospheric humidity.

The use of plastifiers also implies further benefits, because with the decrease in the amount of water used to mix the paste there is a corresponding decrease in the mortar's retraction and capillary network, thus improving the watertightness of the joint (plastifiers should not be confused with other additives designed specifically to

render mortar waterproof). The introduction of a limited amount of air also increases the hardened mortar's resistance to frost.

The mixing of additives into mortar should always be carried out following the manufacturer's recommendations. Only those additives with a document attesting to their technical suitability and which offer sufficient guarantees of a successful result due to previous experience, or to the renown of the manufacturer, should be used. It is important strictly to follow the dosing instructions indicated by the manufacturer, because in many cases overdosing may have the effect of delaying the mortar's setting time.

We advise the use of liquid additives, as they are easier to dose and guarantee a more uniform mass.

Finally, remember always to check up on possible interactions when using two or more additives. Ideally the total additive content should not be more than 5% of the cement weight, especially when using masonry cements with up to 1% additive and up to 10% pigmentation.

Types of Mortar

Introduction

Cerámica Malpesa has pioneered the manufacture of both the water resistant and clinker varieties of low-suction bricks in Spain. Both types of brick offer considerable advantages for improving face-brick assembly quality, both from the aesthetic point of view (cleaner finishes, with a more clean-cut, durable appearance) and the technical perspective (greater resistance to rainwater, frost and other weather conditions and improved thermal insulation of wall enclosures). For these advantages to be exploited, however, the material must be used correctly. It should not be overlooked that this material differs in its properties from traditional brick and its laying therefore requires some modifications to the other component involved: the mortar, to achieve satisfactory on-site performance and finishing.

Generally, high-plasticity mortars are recommended, with a flow value of between 140 and 180 mm, tested on a flow table as indicated in UNE-EN 1015-3.

Prepared mortars on-site

- Select sand with the correct grading, and avoid those that are too fine or that contain excessively large particles.
- Use cement that has been kept in good condition, with a dosage of at least one part cement per five parts sand (1/6 if using BL-42.5 white cement).
- The addition of lime considerably improves the workability of the cement.

- Use plastifiers of good repute, and always follow the manufacturer's instructions. The use of such additives is of prime importance, except when using gaged mortars or BL-42.5 cement (with a dosing of at least 1/6).
- Mix with a cement/water ration no higher than 0.50, bearing in mind the possible effect of moisture in the sand on the final dosing.

Industrial mortar

Dry industrial mortar

This type of mortar should be clearly labelled to indicate its origin, the amount of water needed to achieve its advertised strength and/or the correct dosing. It should comply with market standards, and bear the EN-998 European Standard label. For low suction bricks, mortar of M-7.5 quality or higher should be requested.

This normally produces good results, because it is manufactured with plastifying agents that allow it to be worked with little water and guarantee uniformity of performance throughout the job.

It is nevertheless advisable to inform the manufacturer of the need to mix this mass with little water, because in many cases its formula can be improved to adapt it to the job.

The only special care that needs to be taken is to check that the water dosing equipment is working correctly, to avoid unwanted surplus water and the consequent differences in consistency between one batch of mortar and another.

Wet industrial mortar

Its origin, strength and/or dosing should be specified, along with its useful lifespan.

It must comply with the labelling regulations set down in European Standard EN-998.

Like the other mortars, it usually produces good results because it avoids the variability of mortars prepared on-site and the additives it contains allow it to be mixed with the optimum cement/water ratio.

The following points should be considered when using this type of mortar:

- It should have a maximum curing stability after 24 h., but it is advisable to reduce this period to 12 h or even less if the rhythm of work and supply allow this. This applies especially in cold weather or high atmospheric humidity, and for building with dry press bricks.
- Mortars of the M-7.5 grade, or better, should be used. • Water must never be added in order to retemper a batch of mortar.