



INSTALLATION DETAILS FOR NATURAL STONE TUMBLED SANDSTONE WALLING

Scope

These guidelines relate to the construction of low to medium height walls up to a maximum height of 1.5m.

Planning permission may be required if the wall is over 1m and is situated next to a highway or footpath adjacent to a highway.

General Information

On delivery, the product should be inspected. If there are **any** issues, please report them immediately and do not commence installation.

Before installation commences a certain amount of sorting of the product may be required to ensure consistency of colour, texture and dimensional tolerance.

Natural stone products are unique and you can expect colour and veining variances between each unit.

Health and Safety Information

Safe working practices should be employed at all times during the construction process and all necessary Personal Protective Equipment (PPE) should be worn.

Foundation

It is essential that the wall has a firm level foundation along its entire length to give a stable base. For walls from 650mm to 1.5m in height a conventional concrete foundation will generally be sufficient. As a general guide, the width of the foundation should be three times the thickness of the wall, and 100mm in depth.

It is important that the foundation is dug into firm sub-soil material, and not loose topsoil or other poor material. Because of this the foundation may be quite a distance below ground level. The top of the foundation should be a minimum of 300mm below ground level, even where good subsoil materials exist.

On sloping ground a stepped foundation should be formed, ensuring that each step corresponds with walling unit dimensions to avoid unnecessary cutting.

Note: If it is not possible to form a clean cut trench due to poor ground conditions, then timber shuttering should be used to act as a former and restrain the trench sides.

For foundations a good standard concrete mix is 1:2:4 (cement : sand : aggregate).

Newly laid concrete should be protected from heavy rain, hot sunlight and strong wind, but particularly from frost. It is therefore not advisable to lay concrete in extremely hot or cold weather. On completion, the concrete should be covered with polythene, and left to cure before building on top of it.

Mortar

A good general mortar mix for walling is 1:5 or 1:6 cement : building sand. The dry materials should be mixed together adding water gradually to form a uniform consistency.

Damp Proof Course (dpc)

To prevent the walling units from becoming stained by rising damp, the wall should ideally incorporate some form of damp proof course (dpc). The most popular method of forming an effective barrier against damp is to use a flexible membrane material.

The dpc should be positioned within a horizontal mortar joint, a minimum of 150mm above the level of the surrounding ground or paving. If the ground level on one side of the wall is different to that on the other side, then in a single skin wall the dpc should be placed a minimum of 50mm above the highest ground level. If the wall has two skins with a cavity or gap between, then the dpc can be positioned at different levels in the two skins providing they are both a minimum of 150mm above the respective ground levels, and are joined by a vertical dpc.

The dpc should be laid fully sandwiched between fresh beds of mortar ensuring that it is supported throughout its entire length and width. When selecting the dpc material, it is important to use the correct dpc for the width of the wall. Ideally the dpc should extend through the full thickness of a solid wall and through each leaf or skin of a cavity wall. On no account should the dpc be covered by pointing or rendering to the external surface of the wall, but rather it should project forward of the walling unit face by 3 - 4mm.

In addition to preventing staining by rising damp a damp proof course can also be used at the top of the wall to prevent water soaking down through the walling, particularly if the wall does not have an overhanging coping to protect it. In this case the dpc should be positioned in the mortar joint directly beneath the capping/coping units.

Setting Out

Mark the position of the wall on the foundation by using a string line and chalk. Next lay out dry a line of walling units for the length of the wall with another course laid on top to the required length.

Any adjustments can then be made at this stage, as these two courses of units will form the pattern for the entire wall.

Construction Sequence

Begin by laying a bed of mortar along the line of the wall on the foundation, enough for four or five walling units. Place the first unit on the mortar, checking its position against the chalk mark.

Take the next unit, and butter one end with mortar. Place the unit next to the first one so that the buttered end forms the first vertical joint. Check the alignment of the units, and adjust if necessary. Gently tap both units down, then span with a spirit level and adjust the level if required.

Repeat the operations and continue to the end of the wall. Take time to check the work, as building the rest of the wall will be far simpler if the first course of units is level and straight.

For return ends the walling units should be dressed to give a natural appearance.

Then simply repeat the operation and lay another course of units ensuring that the vertical joints in the second course are staggered against those below.

When the wall has been constructed to a minimum height of 150mm above the surrounding ground level the flexible or brick dpc can be installed. The next course of units can then be placed on top, as the walling operation continues. This installation technique should be repeated when installing a dpc at the head of the wall.

Note: On no account should the dpc be laid “dry” on top of the previous course of units as this can affect the stability of the wall and can also puncture the dpc material.

On completion of the wall, and when the mortar has dried sufficiently to work without smearing, then pointing can be undertaken. At the same time, any spots of mortar can be removed from the unit faces. Care should be taken when cleaning units to avoid damaging or scouring the face.

Movements Joints

In general, walls less than 10m in length will not require the installation of movement joints. However, for longer walls, the provision of movement joints must be considered.

Tolerances

These walling units vary in size from one to another due to their manufacturing tolerance, which could be up to +/- 15mm. Therefore, before any units are installed, we advise that the units are checked and sorted into common sizes.

When setting out the wall it is important to check the alignment of the walling for both line and level at regular intervals. The width of the vertical mortar joints in walling is

roughly 10mm. However rather than attempting to achieve joint widths which are exactly 10mm wide between every unit, the aim should be to adjust the joint widths slightly to account for any possible size variation in the units themselves. By adjusting the joints in this way a satisfactory appearance can be achieved in the finished wall.

Building Features - Cappings and Copings

To prevent saturation of the walling units, the top of the wall should be finished with some form of capping or coping unit. (Cappings are the same width as the wall, copings are wider, and overhang the wall).

These units not only provide the right aesthetic finish to the wall, but more importantly, in the case of a coping unit, will cast rainwater off the wall. Wet walls not only encourage the growth of moss and algae, but may also lead to the appearance of efflorescence.

Building Features - Piers

Single skin walls up to 450mm high can generally be built without piers but over that height piers are needed at 3m intervals. The strength and effectiveness of the pier will be greatly improved if it is built as an integral part of the wall fully bonding the units together. When using wall ties, to increase restraint in the walling, it is important that the tie is sandwiched in the mortar joint.

Building Features - Curves

Curves also add strength to a wall but more often they are used for purely decorative effect. Gentle curves can be achieved without problem. In general, however, curved walling with a radius of 2.5m or less will require the use of special shaped radial units to avoid the mortar joints between the units becoming excessively wide.

Building Features - Corners

At corners, strength is built into the wall by interlocking alternate courses. Where two walls join, the units can be interleaved as both walls are built up, or they can be joined with metal ties every three or four courses.

Building Features - Double skin

Double skin walls are often used for retaining walls or larger boundary walls. Up to 650mm in height the two skins need not be tied together – other than mortar between them and, of course, a capping or coping spanning both skins. Above 650mm in height the skins should be tied with through units, (units laid across the width of the wall) and with metal wall ties or bed joint reinforcement.

Retaining Walls

Where there are sharp divisions of levels, retaining walls will be needed to prevent the inevitable collapse of unrestrained banks. Retaining walls are built with a double skin. To allow for draining, un-mortared vertical joints should be left at 1m intervals along the foot of the wall, or alternatively pipes can be set through the wall. The area immediately behind the wall should be back-filled with free-draining material such as hardcore or crushed stone, then the soil. Water must not be allowed to build up behind the wall. It is important that the rear face of the wall, in contact with the

retained material is protected with some form of dpc material between the wall and the retained material, or by applying a suitable damp proof coating to the wall.

Inclement Weather

Installation should be discontinued (and any open work face covered) if weather conditions are such that the performance of the paving may be jeopardised. Laying operations should not be undertaken when the temperature is below 3°C on a falling thermometer and 1°C on a rising thermometer. All unfinished areas and stockpiles of materials should be covered in the advent of inclement weather to prevent saturation.

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