

### Application of Conbextra Cementitious Grouts

#### Installing Conbextra Grouts

The following information is provided as a guide to typical grouting of machine bases. If any doubt exists on site regarding the product or process being used it is important that consultation with all parties involved takes place and then proceed with an agreed plan.

#### Preparation of the foundation

The concrete foundation or plinth on to which we are grouting our machine or similar will generally have been cast weeks before the grouting is to take place. A minimum 28 days (4 weeks) curing should be allowed unless special concrete mixes are being used.

Remove the laitance layer from the surface of the cured concrete. This is a weak layer which could affect the bond strength to the foundation. It is critical that the laitance layer is removed without damaging the concrete below. The end result should be a surface showing around 50% clean aggregate with no dust or loose material evident.

Scabblers and Chipping guns are very effective methods of preparation. When using the correct multi-point heads, these machines produce a sufficiently low impact force which will not disrupt the aggregate in the concrete but easily removes the cement matrix. Small hand units are available and larger units for larger areas.

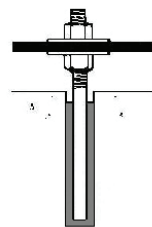
Captive Blast machines are very effective for preparing large areas. These machines are adjustable to meet most concrete strength and depth of removal required.

#### Machine / Baseplate Installation

The baseplate will first be positioned and levelled to the required height leaving a gap to be grouted. Following are several leveling methods commonly used on site.

**Threaded bolt with 2 nuts** - this is a common way to level small baseplates in non-critical applications. The lower nut under the baseplate can be adjusted up or down to suit and the top not is tightened to “sandwich” the baseplate into position. This method is not recommended as after grouting, the weight of the machine is still resting mostly on the lower nut and the threaded bolt; post-tensioning is impossible (tightening the top not just squashes the baseplate without tensioning it down)

#### Double nuts



**Metal shim plates** - a common process used to level large equipment. The machine is lifted and thin metal shims are placed under the baseplate on to the concrete foundation and the machine lowered on to the shims however unless the shims are removed after grouting, they will (like the bolt and 2 nuts) bear most of the weight; post tensioning is not possible unless the shims are removed.

**Levelling Screws (Bolts)** - the best method. Threaded holes are made through the baseplate; bolts are threaded into these holes from the top and the tip of the bolt rests on metal pads positioned on the foundation. The bolts are turned up or down to achieve the correct level of the machine; the grout installed and when hard enough the bolts can be backed out of the threaded holes leaving only the grout to support the weight of the machine. One of the things to make this process a success is to isolate the thread of the leveling bolts from adhering to the grout (especially resin grouts) - this can be achieved with petrolatum tape or rubber tubing around the bolt.



Typical levelling screw arrangement

#### Anchor bolts

It is common practice for anchor bolt / holding down bolts to be grouted into preformed pockets as part of the grouting process. Epoxy resin based grouts or specialist anchoring products are best for this as they have greater bond strength and tensile strength than typical cement based grouts. It is important that the filling of the anchor pockets is done as a separate process to the general grout application to ensure the anchor pockets are filled without entrapping air.

If cement based grouts are being used for anchoring then the anchor pocket must be pre-soaked with water for at least 2 hours (preferably 24 hours) and the water vacuumed out just prior to the grout being placed. The anchor holes must also be undercut (tapered) or rough sided to provide mechanical resistance to pulling out. This is also the case when using polyester resin based anchoring systems which have limited bond strength and are prone to shrinkage.

Depending on the particular application and engineering requirements, there may be a requirement for the anchor bolts to be isolated from the grout and even from part length of the anchor material to allow for free stretch in the bolt when tensioned at the end of the installation. This can be achieved using foam pipe insulation or petrolatum wrapping tape or similar. Refer to the relevant design requirement on site.

### Formwork

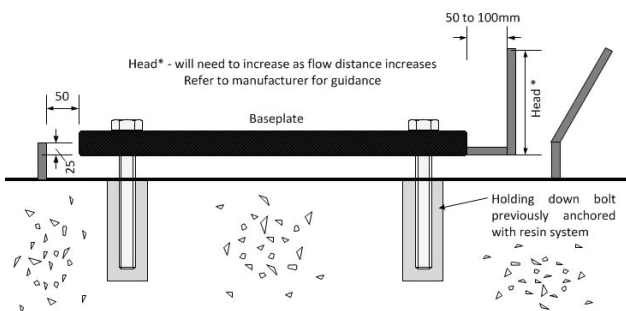
The method of installation (placement) will determine the extent and type of formwork required. Small baseplates which are being grouted using a “dry pack” method will only require basic formwork to be erected on the 2 back edges to provide a “stop” to pack the grout in against and then work forward. Trowel applied grouts will be similar to dry pack and both of these types of applications will typically be done using a suitable cement based grout.

Flowable and fluid applications require much more complex formwork to achieve the desired result. The grout should be flowed in a single pass from one side of the baseplate to the other – ideally across the smaller dimension. The most common arrangement is a header box on one side into which the grout will be poured, lateral formwork against the baseplate to direct the flow and maintain the head of pressure and the exit form which allows the progress of the grout to be monitored. For large pours it may be necessary to construct a moveable header box which can be moved along the length of the pour or have several header boxes and simultaneously pour the grout in. NEVER attempt to pour grout from more than one side unless the pour has been well planned with air relief holes positioned in the baseplate.

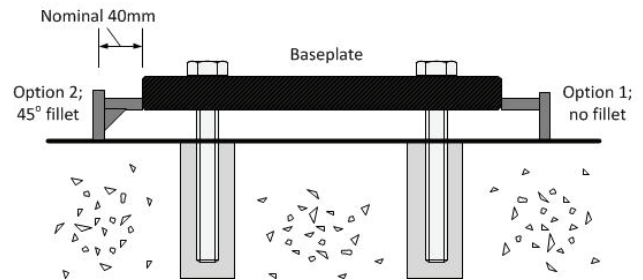
**Formwork materials** – it is important that once the installed grout has set that any formwork can be easily removed without damaging the grout. This is particularly the case with cement based grouts which will often be “stripped” before the grout has achieved significant strength. Good quality new form-ply can generally be used for cement based grouts without the need for form release agents however if the grout is found to be sticking to the formwork a thin application of a quality form release should limit this – be careful not to allow form release agent to contaminate the prepared concrete foundation.

When it does come time to remove the formwork use a gentle tapping action to protect the fresh grout which may still be relatively weak.

The following drawings are examples of formwork set ups when installing flowable / fluid grouts. There may be variations of these required on site depending on the actual configuration and shape of the situation but the basic principle remains to flow the grout via a header box on one side, under the baseplate in one flow to the opposite side.



Typical grout formwork set up



Typical lateral formwork arrangement

### Pre-soak the substrate

One step in process of installing cement based grouts which is often overlooked is pre-soaking the concrete foundation before applying cement based grout. This simple thing can have a dramatic effect on the outcome. This only applies to cement based grouts – do NOT pre-soak when using resin based grouts.

Once the formwork is in place and any sealant applied had cured sufficiently the formwork should be filled with clean potable water for a minimum of 2 hours, preferably 24 hours before the grout is applied. This has three benefits; minimises moisture loss into a dry concrete foundation during the initial setting of the grout; increases flow properties – pouring a flowable or fluid cement based grout on to a dry concrete foundation will result in greatly reduced flow of the grout; increases bond strength to the concrete foundation.

During construction of the formwork, incorporate sealable outlets for the pre-soaking water to be drained out.

### Mixing

Correct mixing of the grout is critical to the success of the total job. Sufficient man power and suitable equipment is essential.

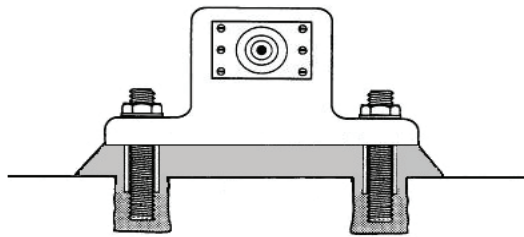
**Temperature considerations** - All grouts should be stored (pre-conditioned) at suitable temperatures – typically above 10°C and below 30°C; ideal conditions are at 23°C. This not only protects the shelf life of the product but also improves the mixing and placement properties of the products. In hot regions, chilled water should be used in cement based grouts to help lower mixing temperatures; products should be kept in shaded areas to lower mix temperatures.

The water:cement ratio in cement based grout is critical to the strength achieved and to the consistency required for the application. Water must be of drinkable quality (potable) and must be accurately measured in line with the product data sheet – never exceed the recommended maximum water addition. The water should always be poured into the mixing vessel first then the grout powder added while mixing progresses. Mixing time should be monitored with a stopwatch / clock to ensure sufficient time for the additives to begin working to produce the required final product – generally in the range of 3 to 5 minutes once all the powder has been added.

**Mixing equipment** - Various mixing equipment is available for cement based grouts from simple 20 litre bucket and hand held mixers to complex high volume mixing machines with built in pumps for large projects. The important thing is that the mixer can shear the grout powder and water for around 3 minutes (refer to specific product data sheet) to produce a thoroughly mixed product before it is pumped. Free-fall type “concrete mixers” are generally not suitable and should not be used. BEWARE: some “grout pumps” are only suitable for cement slurry grouts containing no aggregate – these machines will generally not be suitable for Conbextra cementitious grouts. Mixing by hand is also not acceptable except for cement based “dry-pack” consistency applications. Parchem can provide advice on suppliers of suitable mixing equipment.

### Placement

Place cement based grout in small volumes by mixing the product to a trowellable consistency, push the product into place under the baseplate and finish the edges generally at a 45° slope from the bottom of the baseplates out onto the foundation as shown in the image below;



The grout should not extend up past the bottom of the baseplate in case the steel baseplate expands with heat in which case the grout at the sides will crack away. Finishing at a 45° angle help shed water away from the baseplate as well as improving the appearance of the finished installation and reducing sharp edges which may be prone to damage.

Similarly when using a “dry-pack” cement based grout, the grout is mixed at a very low water ratio and the product is then rammed into place using a piece of wood and a hammer or a “Kango” fitted with a rammer head.

### Important notice

A Safety Data Sheets (SDS) and Technical Data Sheets (TDS) are available from the Fosroc website. Read the SDS and TDS carefully prior to use as application or performance data may change from time to time. In emergency, contact any Poisons Information Centre (phone 13 11 26 within Australia) or a doctor for advice.

### Product disclaimer

This Application Guide summarises our best knowledge of the product, including how to use and apply the product based on the information available at the time. You should read all literature carefully and consider the information in the context of how the product will be used, including in conjunction with any other product and the type of surfaces to, and the manner in which, the product will be applied. Our responsibility for products sold is subject to our standard terms and conditions of sale. Parchem does not accept any liability either directly or indirectly for any losses suffered in connection with the use or application of the product whether or not in accordance with any advice, specification, recommendation or information given by it.

Larger baseplates should be grouted by forming up the area and pouring or pumping the grout into place. When flowing a grout under a baseplate it should be done in one continuous pour action, from one side only, until the grout emerges from under the baseplate on the opposite side. This helps ensure any air or residual pre-soak water is expelled and there should be complete contact of the grout and the entire underside of the baseplate. During this process it is acceptable to gently “rod” the grout or use flexible strapping to help the flow however with cement based grouts this should be kept to a minimum as excessive vibration of the mix could result in water segregating from the grout which will accumulate under the baseplate and severely affect the effective bearing area. Vibrators should never be used.

Pumping grouts through injection ports in a baseplate is possible providing it is well planned to ensure air pockets are not created. Pumping grout under baseplates horizontally is also acceptable; the hose should be inserted to the farthest point under the baseplate and slowly withdrawn as the grout is pumped in. This can also be a useful procedure to complete a failed grout pour where the initial grout pour has failed to reach to opposite side for some reason.

### Curing and protection

**Cement based grouts** – as with any cementitious product it is important to protect the freshly installed grout from excessive loss of moisture which could lead to shrinkage and loss of strength. Maintaining the moisture content is particularly important for the first 7 days while the cementitious grout cures. This is best achieved with the application of a good quality curing compound or by keeping the surface damp with wet hessian after the grout has achieved final set. The baseplate along with the grout should also be protected as much as possible from extremes in weather – both hot and cold. Large volume pour of cement based grouts can generate significant heat from hydration – insulation from sudden cold temperature should be considered.