Technical Bulletin 410

Grout Formwork

Formwork shall be constructed of rigid nonabsorbent materials, securely anchored, watertight, and strong enough to resist forces developed during grout placement.

Formwork Best Practices

- *Forms are strong and rigidly constructed.*
- *Grout shoulder widths are minimized.*
- *Formwork is caulked and verified to be leak free.*
- *Chamfering (chamfer strips) is incorporated into formwork to eliminate 90° angles.*
- *Grout contact surfaces are generously coated with bond-breaking materials*

BEST PRACTICE FORMWORK

Plywood products classified as BB are commonly used for constructing forms due to their smoothness. A non-sanded plywood surface can be rough and offer more of an opportunity for the grout to adhere to it. The smoother the surface that is in contact with the grout the better the surface will appear when the forms are removed. Regardless of the material used, it is still required to add a bond-breaker material to the formwork. Consideration should be given to coating not only the interior but the exterior of the formwork and bracing.

Bond-breaker materials such as grease, polyethylene film, or paste wax can be used. Any solid grease (not in spray form) is an excellent bond break material and does not dry out the way paste waxes can. Polyethylene film (visqueen plastic sheeting) can be used but there is always the risk that the sheeting may tear or pull away particularly on deeper grout pours. When paste wax is used a minimum of three coats is required.
CAUTION: Care should be taken not to contaminate grouting surfaces with bond breaking materials where bond is required.

The formwork should be caulked 24-hours prior to grouting to make it leak free. Consideration should be given to testing for watertightness (i.e., flooding the formed area) prior to installing the grout. Forms should not contain any standing water prior to installing the grout.

Forms should be level and extend 1 inch (25 mm) above the bottom of the equipment/baseplate. When determining how to construct the forms, consideration should be given for how the grout will be poured or pumped into the forms as well as how air will vent out of the forms as grout flows and displaces the air. Forms should be kept tight to the equipment or plate being grouted. Five Star recommends that 90° angles be avoided wherever possible; sharp angles cause stress concentrations in the grout thereby increasing the probability of crack development.

Five Star recommends that the volume of grout required be confirmed after the forms have been constructed. It is not unusual for the actual width of the grout shoulders as well as the depth of the grout to differ than what was estimated when the grout was purchased. Starting an installation and not having enough grout to complete the installation creates major issues and should be avoided.

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Grout Formwork

Grout Shoulders

Constructing forms to allow for grout shoulders (unconfined grout around the outside of a piece of equipment or baseplate) is the most common way to build formwork.

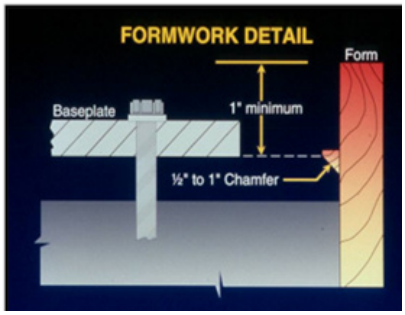
GROUT FORMWORK SHOULD FOLLOW THE SHAPE OF THE EQUIPMENT. THIS COMPLICATES THE FORM CONSTRUCTION BUT AVOIDS THE ISSUES THAT RESULT FROM LARGE GROUT SHOULDERS (CRACKING, EDGE LIFTING, ETC.)

The primary reason for having grout shoulders is to provide a space from which the grout can be installed and so that the air can be vented. It is also useful to have a space on the opposite side (from grout introduction) where it can be confirmed that the grout has traveled completely under the baseplate. Formwork is also easier to construct if grout shoulders are incorporated.

Large grout shoulders and areas of unconfined grout near the edges of a foundation create problems and should be avoided wherever possible. The general recommendation is to not make the width of the grout shoulder wider than the grout depth. Grout shoulders wider than the grout depth do not perform any function in transferring the load. If a grout shoulder must be wider than the grout depth to address installation issues, the grout shoulder should be typically limited to a maximum width of three inches. For additional information on acceptable grout shoulder configurations refer to Five Star® Technical Bulletin 411 – *Grout Shoulder Configurations.*

Edge Chamfering

Forming chamfered edges or adding chamfer strips to formwork to break any sharp angles is a common practice when constructing forms.



SECTION VIEW OF FORMWORK SHOWING SUFFICIENT FORM HEIGHT AND CORRECT USE OF CHAMFER STRIPS. THE GROUT SHOULDER WIDTH IS ASSUMED TO BE KEPT TO A MINIMUM.

For cementitious grouts chamfering edges may be accomplished by removing the forms and cutting back stiffened grout once it has set sufficiently to be shaped.

For epoxy grouts any shaping of the grout must be incorporated into the formwork because there is not sufficient time between the initial set and the time in which the epoxy can no longer be worked to shape the grout.

Five Star recommends that chamfering or chamfer strips be part of the formwork for all grout installations. This allows the forms to be left in place for 24 hours after the grout is installed. Leaving the forms in place ensures that the grout is fully set before removing the forms and minimizes the area of cementitious grout that must be wet cured.

For additional information, contact your Five Star® Technical Sales Representative

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