



UPSTATE NEW YORK MCAA CHAPTER

Upstate NY MCAA Installation Bulletin #3

Grout Cleanouts – When and Where

Upstate NY MCAA's Installation Bulletins are meant to be brief reminders on various aspects of masonry construction. They aren't intended to be a complete discussion of the topic. At the end of each Installation Bulletin are references that you can follow up for a broader understanding.

What are grout cleanouts?

Grout cleanouts are openings left in a reinforced masonry wall (Figure 1) and can serve multiple purposes.

1. They facilitate removing debris and mortar droppings in a reinforced cell which would otherwise impede the flow of masonry grout.
2. Once any accumulated debris and droppings are removed, the cells can be inspected before the placement of the masonry grout in the wall.
3. The cleanouts may also be used as access points to ensure that the bottom of the vertical rebar is correctly secured and positioned.



Figure 1 – Grout cleanout

When should the Masonry Contractor utilize grout cleanouts?

That normally depends upon the grouting method the masonry contractor employs. There are two types of grouting techniques a masonry contractor can utilize – “Low Lift” and “High Lift” Grouting. Grout cleanouts are mandatory for “High-Lift Grouting” and not required for “Low-Lift Grouting”. Figure 2 graphically shows the difference between the two methods. High-Lift grouting also has an alternative method that is not discussed here but can be used with specific limitations.

Grout Space Requirements

Grout is placed in increments that are lift heights. The total of all lifts in an operation is a pour. The maximum lift height is 5'-4" for typical masonry grout. Pour heights are determined based upon the grout type (Fine or Coarse) and the grout space available (open area of the cell to be grouted) as shown in Table 6 is taken from TMS 602, *Specifications for Masonry Structures*. These specifications are referenced in the NYS Building Code and masons are expected to adhere to them.

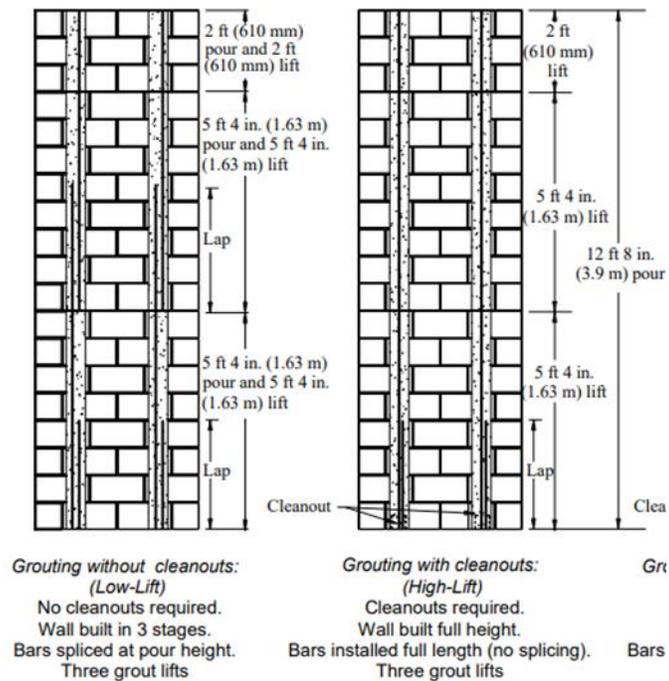


Figure 2: Source: NCMA FAQ 06-14

Table 6 — Grout space requirements

Grout type ¹	Maximum grout pour height, ft (m)	Minimum clear width of grout space, ^{2,3} in. (mm)	Minimum clear grout space dimensions for grouting cells of hollow units, ^{3,4} in. x in. (mm x mm)
Fine	1 (0.30)	³ / ₄ (19.1)	1 ¹ / ₂ x 2 (38.1 x 50.8)
Fine	5.33 (1.63)	2 (50.8)	2 x 3 (50.8 x 76.2)
Fine	12.67 (3.86)	2 ¹ / ₂ (63.5)	2 ¹ / ₂ x 3 (63.5 x 76.2)
Fine	24 (7.32)	3 (76.2)	3 x 3 (76.2 x 76.2)
Coarse	1 (0.30)	1 ¹ / ₂ (38.1)	1 ¹ / ₂ x 3 (38.1 x 76.2)
Coarse	5.33 (1.63)	2 (50.8)	2 ¹ / ₂ x 3 (63.5 x 76.2)
Coarse	12.67 (3.86)	2 ¹ / ₂ (63.5)	3 x 3 (76.2 x 76.2)
Coarse	24 (7.32)	3 (76.2)	3 x 4 (76.2 x 102)

¹ Fine and coarse grouts are defined in ASTM C476.

² For grouting between masonry wythes.

³ Minimum clear width of grout space and minimum clear grout space dimension are the net dimension of the space determined by subtracting masonry protrusions and the diameters of horizontal bars from the as-built cross section of the grout space. Select the grout type and maximum grout pour height based on the minimum clear space.

⁴ Minimum grout space dimension for AAC masonry units shall be 3 in. (76.2 mm) x 3 in. (76.2 mm) or a 3 in. (76.2 mm) diameter cell.

Table 6 – Grout Space Requirements
(Courtesy of The Masonry Society)

Low-Lift Grouting

Cleanout holes for “Low-Lift” grouting are not required and are typically not used. However, to avoid cleanouts, the mason must adhere to the rules that include:

- The masonry wall is constructed in increments where the lift height is also the pour height (see Figure 1). Therefore, for low-lift grouting, the maximum pour height is 5’-4”. If there are intermediate bond beams, the pour height is reduced to the bond beam spacing.
- The reinforcing bars are placed within the vertical cores at the required spacing, and/or in any bond beams if indicated on the drawings. The vertical rebars should extend above the top of the grout pour to provide the required specified lap.
- The cells are then filled with masonry grout and consolidated. If the pour is over 12 inches high, consolidation requires mechanical vibration. The grout should be held down about 1-1/2 inches from the top to form a grout key (Figure 3) so subsequent pours will interlock with this pour. **Note:** beams and lintels don’t require a grout key.
- After consolidation is completed and the grout has settled and experience water loss, the grout must be reconsolidated.
- That’s it for the the pour. Allow the grout to set sufficiently to support additional construction, and then proceed on to construct the subsequent pour/lift height. This process continues until the wall is topped out.

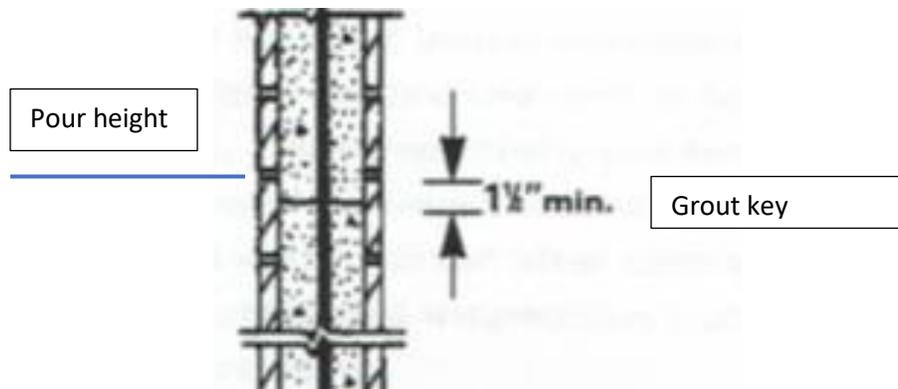


Figure 3 – Grout key

High-Lift Grouting

Grout Cleanouts must be used with “High-Lift” grouting techniques.

The “high-lift” grouting method differs from “low-lift” grouting in that multiple lifts can be performed in a day up to the pour height. Lift heights are again limited to 5’-4”, but the overall pour height is governed by Table 6. Dependent upon the grout space size, pour heights could be up to 24 feet.

High-lift grouting:

- allows the masonry contractor to lay the wall units without the obstruction of vertical reinforcing impeding production. Walls can be built without “fighting” vertical rebar already installed, nor having the need to use special CMU units such as “A” Block, or “H” Block to navigate around previously placed rebar.
- can result in faster and more efficient construction, and increased productivity in grouting may be achieved. This has the potential to make masonry walls more efficient and less costly.
- reduces the number of required laps of the rebar, as a single vertical bar length can be used within the reinforced cell, minimizing lap splices. However, bar positioners should be used to maintain the bars in position during grouting.



Photo: Courtesy of Spec-Mix

High-Lift grouting sequence

- The wall is first constructed to the desired pour height.
- Cleanout holes are installed at the base of the wall and mortar droppings and debris is removed from the cells to be grouted. **Note:** High-Lift Grouting can be utilized for both partially grouted walls and fully grouted walls.
- The vertical rebar can then be placed in appropriate cells, properly positioned at the bottom, the wall inspected, and released for grouting.
- The cleanout holes are then closed off, and the placement of masonry grout can proceed.
- The contractor can place the grout in lifts of 5'-4 or to the next bond beam (whichever is less). Again, remember to key the grout at the top of the pour.
- The grout is then consolidated and reconsolidated as required. NCMA recommends waiting 3-10 minutes after consolidating to reconsolidate.
- That's it for the pour. Allow the grout to set sufficiently to support additional construction, and then proceed on to construct the subsequent pour/lift height. This process continues until the wall is topped out. **Note:** Subsequent cleanouts must be installed at the base of the next pour or the top of the previous pour (see Figure 4).



Figure 4 – Grout cleanouts in the second pour

Grout Cleanouts

- The minimum dimensions of a proper cleanout hole should be 3" x 3". Be sure it's large enough to remove any debris
- In partially grouted walls, a cleanout hole is required at each cell that contains rebar. In fully grouted walls, cleanouts are not required at the base of each cell, but at a maximum of 32" on center (Figure 5).

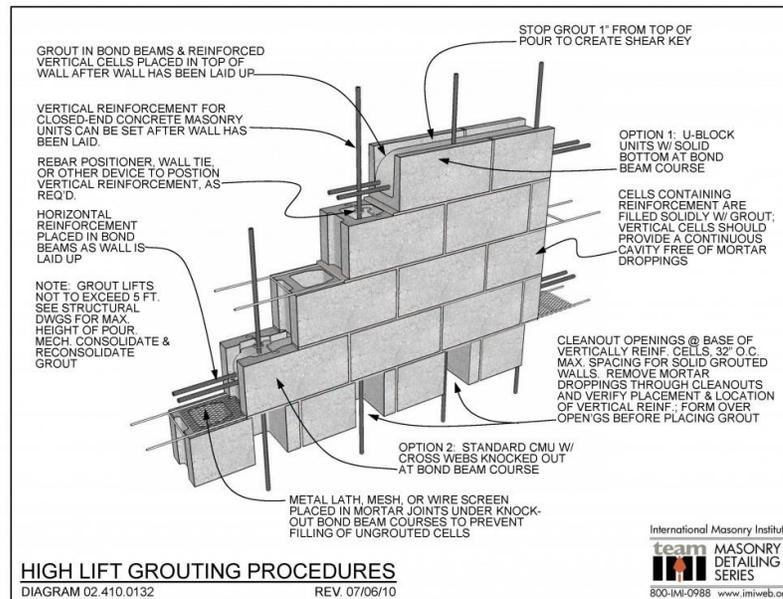


Figure 5– Grout cleanout spacing
Courtesy of International Masonry Institute)

- After cleaning and inspection of the cell, the temporary hole is closed off and braced to prevent blowouts and the flow of liquid grout out of the wall. Once the cleanouts are properly braced, the grouting operation may proceed.

- Cleanout openings can be closed off with face shells of CMU and formwork (Figure 6), or commercially available acrylic inspection ports that are reusable (Figure 7). For exposed wall applications, NCMA suggests the entire face shell be removed and then reinstalled to better hide the clean out opening.

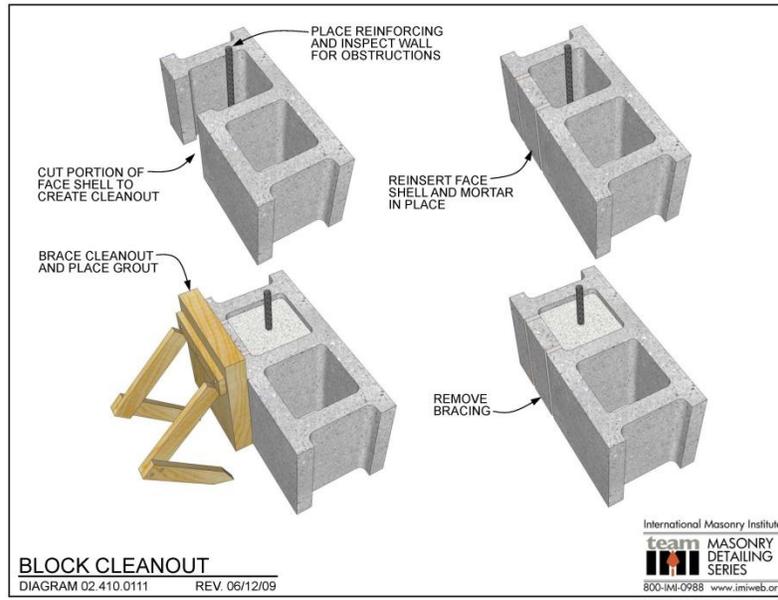


Figure 6 – Grout window
 (Courtesy of International Masonry Institute)

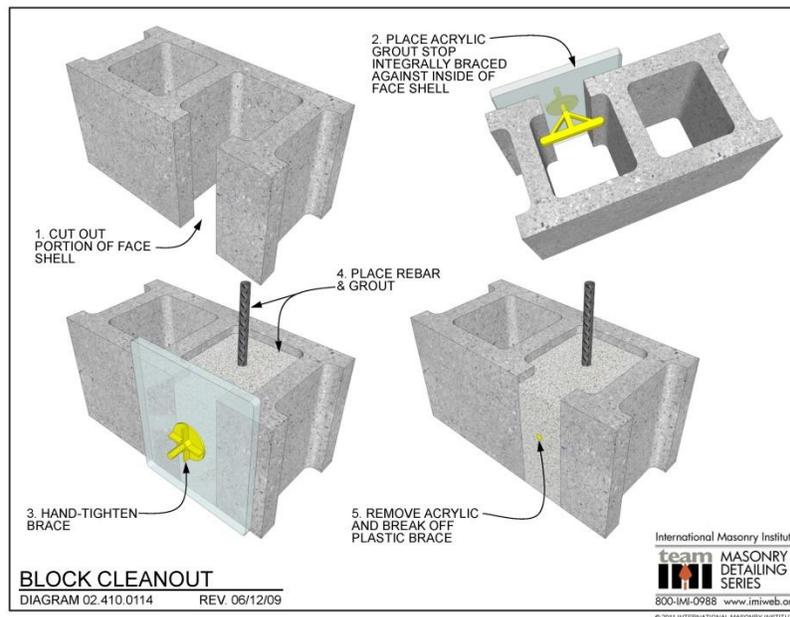


Figure 7 – Grout window
(Courtesy of International Masonry Institute)

Summary:

1. Grout cleanouts are only required for high-lift grouting at the bottom of each pour.
 2. Cleanouts are useful for inspection purposes as well.
 3. Each grout pour, for low-lift and high-lift grouting, should have a grout key to interlock with a subsequent pour. Grout keys are not required at bond beams and lintels.
 4. For partially-grouted walls, cleanouts should be located at each vertical bar.
For fully-grouted walls, cleanouts are not required at each bar but can be spaced 32 inches on center.
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For a better understanding of High-Lift Grouting in masonry construction and the use of grout cleanouts, please refer to the following technical resources:

Google Upstate New York MCAA and click into the “Education” section at the top of the page. “Above Grade – Code Based Masonry Training” and “Mortar for Masonry”
TMS 602, Specifications for Masonry Structures, The Masonry Society

The following National Concrete Masonry Association TEK Notes can be accessed through NCMA’s resource center: <https://ncma.org/resources/tek-solutions-center/>
Click on TEK Notes.

TEK 03-02A: Grouting Concrete Masonry Walls

TEK 03-08A: Concrete Masonry Construction

FAQ 06-14: High-Lift Versus Low-Lift Grouting, Which is the Better Option,
<https://ncma.org/resource/faq-06-14/>