

TMS 602 SPECIFICATION

3.5 D. Grout lift height

1. For grout conforming to Article 2.2 A:
 - a. Where the following conditions are met, place grout in lifts not exceeding 12 ft 8 in. (3.86 m).
 - i. The masonry has cured for at least 4 hours.
 - ii. The grout slump is maintained between 10 and 11 in. (254 and 279 mm).
 - iii. No intermediate reinforced bond beams are placed between the top and the bottom of the pour height.
 - b. When the conditions of Articles 3.5 D.1.a.i and 3.5 D.1.a.ii are met but there are intermediate bond beams within the grout pour, limit the grout lift height to the bottom of the lowest bond beam that is more than 5 ft 4 in. (1.63 m) above the bottom of the lift, but do not exceed a grout lift height of 12 ft 8 in. (3.86 m).
 - c. When the conditions of Article 3.5 D.1.a.i or Article 3.5 D.1.a.ii are not met, place grout in lifts not exceeding 5 ft 4 in. (1.63 m).
2. For self-consolidating grout conforming to Article 2.2:
 - a. When placed in masonry that has cured for at least 4 hours, place in lifts not exceeding the grout pour height.
 - b. When placed in masonry that has not cured for at least 4 hours, place in lifts not exceeding 5 ft 4 in. (1.63 m) or the grout pour height, whichever is less.

3.5 E. Consolidation

1. Consolidate grout at the time of placement.
 - a. Consolidate grout pours 12 in. (305 mm) or less in height by mechanical vibration or by puddling.
 - b. Consolidate pours exceeding 12 in. (305 mm) in height by mechanical vibration, and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
2. Consolidation or reconsolidation is not required for self-consolidating grout.

COMMENTARY

3.5 D. Grout lift height — A lift is the height to which grout is placed into masonry in one continuous operation (see Figure SC-20). After placement of a grout lift, water is absorbed by the masonry units. Following this water loss, a subsequent lift may be placed on top of the still plastic grout.

Grouted construction develops fluid pressure in the grout space. Grout pours composed of several lifts may develop this fluid pressure for the full pour height. The faces of hollow units with unbraced ends can break out. Wythes may separate. The wire ties between wythes may not be sufficient to prevent this from occurring. Higher lifts may be used with self-consolidating grout because its fluidity and its lower initial water-cement ratio result in reduced potential for fluid pressure problems.

The 4-hour time period is stipulated for grout lifts over 5 ft 4 in. (1.63 m) to provide sufficient curing time to minimize potential displacement of units during the consolidation and reconsolidation process. The 4 hours is based on typical curing conditions and may be increased based on local climatic conditions at the time of construction. For example, during cold weather construction, consider increasing the 4-hour curing period. When a wall is to be grouted with self-consolidating grout, the grout lift height is not restricted by intermediate, reinforced bond beam locations because self-consolidating grout easily flows around reinforcing bars (NCMA (2006); NCMA (2007)).

3.5 E. Consolidation — Except for self-consolidating grout, consolidation is necessary to achieve complete filling of the grout space. Reconsolidation returns the grout to a plastic state and eliminates the voids resulting from the water loss from the grout by the masonry units. It is possible to have a height loss of 8 in. (203 mm) in 8 ft (2.44 m).

Consolidation and reconsolidation are normally achieved with a mechanical vibrator. A low velocity vibrator with a $\frac{3}{4}$ in. (19.1 mm) head is used. The vibrator is activated for one to two seconds in each grouted cell of hollow unit masonry. When double open-end units are used, one cell is considered to be formed by the two open ends placed together. When grouting between wythes, the vibrator is placed in the grout at points spaced 12 to 16 in. (305 to 406 mm) apart. Excess vibration does not improve consolidation and may blow out the face shells of hollow units or separate the wythes when grouting between wythes.