

Technical Memorandum

Subject: Concrete Strength for Precast Modular Wall Units

Technical Information:

Stone Strong requires that all precast modular wall units have a minimum compressive strength of 4,000 psi (28 mPa) at the time of delivery. Concrete mixes with much higher strength are typically used in order to provide sufficient strength at the time of stripping the unit from the form. Sufficient strength is necessary for safety when the block is lifted from the form and to prevent damage to the unit during handling, especially in the tipping procedure and when transporting over rough surfaces in storage yards.

For unreinforced units, Stone Strong generally recommends that the concrete achieves a compressive strength of 2,000 psi (14 mPa) before stripping from the form and handling. Blocks may be stripped from the form at a compressive strength of 1,500 psi (10 mPa). However, these units will be prone to damage after stripping, and handling of these units should be minimized until compressive strengths approach 2,000 psi (14 mPa).

For reinforced units, a minimum compressive strength of 1,500 psi (10 mPa) is recommended before stripping units from the form and handling the units.

Note that manufacturing of precast concrete components can be impacted by cold weather depending on how a precast plant is set up. Many precast plants in colder climates are set up with winter production in mind, including placing aggregate storage bins in climate-controlled buildings and providing heated, enclosed spaces for casting and curing. However, not all precast plants have sufficient space for all production to occur indoors, and some precast plants in cold climates store some or all of their aggregate in exposed bins. In moderate climates, production may occur outdoors, and thus may be exposed to periodic cold weather.

Cold conditions present various challenges to precast production. Cold aggregate and cold water will combine to create cold concrete, which delays set and strength gain. In cold conditions, it is important to verify that the concrete has reached the required compressive strength before the blocks are removed from the form or handled. Stripping green concrete can result in cracks or other damage to the units.

In the event that cracks develop (including shrinkage cracks), the units may still be sound and suitable for placement in a retaining wall. The guidelines of ASTM C1776 may be used to judge acceptability of units with cracks. Cracks that extend fully through any solid element of the unit are cause for rejection. Cracks that are otherwise less than 0.012 inches (0.3 mm) wide and not longer than 25% of the nominal height of the unit are acceptable.