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HOT WEATHER SETTING PRACTICES FOR ARCHITECTURAL PRECAST CONCRETE (APC)

Hot weather conditions present unique challenges in the installation of Architectural Precast Concrete (APC), particularly for mortar performance and the bond between APC units. Elevated temperatures, defined as exceeding 90°F (32°C), accelerate hydration and moisture loss, leading to reduced bond strength, increased cracking, and compromised structural integrity. This bulletin provides detailed guidance on mitigating the adverse effects of hot weather during APC installation, incorporating recommendations from ASTM standards, PCI guidelines, and industry best practices.

CHALLENGES IN HOT WEATHER MASONRY CONSTRUCTION

1. **Accelerated Moisture Loss:**
   - High ambient temperatures increase water evaporation from mortar, hindering proper hydration and reducing strength.
   - Shortened mortar board life complicates placement and finishing processes.
2. **Reduced Workability:**
   - Rapid loss of moisture affects mortar consistency, making it difficult to achieve even application.
3. **Decreased Bond Strength:**
   - Heated APC units absorb more water from mortar, weakening the bond between units.
4. **Increased Risk of Cracking:**
   - Uneven curing and rapid drying lead to shrinkage cracks, compromising the visual and structural integrity of APC assemblies.

BEST PRACTICES FOR HOT WEATHER CONSTRUCTION

Material Preparation and Handling

1. **Cooling Materials:**
   - Store sand and other mortar components in shaded areas.
   - Use cool water or ice in mixing water; ensure ice is fully melted before combining with other ingredients.
2. **Mixing Mortar:**
   - Prepare smaller batches of mortar to minimize exposure to heat.
   - Add hydration stabilizers or retarders compliant with ASTM C1384 to extend workability.

Application Techniques

1. **Limit Mortar Spread:**
   - Spread mortar no more than 4 feet ahead of placing APC, especially when temperatures exceed 90°F (32°C).
2. **Prompt Placement:**
   - Install APC units within one minute of spreading mortar to prevent premature setting.
3. **Pre-Wetting APC:**
   - Lightly moisten APC units to reduce absorption rates. Avoid over-wetting, which can lead to mortar shrinkage.

Environmental Controls

1. **Wind and Humidity Management:**
   - Use windbreaks or fogging systems to reduce moisture evaporation in low humidity or windy conditions.
2. **Shading and Scheduling:**
   - Provide shade for work areas and schedule installations during cooler parts of the day, such as early morning or late afternoon.

POST-PLACEMENT CARE

1. **Fog Spraying:**
   Mist installed masonry three times daily to maintain curing moisture and reduce shrinkage cracks.
2. **Protective Covering:**
   Cover APC assemblies with plastic sheeting or damp burlap at the end of each workday to control moisture loss.
3. **Curing:**
   Protect installations from direct sun and excessive wind exposure to ensure uniform curing and optimal strength development.

TECHNICAL RECOMMENDATIONS

- Monitor the temperature of mortar during mixing and application to stay within acceptable ranges specified by ASTM C270 and ACI 530.1.
- Use admixtures cautiously, verifying compatibility with project specifications and environmental conditions.
- Evaluate the site for exposure risks such as wind and direct sunlight, and implement mitigating strategies as necessary.

CORINTHIAN ARCHITECTURAL PRECAST SUPPORT

Corinthian Cast Stone Inc. maintains rigorous quality standards for APC manufacturing and installation, providing tailored guidance to address challenges in hot weather construction.

For additional assistance with product specification, installation practices, or maintenance strategies, contact our technical services department at **631-920-2340 or info@corinthian-usa.com.**

REFERENCES

This bulletin is informed by the following standards and resources:

- **ASTM C1364: Specifications for APC manufacturing, including strength and absorption criteria**
- **ACI 530.1: Guidelines for mortar temperature management during hot weather masonry construction**
- **TMS 404-504-604 Standards: Design and installation recommendations for APC**
- **Cast Stone Institute® Technical Bulletins: #37 (Handling Practices) and #48 (Hot Weather Setting Practices)**

This Technical Bulletin reflects industry-accepted best practices and is intended as a guide only. Specific project requirements should be determined by design professionals based on actual conditions and intended use.
For further information, visit www.corinthian-usa.com.

115 Wyandanch Avenue
Wyandanch, NY 11798

(631) 920-2340

www.CorinthianCastStone.com

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