SUMMARY OF CHANGES

UPDATES FOR THE 20TH EDITION NPCA QC MANUAL QCM-001

During the 2026 NPCA Committee Week, the NPCA QA/QC Committee discussed updates to the NPCA Quality Control Manual for Precast Concrete Plants in a number of sections.

The format for notifying members and certified plants of these changes will be via the NPCA Certification Express or Precast Express email blast tool. Members and certified plants will be notified of changes in multiple emails distributed to the designated primary contact and liaison to the auditor. A letter outlining changes will not be mailed to the liaison to the auditor for each certified plant location this year.

The 20th edition of the Quality Control Manual will include several editorial updates that are not itemized within this summary. Please see the tracked changes or "redline" version of the full manual for editorial changes indicated in red highlighted text. Members will have the opportunity to review and comment on the changes during a 60-day comment period from Nov. 16, 2026, to Jan. 15, 2027.

Below are the significant changes discussed during committee week with new language in RED.

TABLE OF CONTENTS

With the addition of text, several page references have been updated. (See redline version of full manual for specific sections)

FOREWORD

Updated effective dates of the manual and the members of the QAQC Committee for the 2026 -2027 program year.

NPCA Quality Assurance/Quality Control Committee Members (2026 - 2027):

- Tim Sander, Gainey's Concrete Products Inc. (Chairman)
- Drew Wieser, Wieser Concrete Products Inc. (Board Liaison)
- Kelby Alvarez, DZ Precast Solutions
- Stephen Bacho, Rotondo Environmental Solutions
- Melissa Camarillo, Del Zotto Products of Texas
- Joshua Charnosky, Pennsylvania Department of Transportation
- Jason Civils, North Carolina Department of Transportation
- Chris Coronado, Locke Solutions

- Scott Crumpler, Concrete Pipe & Precast
- Billy Haas, Sika Corporation
- Matthew Haggenjos, Voller Mixers
- Matthew Hamlin, Oldcastle Infrastructure
- Stephen Headley, County Materials Corporation
- Stephen Henne, Norwalk Precast Industries
- Alexander Hows, Haarup North America, Inc.
- Steven Jensen, AmeriTex Pipe and Products
- Brian Leitman, Champion Precast
- Justin Reason, Tindall Corporation
- Daniel Sawhook, Concrete Sealants Inc.
- Alan Woolard, Alcrete

Chapter One

1.1.2. Updated plant-specific QC manual language to address electronic forms and software programs.
1.1.3. Updated commentary to explain how QC training is graded for audit purposes.
1.1.4. Updated language to clarify Continuous Improvement activities are for each program year and added language to address CI points in the event of a random reaudit.

1.1.2 Plant Specific Quality Control Manual

The plant shall have a plant-specific QC manual that details the production and QC policies and procedures used by the plant. The manual shall be compiled in a format for easy review by plant personnel and by an inspector. At a minimum, the manual shall include the requirements of this manual and the following sections:

1. Management QC policy statement
2. Company QC personnel organizational chart
3. Description of responsibilities for QC personnel
4. Description of training requirements for QC personnel, production staff, forklift operators, and drivers
5. Housekeeping plan
6. Product pre-pour, casting, post-pour, and final inspection procedures
7. Plant curing procedures for all seasons
8. Minimum strength requirements for stripping and shipping product
9. Product repair policy and procedures
10. Product and reinforcing steel dimensional tolerances unless shown on product detail drawings and/or production documentation
11. Form tolerances and maintenance policy
12. Mix design qualification and testing procedures
13. Raw material testing policy and procedures
14. Equipment calibration policy and procedures
15. Product performance test policy and procedures applicable to Chapter 6.

16. Examples of all documentation and forms used by plant to record QC and production processes. Plants shall indicate in their plant-specific QC manual when using electronic forms or quality management software, where the information is stored, and how to access it. It shall be QC personnel's responsibility to provide requested electronic information to the auditor. Additionally, due to company IT security policies, audit firms may be restricted from accessing certain cloud based storage platforms. In these cases, the plant shall provide requested information using the plant's equipment as if the information was stored locally. See Part 3.2 of the Plant Terms and Conditions in this manual for assigned Plant Liaison responsibilities.
17. Documentation of products manufactured under franchise or licensing agreements, including all design specifications and drawings.
18. If the plant participates in Section 1.1.4 Continuous Improvement, then policies and procedures shall be in the plant-specific QC Manual.

1.1.3 Commentary

Additional training and / or certification for concrete testing (SCC for example) should be considered and aligned with project specifications when applicable.

For audit purposes, QC personnel training will be scored as follows:

- *Lead PQS = 2 points*
- *Lead ACI (or equivalent) = 2 points*
- *Backup PQS = 1 point*
- *Backup ACI (or equivalent) = 1 point*

By definition, continuous improvement' is an ongoing effort to improve products, services or processes. Organizations efforts can seek incremental improvement over time or breakthrough improvement all at once.

1.1.4 Continuous Improvement

Plants engaged in continuous improvement activities shall maintain objective evidence of these activities for each program year in the form of documentation, policies and procedures, and / or visual example. In the case of a random reaudit the same program year, continuous improvement points shall be awarded as they were for the original audit that program year.

Chapter Two

2.3.5. Added back section on sealants and pipe-to-structure connectors. Updated commentary.

2.3.5 Joint Sealants and Connectors	*Commentary*
Certificates of Conformance shall be obtained from all suppliers and maintained on file for each type of joint sealant and pipe-to-structure connector used by the plant once annually.	*Joint sealants typically must conform to ASTM C990, and pipe-to-structure connectors typically must conform to*

ASTM C923 or C1478. However, project requirements may specify a sealant or connector not covered by an ASTM or other relevant standard, e.g., potable water compatible sealants. In these cases, manufacturer certification to project specifications should be collected and maintained.

Refer to sections 6.2.6 for pipe joint gasket requirements and 6.3.5. for manhole joint gasket requirements.

CHAPTER FOUR

4.5 Moved language related to monitoring highest internal temperature to the commentary given the ongoing ambiguity on how to apply that across different types of products.

4.5 CURING CONCRETE

Internal concrete temperature monitoring criteria is established to help prevent Delayed Ettringite Formation (DEF). Further guidance is also given in the commentary by including five concrete mix design options that will mitigate for both Alkali Silica Reaction (ASR) and DEF.

4.5.1 General

Effective curing shall begin as soon as possible, prior to the formation of shrinkage cracks, and no longer than 4 hours after casting the precast concrete unit. The concrete shall not exceed 150° F (65° C). If approved measures to prevent DEF are employed concrete temperatures shall not exceed 160° F (71° C).

If concrete is cured with steam or radiant heat, curing procedures must be established and records kept of the temperature of the concrete and environment during the curing period (see 4.5.3).

Commentary

Concrete hardens by the chemical reaction between cement and water, a process called hydration. Hydration continues for years provided moisture is present, but if concrete dries, hydration stops and concrete stops gaining strength. Like most chemical reactions, hydration proceeds faster at warm temperatures than at cooler temperatures. Curing of concrete means providing the proper environment for hydration to occur. Thus, the necessary factors are moisture, time and temperature. Concrete can be cured by covering it with damp burlap, ponding the surface, steam, or by other means of preventing moisture within the concrete from evaporating. Alternate wetting and drying during the first few days after casting is almost as bad as no curing. Ensure proper ventilation and tarping to avoid carbonation.

Research has shown that if concrete temperatures during curing are kept below 160° F problems from DEF can be avoided.

The internal concrete temperature should be monitored in the location(s) of highest internal temperature at least once every three (3) months. The location(s) of highest internal concrete temperature should be determined by testing. Verification testing and monitoring should consider all product sizes, mix designs, and curing conditions when selecting the minimum amount of necessary testing.

When testing for the highest internal concrete temperature location(s) the temperature monitoring device should be located in the hottest section (usually largest mass) of the product. Concrete mix designs that generate the highest internal concrete temperatures such as mixes containing accelerating admixtures, corrosion inhibitors, Type III cement, or heated aggregates should be selected. Product close to any heat source should also be selected.

Mix designs to prevent DEF should include the replacement of cement with a Supplemental Cementitious Material (SCM). The SCM's most commonly used for DEF mitigation include coal ash, slag cement, silica fume, and metakaolin. Mix designs that contain SCM's in the proper replacement percentages inherently have lower peak concrete temperatures, and mitigate DEF, even at concrete temperatures above 158°F.

DEF and ASR mitigating mix design options include but are not limited to:

Option 1. Replace 20% to 45% of the cement with Class F coal ash.

Option 2. Replace 35% to 50% of the cement with slag cement.

Option 3. Replace 35% to 50% of the cement with a combination of Class F coal ash, slag cement, metakaolin, or silica fume; however, no more than 35%

may be coal ash, and no more than 10% may be silica fume.
Option 4. Use Type IP, Type IS, or Type IT cement. Up to 20% of a Type IP, Type IS, or Type IT cement may be replaced with Class F coal ash, slag cement, or silica fume. Use no more than 10% silica fume in the final cementitious material mixture if the Type IT cement contains silica fume, and silica fume is used to replace the cement.
Option 5. Replace 35% to 50% of the cement with a combination of Class C coal ash and at least 6% of silica fume, or metakaolin. However, no more than 35% may be Class C coal ash, and no more than 10% may be silica fume.

Mix design options containing ultra fine coal ash (UFCA) or modified Class F coal ash (MFCA) may be acceptable with proper testing documentation.

Plant Terms and Conditions

Part 4 Added language to update and clarify how scores are calculated for audits. The existing equations were incorrect.

PART 4
GRADING SCHEDULES

4.1 The grading schedules are shown in the section titled "Grading Schedule" in the NPCA Quality Control Manual for Precast Concrete Plants. It can be seen that the items listed specifically refer to sections of the NPCA Quality Control Manual for Precast Concrete Plants.

4.2 Sections to be graded have been assigned total "points" for that section, (A). The auditor grades each section by determining the percentage of compliance with the Quality Control Manual. The total point value for the section (A) is multiplied by the decimal percent compliance to determine points awarded, (B). This is indicated on the audit grading schedule as (B) / (A), or points awarded over points available for each section. Certain items may not be applicable (NA) to all plants during an inspection. Those items are not graded. The sum of (B), points awarded and the sum of (A), points available is obtained for each chapter and indicated at the bottom of each chapter on the score sheet as total awarded points over total available points for that chapter. Because some items are not applicable, an adjustment is made.

4.3 The grade adjustment consists of dividing the sum of (A), points available for each chapter, by 92 to normalize the score to a percentage of 92, allowing for 8 possible continuous improvement points to achieve 100%. This value is designated (C). Then the sum of (B), points awarded for each chapter, is divided by (C) to arrive at the final percentage of 92. Additionally, points for any repeat deficiencies observed during an audit will be deducted from the final percentage of 92. The repeat deficiency value will be set by the QAQC Committee at the start of each program year with approval from the Board of Directors. The final plant score represents the percentage of total points earned by the plant versus the total applicable and/or observable points minus any points deducted for repeat deficiencies. The deduction for each repeat deficiency shall be 0.5 points for the 2027 program year.

4.4 Completed grade schedules are made available to plant representatives via the Producer Portal under myNPCA, and a copy is kept on file by the Administrator. No other copies are distributed unless the applicable plant provides consent or instruction to do so in writing to the program Administrators.

4.5 Critical sections of the manual are graded with the actual scoring percentage earned by the plant for each specific element and totaled. Plants scoring less than 75% in any critical section will be awarded zero ‘0’ points for that element. New plants scoring less than 75% in any critical section during their initial announced plant inspection will not be considered for certification. Existing plants scoring less than 75% in any critical section or an overall plant score of less than 80% but greater than or equal to 75% during their annual unannounced plant inspection will be subject to probationary status (See part 5.2.1 Probationary Status).

Updated Tables on next page

Table 5.3.6(a)
Frequency of Quality Control Operations
Materials Certifications and Equipment Calibrations

NPCA QC Section	Item	Each Shipment	Every 1,500 tons[a]	Every 2,000 tons[b]	Each Pour	Every 200 YD^3[c]	Every 150 YD^3[d]	Every 100 YD^3[e]	Daily	Weekly	Monthly	Annually	Remarks
2.1.1	Cement mill test report	✘*											
2.2.1	Reinforcing bar mill test report	✘*											
2.2.2	Reinforcing wire mill test report	✘*											
2.2.3	Reinforcing bar mats & WWR mill test reports	✘*											
3.1.4	Admixture dosing equipment certification											✘*	
3.2.4	Batch weigh scales calibration reports											✘	
5.1.1(j)	Lifting Insert Certificate of Compliance											✘	
5.1.1(k)	Current ACI certificate for third party tester and equipment calibrations											✘	

** - Items may be furnished by the raw material supplier*
a – 1,350 metric tons
b – 1800 metric tons
c – 200 cubic meters
d – 115 cubic meters
e – 75 cubic meters

Table 5.3.6(b)
Frequency of Quality Control
Operations Production Practices

NPCA QC Section	Item	Each Shipment	Every 1,500 tons[a]	Every 2,000 tons[b]	Each Pour	Every 200 YD^3[c]	Every 150 YD^3[d]	Every 100 YD^3[e]	Daily	Weekly	Monthly	Annually	Remarks
4.1.2	Form cleaning				✘								
4.1.3	Dimensional checks of machine made product								✘				
4.1.4	Housekeeping								✘				
4.3.5	Pre-pour inspection				✘								
4.6.4	Post-pour inspection				✘								
4.8.4	Final inspection	✘											

** - Items may be furnished by the raw material supplier*
a – 1,350 metric tons
b – 1800 metric tons
c – 200 cubic meters
d – 115 cubic meters
e – 75 cubic meters

Table 5.3.6(c)
Frequency of Quality Control Operations
Aggregates and Concrete

NPCA QC Section	Item	Each Shipment	Every 1,500 tons[a]	Every 2,000 tons[b]	Each Pour	Every 200 YD^3[c]	Every 150 YD^3[d]	Every 100 YD^3[e]	Daily	Weekly	Monthly	Annually	Remarks
2.1.2	Fine aggregate gradation and deleterious substances		✘								✘		Whichever occurs first
2.1.3	Coarse aggregate gradation and deleterious substances			✘							✘		Whichever occurs first
2.1.4	Lightweight aggregate and deleterious substances					✘					✘		Whichever occurs first
5.2.2	Organic impurities of fine aggregate											✘	When aggregate is suspect
5.3.1	Slump, slump-flow, and VSI						✘		✘				Whichever occurs first, for each mix design
5.3.2	Temperature of fresh concrete						✘		✘				When air content or slump is tested, for each mix design
5.3.3	Density (unit weight) of concrete						✘			✘			For each mix design
5.3.3	Density (unit weight) of lightweight concrete							✘			✘		For each mix design
5.3.4	Air content of air entrained concrete						✘		✘				Whichever occurs first, for each mix design
5.3.5.3	Compressive strength of wet cast concrete						✘			✘			Whichever occurs first, for each mix design
5.3.5.3	Compressive strength of dry cast concrete						✘			✘			Whichever occurs first, for each mix design

** - Items may be furnished by the raw material supplier*
a – 1,350 metric tons
b – 1800 metric tons
c – 200 cubic meters
d – 115 cubic meters
e – 75 cubic meters