SP- 150887
(New)

SPECIAL PROVISIONS
FOR
NEXT GENERATION CONCRETE SURFACE

Polk County
IMN-035-4(316)92--0E-77

Effective Date
July 19, 2022

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150887.01 DESCRIPTION.

This standard specifies the procedures for construction of the Next Generation Concrete Surface (NGCS) on existing or newly constructed roadways using diamond grinding and grooving techniques.

150887.02 EQUIPMENT.

A. Grinding shall be accomplished using diamond blades mounted on a self-propelled machine designed specifically for diamond grinding and texturing pavement. The equipment shall weigh a minimum of 35,000 pounds including the grinding head and be of a size that will grind a strip at least 4 feet wide in a single pass. The effective wheelbase of the machine shall be no less than 12 feet. The effective wheelbase is defined as the distance from the front wheel assembly transverse pivot point to the transverse pivot point of the profile/depth control/ ground drive wheels.

B. Grinding equipment that causes raveling, aggregate fractures, spalls, or disturbance to the transverse or longitudinal joints shall not be permitted. The equipment shall have a positive means of vacuuming the grinding residue from the pavement surface leaving the surface in a clean, near-dry condition.

C. The equipment shall be maintained to ensure it is in proper working order, with attention paid to the “roundness” of the match and depth control wheels. Any wheels found to be out of round shall be replaced immediately.

150887.03 CONSTRUCTION.

A. General.

1. The construction operation shall be scheduled and proceed in a manner that produces a

neat, uniform finished surface. Shoulder, auxiliary or ramp lane grinding shall transition from the edge of the mainline as required to provide drainage, leaving no more than a 3/16 inch ridge and an acceptable riding surface. When conditions require a feather pass into the shoulder, auxiliary or ramp lanes, conventional diamond grinding shall be used. Full- and partial-depth concrete repairs, slab stabilization and dowel bar retrofit shall be completed prior to any grinding. Joint sealing shall be completed subsequent to the diamond grinding operations and shall be installed in a recessed condition.

2. NGCS construction can be accomplished as a single-pass or two-pass operation as determined by the contractor. If the single pass operation is selected, smoothness levels stated within this standard must be attained and checked periodically by the contractor throughout the construction phase to ensure that corrective measures are not necessary as this could impact the quality of the NGCS texture.

3. Grinding shall be accomplished in a manner that eliminates joint or crack faults so there is no more than a 1/16 inch differential between the adjacent sides of the joints and cracks. Grinding shall also substantially remove pavement conditions such as warp and curl to provide an acceptable ride.

4. Lateral drainage shall be achieved by maintaining a constant cross slope between grinding extremities in each lane. The finished cross slope shall mirror the pre-grind cross slope and shall have no depressions or misalignment of slope greater than 1/8 inch in 12 feet when measured with a 12 foot straightedge placed perpendicular to the centerline. Straightedge requirements will not apply across longitudinal joints or outside the ground area.

5. Grinding shall begin and end at lines normal to the pavement centerline at the project limits. Passes of the grinding head shall not overlap more than 1 to 2 inches. No unground surface area between passes will be permitted.

B. Single-Pass NGCS Operation.

The construction operation will provide a flush ground surface that contains longitudinal grooves and shall be constructed in one, single-pass operation. The diamond blade stack will consist of two types of diamond grinding blades arranged to provide a flush ground surface as well as those required to produce the longitudinal grooves. The flush grind diamond blades shall be mounted on a minimum 4 foot grinding head, stacked with 0.125 inch wide blades separated by 0.035 +/- 0.005 inch wide spacers resulting in 92 to 100 blades per foot. The blades used to produce the flush ground surface shall be flat across their contact surface and in the same plane with other flush grind blades (excluding grooving blades) when mounted. The complete head, when stacked with all blades, shall be straight across its length without bowing when mounted on the diamond grinding machine. No unground surface area between passes will be permitted. The longitudinal grooving blades shall be 0.095 +/- 0.05 inches wide and spaced among the flush grind blade stack on 1/2 inch to 5/8 inch centers. The grooving blades shall produce grooves 1/8 inch to 3/16 inch in depth. The grooves shall be constructed parallel to the centerline. The contractor shall use a guide to ensure proper alignment of the grooves to centerline.

C. Two-Pass NGCS Operation.

This construction operation will allow for two separate operations to construct the NGCS section. The first operation will create the flush ground surface. The flush grind blades shall be mounted on a minimum 4 foot grinding head, stacked with 0.125 inch wide blades separated by 0.035 +/- 0.005 inch wide spacers resulting in 92 to 100 blades per foot. The blades used to produce the flush ground surface shall be flat across their contact surface and in the same plane with other flush grind blades when mounted. The complete head, when stacked with all blades, shall be straight across its length without bowing when mounted on the diamond grinding machine. No unground surface area between passes will be permitted. The smoothness levels stated within this standard must be attained and measured to the satisfaction of the Engineer prior to constructing the second operation. The second operation will provide the longitudinal grooves.

The longitudinal grooving blades shall be 0.095 +/- 0.05 inches wide and will produce grooves 1/8 inch to 3/16 inch in depth. The longitudinal grooves will be spaced on 1/2 inch to 5/8 inch centers. The grooves shall be constructed parallel to the centerline. The contractor shall use a guide to ensure proper alignment of the grooves to centerline.

D. Final Surface Finish.

The NGCS grinding process shall produce a pavement surface that is true to grade and uniform in appearance with a longitudinal grooved texture. The flush ground surface shall appear smooth and shall contain no ridges that exceed 1/32 inch. The longitudinal grooves shall be constructed parallel to the centerline. At a minimum, 98% of the pavement surface shall be textured utilizing the NGCS. Depressed pavement areas due to subsidence, edge slump or other localized causes will be excluded from this requirement when approved by the Engineer.

E. Smoothness.

1. The Engineer may partly profile the pavement using an inertial profiler. The latest inventory average international roughness index (IRI) for each area may be shown in the contract documents. The bidder is also advised that any available profile information is available electronically from the Office of Contracts by contacting the Contracts Engineer. This information represents a summary of conditions found to exist at the time the survey was made. The availability of this information will not constitute a guarantee that a profile other than that indicated will not be encountered at the time of milling.

2. Prior to performing grinding work, provide a profile using an inertial profiler meeting the requirements of Materials I.M. 341. This control profile will be used to identify the required smoothness for the project if a percent improvement is the controlling factor. Obtain a final average IRI for each 0.1 lane-mile segment as follows:

- **a.** 65.0 inches per mile or less and no bumps exceeding 0.5 inches in 25 feet.
- **b.** For extremely rough conditions: the greater of 35% of the pre-grind profile or the aforementioned requirement shall be the required smoothness or less and no bumps exceeding 0.5 inches in 25 feet.
- **c.** Identify depressed pavement areas and localized areas with excess faulting greater than 1 inch. Review these areas with the Engineer to determine the limits for exclusion from the profile index calculation.

3. Obtain the profile in both wheel paths of each mainline lane using a certified operator. A pavement segment is defined in Article 2317.03. Compute an average IRI for each segment of each lane by averaging the two wheel path IRI values. The wheel paths are at 3 feet and 9 feet from center line or lane line.

4. Verification testing requirements will be according to Article 2317.04, F.

F. Limitations.

1. When nighttime work is required, include lighting at each work area. Ensure lighting does not glare into oncoming motorists. During nighttime grinding operations, progress in the direction with normal traffic flow.

2. Continuously remove all slurry or residue resulting from the grinding operations. Do not deposit on the slab or shoulder. Leave pavement and paved shoulders in a clean condition. Ensure residue from grinding operations does not flow across lanes occupied by public traffic or into gutters or other drainage facilities.

3. Uncompleted sections may be opened to traffic without completion of grinding across an entire lane.

4. When the following work is included in the contract, sequence the operations in the following order:
   a. Undersealing,
   b. Longitudinal subdrains,
   c. Patching,
   d. Installation of retrofit load transfer,
   e. Diamond grinding, and then
   f. Crack and joint sealing.

150887.04 METHOD OF MEASUREMENT.

A. Next Generation Concrete Surface will be measured by the square yard. The measurement will be the final textured surface area regardless of the number of passes required to achieve acceptable results.

B. Minor areas of unground pavement within the designated areas to be ground will be included in the measurement. When conditions require a feather pass into the shoulder, auxiliary or ramp lanes, conventional diamond grinding shall be used. Payment will be by the square yard based on a width of 2 feet times the length of the required feather pass. The minimum length of feather pass will be 100 feet.

150887.05 BASIS OF PAYMENT.

Payment will be as follows:

A. Contract unit price per square yard for Next Generation Concrete Surface.

B. Payment is full compensation for furnishing all equipment, materials, and labor to:
- Grind the concrete surface,
- Test for smoothness according to the contract documents, and
- Remove slurry and residue from this operation.

C. In addition to the payments above, the Contractor may receive an incentive payment based upon the number of qualifying segments. The incentive payment will be based upon the following schedule:

Table SP-150887.05-1: Incentives for Next Generation Concrete Surface

International Roughness Index for greater than 45 mph	Dollars per 0.1 mile segment per lane
Inches per mile	
0.00 – 30.00	400
30.01 - 50.00	1000-(20 X IRI)
50.01 - 65.00	Contract Unit Price
>65.01*	Grind

* For extremely rough conditions, this limit may be higher as noted above.