420 Diamond Grinding

420.1 Description

(1) This section describes continuous diamond grinding and intermittent diamond grinding for surface restoration of existing or repaired pavement and profile correction for new pavement.

420.2 (Vacant)

420.3 Construction

420.3.1 General

420.3.1 Revise to obtian prior approval from engineer when deeper grinding is necessary to conform to ride quality specification.

(1) Diamond grind the existing concrete pavement to provide a uniform surface that is reasonably plane, free of excessively large scarification marks, and has the grade and cross slope the plans show or the engineer specifies. Do not damage the remaining pavement. Do not grind deeper than 3/4 inch from the top of the original surface. Obtain engineer's prior approval when deeper grinding is necessary to conform to the ride quality specified in 740.

(2) Complete full-depth and partial-depth concrete repairs, slab stabilization, dowel bar retrofit, and other pavement repair operations before grinding. Begin and end grinding at lines perpendicular to the roadway centerline at the project limits. Do not overlap adjacent grinding passes by more than 1-inch. Do not leave un-ground surface area between passes.

(3) Grind joint or crack faults so there is no more than a 1/16-inch differential between the adjacent sides of the joints and cracks. Grind warped and curled slabs as required to provide an acceptable ride. Provide smooth transitions from the edge of the mainline to shoulders, adjacent lanes, and ramps leaving no more than a 3/16-inch ridge at transitions. Grind adjacent pavement and paved shoulders as necessary to feather in a smooth transition and maintain drainage. Do not grind approach slabs unless necessary to provide a smooth transition.

(4) Provide lateral drainage by maintaining a constant cross slope between grinding extremities in each lane including feathered areas of the shoulder. Ensure that the finished cross slope conforms to the plans and has no depressions or slope misalignment greater than 1/4-inch in 12 feet when measured perpendicular to the centerline with a 12-foot straightedge.

(5) Do not diamond grind over valves, manholes, or other fixtures. Provide a smooth taper from the diamond ground surface to the top of the fixture.

420.3.2 Equipment

420.3.2.1 General

(1) Use self-propelled grinding machines with depth, grade, and slope controls designed for grinding and texturing concrete. Equip grinding machines with diamond blades and a vacuuming system capable of removing liquid and solid residue from the ground surface. Shroud the machine to prevent discharging loosened material into adjacent work areas or live traffic lanes. Provide the specified effective wheelbase, defined as the center of the front to center of the rear main support wheels.

(2) Do not use equipment that causes raveling, aggregate fractures, joint deflection, or other damage to material remaining in place.

(3) Maintain equipment in proper working order. Ensure that the match and depth control wheels are round. Stop grinding and immediately replace out-of-round wheels.

420.3.2.2 Continuous Grinding

(1) Under the Continuous Diamond Grinding Concrete Pavement bid item, ensure that the grinding machine, including the grinding head, weighs 35,000 pounds or more, will grind a strip at least 4 feet wide, and has an effective wheel base of 25 feet or more. For pavements with a design speed less than 40 miles per hour and areas difficult to access, the contractor may use equipment with an effective wheel base of 12 feet or more.

420.3.2.3 Intermittent Grinding

(1) For intermittent grinding required for ride correction under 740, ensure that the grinding machine will grind a strip at least 3 feet wide and has an effective wheel base of 12 feet or more. The engineer may require continuous grinding equipment if intermittent grinding equipment does not produce acceptable results.

420.3.3 Final Surface Finish

(1) Produce a surface that is true in grade and uniform in appearance. Provide a longitudinal line-type texture with corrugations parallel to the outside pavement edge.

(2) Select the number of diamond blades per foot that will provide the proper surface finish for the aggregate type. Determine the sequence of operations and number of passes required to meet the specifications.

(3) Ensure that ridges are 1/16 to 3/16 inches higher than the bottom of the grooves and uniformly spaced as follows:

For limestone: 0.09 to 0.11 inches between grooves.

For gravel: 0.06 to 0.09 inches between grooves.

(4) Ensure that a minimum of 95 percent of any 4-foot by 100-foot section is textured. Remove unbroken fins as the engineer directs.

420.3.4 Residue Disposal

(1) Remove solid and liquid grinding residues from the roadway by vacuuming. Leave the roadway in a clean, damp condition immediately behind the grinding machine. Remove residue immediately in areas of cross traffic. Do not allow residue and water to flow or blow across lanes used by public traffic or to enter any storm sewer, stream, lake, reservoir, marsh, or wetland. Dispose of residue and water at an acceptable material disposal site located off the project limits and as shown in the ECIP.

420.3.5 Surface Testing

420.3.5 Revise to add information for continuous diamond grinding profile runs and to the information for exceptions to 740.

(1) Measure International Roughness Index (IRI) for surfaces the contract designates for continuous grinding both before and after grinding.

(2) For pavements with more than 8 lane-miles designated for continuous diamond grinding, conduct profile runs and measure IRI intermediately, after every 8 lane-miles of grinding or fraction thereof. Intermediate profile runs may be used for acceptance if no corrective actions are required.

(3) Conform to 740 except as follows:

- Prepare a QC plan as specified in 740.1.2.1 and obtain the engineer's approval before beginning work.
- Submit ProVal smoothness assurance reports to the engineer before and after grinding for IRI and before and after correcting areas of longitudinal surface deviation.
- Straight edging is required to identify depressions or slope misalignment as specified in 420.3.1(4).
- Ensure the profiler and operator are on site when before-grinding and after-grinding profiles are to be run; and when corrective grinding operations are to be preformed, according to the schedule in the contractor's QC plan.

(4) The department will adjust pay based on the final ride measured after initial grinding and corrective grinding done under 740.3.4.4 is completed.

420.4 Measurement

(1) The department will measure Continuous Diamond Grinding Concrete Pavement by the square yard acceptably completed, measured as the final textured surface area regardless of the number of passes required to achieve acceptable results. The department will include minor areas of un-ground surface within the ground area.

(2) If conditions require a feather pass into the shoulder, adjacent lanes, or ramps, the department will also measure an area 2 feet wide times the length of the feather pass or an additional 20 square yards whichever is greater.

420.5 Payment

(1) The department will pay for the measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
420.1000	Continuous Diamond Grinding Concrete Pavement	SY

(2) Payment for Continuous Diamond Grinding Concrete Pavement is full compensation for grinding to improve ride including measuring IRI before and after grinding; for feathering in adjacent surfaces; for removing unbroken fins; and for hauling and off-site disposal of grinding residue. The department will adjust pay for ride as specified in 740.5.

(3) Corrective grinding for new pavement required under 740 is incidental to the contract.