



## SECTION 622

### PAVEMENT AND BRIDGE SURFACE REMOVAL AND TEXTURING

**622.1 Description.** This work shall consist of removing or texturing the surface of existing pavement and bridge decks as shown on the plans. The term "pavement" as used in [Sec 622](#) will be considered reference to the paved portion of the highway within the limits of construction, including bridge decks.

#### **622.2 Construction Requirements.**

**622.2.1** The pavement surface shall be removed or textured to the depth, width, grade and cross slope shown on the plans or as directed by the engineer.

**622.2.2** Unless specified otherwise in the contract, the contractor shall accept full ownership of all material generated by removal or texturing operations and shall indemnify the Commission of responsibility for and pay all costs relating to generation, handling, storage, treatment, transportation, disposal, or any future use of the material.

**622.2.3** Depth transitions at the beginning and end of a project, side roads, bridge ends or other locations shown on the plans shall be milled by using equipment and a process approved by the engineer. The equipment will not be required to have an automatic grade leveling and slope control device or a means of removing and discharging millings from the pavement, unless specified otherwise. Any necessary pavement marking in the transition areas shall be as directed by the engineer and at the contractor's expense.

**622.2.4** The contractor shall provide signing informing motorists of coldmilled areas open to traffic, at the contractor's expense. The contractor may use static signs, changeable message signs, or a combination thereof to provide this warning. Signing shall be deployed in advance of an exit from the mainline prior to the milled area to allow motorists an opportunity to take an alternate route. Signing shall also be placed on any ramps leading into the milled area. If an alternate route cannot be provided, deployment of the signs shall be located in advance of the milled area to allow motorists to safely negotiate the section of milled pavement. Sign locations shall be approved by the engineer prior to installation. Signing shall be in accordance with Sec 616. Sign layout for static signs shall be as shown in the standard plans. Changeable message signs shall be programmed as directed by the engineer.

#### **SECTION 622.10 COLD MILLING EXISTING PAVEMENT FOR REMOVAL OF SURFACE.**

**622.10.1 Description.** This work shall consist of coldmilling the existing pavement surface to the depth, profile and cross slope shown on the plans and removing and disposing of the milled material.

#### **622.10.2 Equipment.**

**622.10.2.1** The equipment for milling and removing the pavement surface shall be capable of removing a thickness of bituminous or concrete material to the specified depth and providing a uniform profile and cross slope.

**622.10.2.2** The equipment shall be capable of accurately and automatically establishing profile grades within 1/8 inch of each edge of the machine. The milling equipment shall be regulated by an automatically controlled grade leveling and slope control device. The device shall provide control for producing a uniform surface to the established grade and a cross slope in accordance with the typical section. The device shall also be equipped with the necessary controls to permit the operator to adjust or vary the slope as directed by the engineer.

**622.10.2.3** The equipment shall have provisions for controlling dust and other particulate matter created by the cutting action. The equipment shall also have an effective means of removing cuttings from the pavement and discharging them into a hauling unit, all in one operation, as the pavement is milled.

**622.10.3 Construction Requirements.**

**622.10.3.1** In the event the milled surface begins to ravel under traffic or other problems resulting from the milling occur, restrictions on the amount of time that a milled area may be left open will be determined by the engineer.

**622.10.3.2** The milling operations, except in depth transition areas, shall be regulated by an automatically controlled grade leveling and slope control device.

**622.10.3.3** The roadway pavement surface shall be removed and planed around and over manholes, utility valves and drainage appurtenances within the limits of the work as directed by the engineer. Any damage to manholes, utility valves or drainage appurtenances by the removal and planing operation shall be repaired by the contractor at the contractor's expense. After removal of existing material around manholes, utility valves and other appurtenances, the contractor shall place a temporary wedge around the appurtenance. The temporary wedge shall consist of bituminous or another approved material at a slope that will allow safe transition over the appurtenance by through traffic and of a thickness and design that the material remains intact while under traffic. Bituminous wedges shall be removed prior to resurfacing.

**622.10.3.4** The milled surface of each layer shall be substantially free from waves or irregularities. The final milled surface shall not vary from a 10-foot straightedge, applied parallel to the centerline, by more than 1/4 inch. Spalled areas presenting a hazard shall be repaired using an approved bituminous pavement. The texture of the final milled surface shall be a grid surface with discontinuous longitudinal striations.

**622.10.3.5** Existing shoulder material shall be removed as necessary to ensure no ponding of water on the driving surface occurs after the milling operation.

**622.10.3.6** Care shall be exercised not to damage existing concrete pavement. The concrete pavement surface may be scarified as shown on the plans or approved by the engineer.

**622.10.3.7** Loose material not picked up by the milling machine shall be removed from the roadway or bridge deck surface immediately behind the milling operation, except in areas with earth or stabilized aggregate shoulders. Loose material may be swept to the shoulders as approved by the engineer.

**622.10.3.8** The contractor shall provide pavement marking as shown on the plans through the limits of the milled surfaces in accordance with [Sec 620](#).

**622.10.4 Method of Measurement.** Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract

quantity. Where required, measurement for removal of the existing pavement surface will be computed to the nearest square yard. The correction will be added to or deducted from the contract quantity.

**622.10.5 Basis of Payment.** The accepted quantity of removal of existing surface will be paid for at the contract unit price for each of the pay items included in the contract. No direct payment will be made for removal of shoulder material by milling or other methods as required to provide drainage in accordance with [Sec 622.10.3.5](#), unless shoulders are to be removed as part of the contract. No direct payment will be made for loading, hauling, stockpiling or disposing of milled material, repairing spalled areas, placing and removing temporary wedges, providing temporary pavement marking or performing other items incidental to completion of this work.

## **SECTION 622.20 COLD MILLING PAVEMENT FOR A DRIVING SURFACE.**

**622.20.1 Description.** This work shall consist of fine-tooth coldmilling to improve the profile, cross slope or texture of an existing pavement surface as shown on the plans or as directed by the engineer. The finished profile shall provide a smooth riding surface, free from gouges, and shall have a uniform textured appearance.

**622.20.1.1** Locations may be field adjusted in length by the engineer, not to exceed 1/4 mile for any one location and provided the total area for all locations is not changed, without change in payment. All specified locations shall be milled.

**622.20.1.2** Contractors shall make their own conclusions concerning the quantity of material to be removed. The actual depths of milling will vary due to rut depths, drainage and profile requirements.

**622.20.2 Equipment.** Equipment for profiling, texturing and removing the pavement surface shall be in accordance with [Sec 622.10](#), except as modified herein.

**622.20.2.1** The minimum drum cutting width shall be 12 feet, unless specified otherwise in the contract.

**622.20.2.2** The carbide cutting teeth shall be uniform in diameter, with a uniform length of  $\pm 0.02$  inch. In addition, the tooth holder blocks shall be uniform and shall not vary the cutting radius of the mandrel by more than  $\pm 0.02$  inch.

**622.20.2.3** Removing millings from the pavement and discharging the millings into a hauling unit may be individual operations.

### **622.20.3 Construction Requirements.**

**622.20.3.1** Removal of material for rut removal shall be to the approximate depth of the bottom of the wheel rut in the lane being milled. The bottom of the rut shall be textured, but only minimal material removed. Milling shall be done in an approximate lane width, but may start to the right of the centerline in the approximate left wheelpath, extending into the shoulder to allow drainage, leaving the existing centerline marking in place.

**622.20.3.2** Removal of material for surface texturing shall be done for the full lane width, to the depth needed in order to texture all of the described areas.

**622.20.3.3** After the proper combination of mandrel speed and forward speed have been established to produce the required texture, the daily operation shall be uniform and

continuous for other than repair or emergency operations. The milling machine shall not be halted to load or unload trucks, or to take on water.

**622.20.3.4** The entire surface shall be textured, substantially free from waves or irregularities, and shall not vary from a 10-foot straightedge, applied parallel to the centerline, by more than 1/8 inch. There may be occasional exceptions where the bottom of a wheelpath may not be textured in order to maintain an acceptable profile. Spalled areas shall be repaired using an approved bituminous patching material.

**622.20.3.5** The texture produced for the finished pavement shall be a uniform surface with longitudinal striations. There shall be a maximum lateral distance of 0.2 inch between adjacent longitudinal striation mark lines. The longitudinal distance from the center of a strike mark to the center of the next successive strike mark in line shall not exceed 5 inches. The longitudinal successive strike marks shall approximate a continuous grooved line. The difference between the high and low of the surface texture shall be approximately 1/16 inch.

**622.20.3.6** The pavement surface shall be removed and milled around and over appurtenances, such as manholes, utility valves and drainage features, within the limits of the work as directed by the engineer. Any damage to appurtenances by the milling and removal operation shall be repaired by the contractor at the contractor's expense. The final milled pavement surface shall be smoothly transitioned at all appurtenances located in the pavement to maintain an acceptable profile.

**622.20.3.7** Material adjacent to the lane being milled shall be removed as necessary to provide a smooth transition and to ensure no ponding of water on the driving surface after the milling operation. There will be no pay for additional milling width beyond lane width as required for drainage. Removal in the traffic lanes shall be with the same equipment, providing the same texture. Removal of shoulder material may be with other milling equipment meeting the engineer's approval.

**622.20.3.8** Loose material not picked up by the milling machine shall be removed from the roadway immediately behind the milling operation. In areas with earth or aggregate shoulders, the loose material may be swept to the shoulders when approved by the engineer. If required by the engineer, the finished surface shall be wetted just prior to returning to traffic to reduce traffic visibility problems due to dust.

**622.20.3.9** Obliterated edgelines next to a shoulder will not be required to be replaced by the contractor, unless specified in the contract. Any other pavement marking removed by the contractor's operations shall be replaced with temporary pavement marking in accordance with [Sec 620](#), except when permanent pavement marking is specified in the contract. Prior to installation of permanent pavement marking, all joints and cracks shall be cleaned and sealed with hot-poured, elastic type concrete joint sealer in accordance with [Sec 1057](#).

**622.20.4 Method of Measurement.** The roadway lane width will be assumed for computing milling quantities. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in contract quantity. Where required, measurement for coldmilling of the existing pavement surface will be computed to the nearest square yard (m<sup>2</sup>). The corrections will be added to or deducted from the contract quantity.

**622.20.5 Basis of Payment.** The accepted quantity of coldmilling of existing pavement surface will be paid for at the contract unit price for each of the pay items included in the contract. No direct payment will be made for loading, hauling, stockpiling or disposing of milled material, repairing spalled areas, temporary pavement marking or other items incidental to completion of the work.

**SECTION 622.30 DIAMOND GRINDING OF EXISTING PORTLAND CEMENT CONCRETE PAVEMENT.**

**622.30.1 Description.** This work shall consist of grinding concrete pavement to provide good riding characteristics, a surface texture and proper drainage. The finished surface shall be as shown on the plans or as directed by the engineer.

**622.30.2 Equipment.** The equipment shall be of a size that will grind a strip at least 3 feet wide using diamond blades, and shall not cause spalls at cracks, joints or other locations.

**622.30.3 Construction Requirements.**

**622.30.3.1** The construction operation shall be scheduled and proceed in a manner that produces a uniform finished surface. Auxiliary or ramp lane grinding shall transition from the edge of the mainline as required to provide drainage and an acceptable riding surface. Grinding of bridge decks will not be permitted unless specified in the contract.

**622.30.3.2** Pavement undersealing or pavement repair, if required, shall be completed prior to any grinding.

**622.30.3.3** Grinding shall be accomplished in a manner that eliminates joint or crack faults and provides lateral drainage by maintaining a constant cross slope between grinding extremities in each lane. A maximum tolerance of 1/16 inch will be allowed for adjacent sides of joints and cracks, except that under no circumstances shall the grinding depth exceed 3/4 inch from the top of the original surface. When grinding across faulted joints, a minimum of a 20-foot transition onto the approach side slab shall be used.

**622.30.3.4** The cross slope of the pavement shall be as shown on the plans and shall have no depressions or misalignment of slope greater than 1/4 inch in 12 feet when measured with a 12-foot straightedge placed perpendicular to the centerline. Areas of deviation shall be reground. Straightedge requirements will not apply across longitudinal joints or outside the ground area.

**622.30.3.5** As soon as practical after grinding, the surface will be straightedged longitudinally and all variations exceeding 1/8 inch in 10 feet will be plainly marked. Areas of deviation shall be reground.

**622.30.3.6** Substantially all of the pavement surface shall be textured. Extra depth grinding to eliminate minor depressions in order to provide texturing on 100 percent of the pavement surface will not be required. No unground surface area between passes will be permitted.

**622.30.3.7** The grinding process shall produce a final pavement surface that is true to grade and uniform in appearance with a longitudinal line type texture. The line-type texture shall contain parallel longitudinal corrugations that present a narrow ridge corduroy-type appearance. The peaks of the ridges shall be approximately 1/32 inch higher than the bottoms of the grooves. The grooves shall be evenly spaced. There shall be approximately 50-55 grooves per foot, measured perpendicular to the centerline.

**622.30.3.8** The contractor shall remove and dispose of all residue from the grinding in a manner and at a location to satisfy environmental regulations. The contractor shall have the engineer's approval for the method of spreading and disposal of the residue prior to beginning any grinding operations.

**622.30.3.8.1** Solid residue shall be removed from the pavement surface before any residue is blown by traffic action or wind.

**622.30.3.8.2** Residue shall not be permitted to encroach on open lanes.

**622.30.3.8.3** The residue shall not enter into gutters or closed drainage systems. Suitable means to restrict the infiltration of the residue into a closed drainage system shall be provided.

**622.30.3.8.4** The contractor may disperse residue onto unpaved shoulders, adjacent roadside embankments, or median ditch areas of divided highways where the residue runoff can percolate into the soil, unless specified otherwise in the contract. The spread rate shall not generate surface runoff. If surface runoff occurs at a grinding location, the contractor shall haul the residue to an approved location at the contractor's expense.

**622.30.3.8.5** Discharge of any residue runoff shall not flow into adjacent rivers, streams, lakes, ponds or other open bodies of water.

**622.30.3.8.6** Residue shall not be spread within 100 feet of any streams, lakes or other open bodies of water, or within 15 feet of a water filled ditch.

**622.30.3.8.7** The contractor shall use appropriate equipment and methods so the discharging of the residue does not cause erosion of soil or damage to established vegetation along the roadway. The contractor shall repair and reseed any areas where the discharge of grinding residue causes damage to roadway slopes or vegetated areas at the contractor's expense.

**622.30.3.8.8** If the solids concentration of discharged residue at any particular area is determined to be excessive by the engineer, the contractor shall provide equipment and material to flush the areas with water as directed by the engineer, at the contractor's expense.

**622.30.3.8.9** Obliterated edgelines next to a shoulder will not be required to be replaced by the contractor unless specified in the contract. Any centerline or lane line markings removed by the contractor's operations shall be replaced with temporary pavement marking material in accordance with [Sec 620](#), unless permanent pavement marking material is specified in the contract. Prior to installation of permanent pavement marking material, all joints and cracks shall be cleaned and sealed if specified in the contract.

#### **622.30.4 Smoothness Requirements.**

**622.30.4.1** An initial profile index of representative portions of the pavement will be available through the project contact person upon written request. After the contract is awarded, the initial profile index will be available from the 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 grinding. This information is provided only to give the contractor an idea of the condition of the pavement in regard to smoothness when bidding on this work. The contractor assumes the risk of error if the information is used for any purpose other than the intended purpose. The Commission makes no representation as to the accuracy of the initial profile index, since the accuracy of the profile index is limited by the number of profiles taken. Any assumption the contractor makes from this data will be at the contractor's risk, none are intended by the Commission.

**622.30.4.2** Prior to performing any grinding work, the contractor shall provide a control profilograph trace in accordance with [Sec 502](#). This control trace will be used to identify the required smoothness for the project. Each segment of the finished ground surface shall have a final profile index of 35 percent of the control profilograph trace or 30 inches per mile, whichever is greater, and shall not include any bumps exceeding 0.5 inch in 25 feet. Depressed pavement areas due to subsidence or other localized causes and areas where the

maximum cut at mid panel or a fault restricts further grinding, will be excluded from testing with the profilograph when approved by the engineer.

**622.30.4.3** Profilograph testing shall end 15 feet prior to excluded areas and shall resume 15 feet following excluded areas.

**622.30.4.4** The ground surface shall be tested and evaluated in accordance with [Sec 502](#), with the following modifications:

(a) The test shall be run and the profilogram shall be evaluated using the same procedure as for the control trace.

(b) Each segment for which continuous grinding is designated will be evaluated individually, and shall meet the smoothness and bump requirements in accordance with [Sec 622.30.4](#), regardless of the segment's length. The engineer may require removal of unbroken fins at the contractor's expense.

(c) In excluded areas, smoothness requirements will be modified or may be waived by the engineer.

(d) The engineer may test for smoothness and bumps near the center line and at other spot locations where compliance is questionable. Additional grinding may be required. The provisions under [Sec 502.8.6](#) will not apply.

(e) The original and final profilograph traces shall not be used to determine grinding depth.

**622.30.5 Method of Measurement.** Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, measurement will be made to the nearest square yard. Measurement will be based upon the full pavement lane width. No deduction will be made for gaps within the pavement lane to avoid striping, raised pavement markers, manholes or other structures.

**622.30.6 Basis of Payment.** The accepted quantity of ground pavement surface will be paid for at the contract unit price for diamond grinding concrete pavement. Payment will be considered full compensation for all labor, equipment, material and incidentals to complete this work, including hauling and disposal of grinding residue.

## **SECTION 622.40 DIAMOND GRINDING OF NEW PORTLAND CEMENT CONCRETE PAVEMENT.**

**622.40.1 Description.** This work shall consist of grinding new Portland cement concrete pavement to provide good riding characteristics and surface texture. The finished surface shall be as shown on the plans.

**622.40.2 Equipment.** The grinding equipment shall be in accordance with [Sec 622.30.2](#).

### **622.40.3 Construction Requirements.**

**622.40.3.1 Paving.** When diamond grinding is used as the final texturing for new Portland cement concrete pavement, concrete paving shall be in accordance with [Sec 502](#), except as follows. All joints shall be protected to prevent grinding residue from entering. Joints to be diamond ground shall be cleaned and sealed in accordance with [Sec 502](#) after diamond grinding is completed.

### **622.40.3.2 Smoothness Requirements.**

**622.40.3.2.1** No diamond grinding shall be done until the pavement has attained a strength sufficient to be opened to all types of traffic, and no sooner than twenty one days after being placed. All diamond grinding shall be completed on any section prior to opening that section to other than construction traffic, unless approved by the engineer.

**622.40.3.2.2** The final pavement surface from the grinding process shall be in accordance with [Sec 622.30.3.7](#). All grooves and adjacent passes shall be parallel to each other and the roadway, with no variation. Adjacent passes shall completely lap with no unground surface between, however, they shall not overlap more than 1 1/2 inches. Adjacent passes shall be within 1/8 inch of the same height as measured with a 3-foot straightedge. No less than 98 percent of the specified surface shall be textured by grinding. There shall be no ridge between lanes. Any remaining ridges on the outside edge next to the shoulder greater than 1/8 inch high shall be feathered out to the satisfaction of the engineer in a separate operation.

**622.40.3.2.3** Any deficiencies in the final surface due to improper contractor operations or equipment shall be corrected by the contractor, at the contractor's expense.

**622.40.3.2.4** The contractor shall remove and dispose of all residue from grinding operations in accordance with [Sec 622.30.3.8](#).

**622.40.4 Basis of Payment.** No direct payment for diamond grinding new concrete pavement will be made. Diamond grinding new concrete pavement will be considered as part of the work paid for under the contract unit price for Portland concrete pavement in accordance with [Sec 502](#).