

IGGA Guide Specification: Diamond Grinding Asphalt Pavements

Introduction

This standard developed, by the International Grooving and Grinding Association (IGGA), specifies the procedures for continuous diamond grinding of asphalt concrete pavements. The user of this standard shall be responsible to ensure that all local safety, health and environmental standards are made a part of the specifications.

The user of this standard accepts ALL responsibility for decisions made as a result of its use. The International Grooving and Grinding Association, its Officers, Board of Directors and staff are absolved of any responsibility for any decisions made as a result of its use. Use of this standard implies acceptance of the terms of use.

Guide Specification: Diamond Grinding Asphalt Pavements

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SCOPE

This standard specifies the procedures for operations of continuous diamond grinding asphalt pavement to eliminate surface defects such as rutting, roughness and surface deterioration as well as provide desired surface characteristics such as smooth ride, improved friction and drainage. This standard does not apply to corrective bump grinding. The standard provides guidelines for proper operational procedures along with levels of acceptance for the desired surface characteristics. The user of this standard shall be responsible to ensure that all local safety, health and environmental standards are made a part of the project specifications

EQUIPMENT

Grinding shall be done using diamond blades mounted on a self-propelled machine designed for grinding and texturing pavement. The equipment shall be a minimum 35,000 pounds, including grinding head, and of a size that will grind a strip at least 3 feet wide. The effective wheel base of the machine shall be no less than 12 feet. The effective wheel base 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.

The equipment shall have a positive means of vacuuming the grinding residue from the surface, leaving the surface in a clean, near-dry condition.

Grinding equipment that causes raveling, aggregate fractures or deterioration at joints and cracks shall not be permitted.

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 immediately replaced.

CONSTRUCTION

The construction operation shall 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. Any patching or repairs shall be completed prior to grinding. Any required crack sealing shall be completed subsequent to diamond grinding operations.

Lateral drainage shall be achieved by maintaining a constant cross slope between grinding extremities in each lane. The finished cross slope shall mirror the pregrind cross slope 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. Steps will be taken to ensure that wheel path rutting is substantially removed and that the grinding operation is simply not texturing the wheel path depressions. Areas of deviation shall be reground. Straightedge

requirements will not apply across longitudinal joints, areas where existing structures limit grinding operations or outside the specified ground area.

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-inch. No unground surface area between passes of the grinding head will be permitted.

FINAL SURFACE FINISH

The grinding operation shall produce a pavement surface that is true in grade and uniform in appearance with longitudinal line-type texture. The line-type texture shall contain corrugations parallel to the centerline and present a narrow ridge corduroy type appearance. The peaks of the ridges shall be 1/8-inch +/- 1/16-inch higher than the bottom of the grooves with evenly spaced ridges. The number of blades used for grinding will range between 50 - 60 blades per foot as necessary to provide the designated texture. Harder aggregate may require the use of 55 – 60 blades per foot. The project conditions may dictate that the contractor has to make multiple passes with the equipment to meet the specifications. It is the contractor's responsibility to determine the proper sequence of operations. If multiple passes of the grinding equipment are required, the area will only be considered for payment once. A minimum of 95% of any 100-foot section of pavement surface shall be textured. Depressed areas due to subsidence or other localized causes will be exempted from the texture and smoothness requirements.

SLURRY HANDLING AND REMOVAL

Slurry shall be collected, processed and disposed off in accordance with the IGGA Diamond Grinding Slurry Handling--Best Management Practices - April 2013. This document is available on the web at www.igga.net.

SMOOTHNESS REQUIREMENTS

An initial smoothness index and schedule of rut depths of representative portions of the project may be available through the project contact person upon written request. When available, this information represents the conditions that existed at the time the survey was made. The contractor is cautioned to note the date the survey was made, since the conditions may have changed over time. This profile and rut schedule is for informational purposes only, to give the contractor an idea of the conditions that existed at the time of the survey. The contractor assumes the risk of error if the information is used for any purpose other than as stated. Contractors are responsible for visiting the project site to make their own condition determination prior to bidding.

Prior to performing any grinding work, the contractor shall provide a control profile using lightweight profiler equipment with a laser that simulates the tire footprint. Single point lasers shall not be used. Line laser equipment such as RoLine™, Gocator™ or an approved equal shall be used. All equipment shall have current certification and be approved by the contracting authority.

The control profile will be used to identify the required smoothness for the project as indicated in Table 1. The control profile will be obtained after any and all corrective work which impacts the pavement roughness such as pothole repair, etc. The profile will be obtained in 0.1 lane mile long segments (528 feet), and the location of each segment accurately established, either through stationing or GPS coordinates.

The finished surface shall have a final MRI improvement in accordance with Table 1 and grinding will not be considered acceptable until the smoothness requirements are achieved. It is important that the segment locations from the control profile match the segment locations tested in the smoothness acceptance measurements. Price adjustments for exceeding the requirements are indicated in Table 2.

TABLE 1 SMOOTHNESS REQUIREMENTS

Posted Speed Limit (mph)	< 45		≥ 45	
Existing Segment MRI	≤ 330	> 330	≤ 185	> 185
Required Post Grind MRI	≤ 115	≤ 0.35*(Existing Segment MRI)	≤ 65	≤ 0.35*(Existing Segment MRI)

Depressed pavement areas due to subsidence or other localized causes will be excluded from the smoothness requirements. These areas shall be reviewed and approved by the engineer.

The contractor shall measure profiles in both wheel paths and average the resulting IRI to determine acceptance (i.e. MRI). The profiles shall be measured 3 feet from each lane line. A guide shall be used to ensure proper alignment of the profile. The engineer shall have a representative with the lightweight profiler during all testing periods. This representative shall sign the resulting profile form.

The engineer shall conduct comparison profiles on no less than 10% of the segments using the same type of certified equipment as the contractor. It is of great importance that a proper guide is used to ensure that all testing is completed over the same track. The contractor testing and agency testing should be completed during the same time of day and under similar climatic conditions. The results of these verification profiles shall not vary more than 10% from the contractor's profiles.

The engineer may choose to accept isolated sections if the variance between the two profiles is less than 15%. When the difference exceeds 15% on an isolated basis or 10% on a consistent basis, referee testing will be required to determine which device is providing an accurate evaluation of the pavement surface. The party found to have the inaccurate equipment will pay for the referee testing. The engineer may choose to withhold payment for segments that do not meet these criteria until the problem has been resolved. The engineer may choose to run verification profiles on the entire project if the comparison profiles are consistently outside the allowable tolerance. The engineer will charge for the additional testing if the contractor's operation is found to be in error. Segments found not meeting the smoothness requirements will require regrounding at no cost to the department.

For roadways with posted speeds less than 45 mph, the finished ground surface shall not include any bumps exceeding 0.3-inch in 25 feet. For roadways with posted speeds of 45 mph or more, the localized roughness (IRI) will be less than or equal to 125 inches per mile, when determined using the ProVAL Assurance Module with a 25 ft baseline.

The conditions of smaller municipal projects may not be suited for the above type of smoothness requirements. In these cases, the only smoothness requirement may be 1/8-inch variance in a 12-foot straightedge test.

METHOD OF MEASUREMENT

Grinding will be measured by the square yard of area diamond ground. The measurement will be the final textured surface area regardless of the number of passes required to achieve acceptable results. 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 or adjoining lane, 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. Areas which were not designated to be diamond ground will not be measured for smoothness.

BASIS OF PAYMENT

Grinding will be paid for at the contract unit price per square yard. Payment shall be full compensation for all labor, equipment, material and incidentals to complete this work, including hauling and disposal of grinding residue.

TABLE 2 RECOMMENDED PRICE ADJUSTMENTS

Posted Speed < 45 mph		Posted Speed ≥ 45 mph	
MRI (in./mi.)	\$/ Sq. Yd.	MRI (in./mi.)	\$/ Sq. Yd.
0-79	\$1.13	0-45	\$1.13
80-90	$(90 - \text{MRI}) * 0.1125$	45-54	$(45 - \text{MRI}) * 0.1125$
≥ 91	0	> 45	0