

## RIDE SPECIFICATION FOR FLEXIBLE PAVEMENT (REVISED 06/2006)

### 1.0 CONSTRUCTION REQUIREMENTS:

Construct all surfacing courses to provide completed plant mix bituminous pavements that meet surface smoothness levels derived from the International Roughness Index (IRI) for a Category (1 or 2) project and that meet the surface profile requirements of the finished surface. Surface smoothness and surface profile will be analyzed from data collected by the Department using a Class I Laser Road Profiler following various MDT procedures pertaining to profiler operations.

### 2.0 SURFACE SMOOTHNESS:

Target IRI values are determined by project category based on the opportunities for improving the ride, by the pre-pave IRI, or by a combination of both as follows:

#### Category 1 Projects:

Target IRI set at 50 to 55 in/mi (0.79 to 0.87 m/km).

- Project with two or more opportunities to improve the ride or
- Single lift overlays with pre-pave IRI < 110 in/mile (1.74 m/km).

#### Category 2 Projects:

Target IRI set at 55 to 60 in/mi (0.87 to 0.95 m/km).

- Single lift overlays with pre-pave IRI value  $\geq$  110 in/mi (1.74 m/km) and < 190 in/mi (3.00 m/km).

#### Exception for High Pre-Pave IRI Roadways

Roadways with pre-pave IRI values above 190 in/mi (3.00 m/km) will be treated as a Category 1 project with two or more opportunities to improve the ride. However, if for other reasons (i.e., budgetary) only one opportunity is reasonable and/or feasible then MDT will specify a maximum post pave IRI should not be more than 50% of the pre-pave IRI. For these cases, there will be no pay adjustment factor based on smoothness; however, corrective actions need to be taken at contractor's expense if post paving IRI is greater than 50% of pre-paving IRI.

Each opportunity to improve the ride is one of the following:

- Placing a gravel base or surfacing course,
- Placing plant mix bituminous base,
- Placing cement treated base,
- Placing pulverized plant mix surfacing,
- Milling,
- Cold recycling (milling and laydown), or
- Each full 0.15 ft (45 mm) increment of new plant mix surfacing.

### 3.0 SURFACE PROFILE:

Correct surface profile defects that fail the bump criteria of 0.40 inches (10 mm) in a distance of 25 ft (7.62 m) within 30 calendar days of notification but prior to seal and cover operations. Correct surface profile defects by milling and filling deficient pavement depths or by diamond grinding excess pavement depths. Corrected surface profile defects will be retested and evaluated. Pavement thickness will be measured after profile corrections are made. Ensure corrected pavements do not create a transverse height difference between adjacent lanes exceeding 1/8 inch (3 mm). Fog seal corrected areas in the roadway if not chip sealed prior to winter shutdown.

### 4.0 TESTING & ACCEPTANCE:

The Department will test for surface smoothness and surface profile prior to placement of seal and cover on the final lift of plant mix bituminous surfacing pavement. Data collected for each wheel path will be averaged for that lane. Tests will be performed within three working days (extended by rain or other weather conditions) of completion of all paving. The Department will test divided highways within three working days (extended by inclement weather condition) of completion of paving for each direction of travel. The contractor must ensure that the entire finished lane width can be tested and is not impeded to Department personnel at the time of testing. Test results will be furnished within two working days.

If the entire final lift of pavement cannot be completed before winter shutdown, data will be collected for all roadway sections paved through the final lift. Evaluation of the remaining pavement will be performed once the paving is completed.

#### Courtesy Testing

Provide at least seven calendar days notice to the Project Manager to obtain a courtesy test. The Department will provide courtesy smoothness and surface profile tests once per project, on not less than 2 and not more than 3 miles (on not less than 3.2 and not more than 4.8 km) of continuous new pavement. Courtesy test results are informational only. The contractor interprets the courtesy test results and determines the impact to the work. The Department will perform separate tests for acceptance evaluation.

#### Surface Smoothness

The surface smoothness analysis will be used to determine the actual IRI for calculating pay factors for the entire plan depth of bituminous mix section placed in this contract.

Actual IRI values will be determined on all mainline travel lanes including climbing lanes, passing lanes, and ramps that are 0.2 miles (0.32 km) or longer. Bridge decks will be included only if they are paved as part of the project.

Smoothness data will not be evaluated for the following roadway sections:

- Climbing and passing lanes, less than 0.2 miles (0.32 km),
- Turning lanes,
- Acceleration and deceleration lanes,
- Shoulders and gore areas,
- Road approaches,
- Horizontal curves 900 ft (274.32 m) or less in centerline radius and pavement within the superelevation transitions of these short radius curves, or

- Pavement within 50 ft (15.24 m) of bridge decks (only for bridges not paved as part of the project), approach slabs, and the terminal paving points of the project.

Surface Profile

Areas requiring corrective work will be identified using the surface profile measurements of the finished surface. All areas not tested for surface profile under this provision are to meet the requirements in Specification Subsection 401.03.14 Surface Tolerances.

Measurement

The surface smoothness will be measured using the International Roughness Index (IRI). The surface smoothness will be evaluated by section. A section is defined as a single paved lane; 12 feet (3.66 m) wide or greater, 0.20 miles (0.32 km) long. Partial sections will be prorated or added to an abutting section.

Tables 1 and 2 present the category pay adjustment factors will be applied to each section:

*Table 1. Category 1 Pay Adjustment Factor Relationship.*

IRI (in/mi) [m/km]	Pay Adjustment Factor#
< 35 < [0.55]	1.25
35 – 50 [0.55 – 0.79]	1.845 – 17/1000 * IRI
50 < IRI < 55 [0.79 < IRI < 0.87]	1.00
55 – 75 [0.87 – 1.18]	1.825 – 3/200 * IRI
75 < IRI < 90 [1.18 < IRI < 1.42]	0.70
> 90 > [1.42]	Corrective Action Required (Initially Assumed as a Zero Pay)

*#Use only US Customary Units with pay adjustment factor relationships.*

*Table 2. Category 2 Pay Adjustment Factor Relationship.*

IRI (in/mi)	Pay Adjustment Factor#
< 50 < [0.79]	1.10
50 – 55 [0.79 – 0.87]	2.100 - 1/50 * IRI
55 < IRI < 60 [0.87 < IRI < 0.95]	1.00
60 – 95 [0.95 – 1.50]	1.343 - 1/175 * IRI
> 95 > [1.50]	Corrective Action Required (Initially Assumed as a Zero Pay)

*#Use only US Customary Units with pay adjustment factor relationships.*

**5.0 BASIS OF PAYMENT:**

Surface Smoothness

This is a Class \_\_\_\_ project. The pay factor will be applied to the unit price for each type of plant mix surfacing placed in each section. Calculate the quantity of the surfacing for each section as follows:

$$(L \times W \times D) \times \text{Unit Weight}$$

Where:

L = Length of the lot measured.

W = Width of the travel lane measured.

D = Depth of the entire bituminous surfacing section placed under this contract\*\*.

Unit Weight = 98% of mix design bulk density for each type of bituminous surfacing (When accepting density with nuclear gauge).

Unit Weight = 93% of Rice Gravity from the mix design for each type of bituminous surfacing (When accepting density by core method).

\*\*Where different types of bituminous surfacing are used on successive lifts, the pay factor is applied separately to each type of surfacing.

Incentives for sections that qualify for a pay factor greater than 1.00 will be reduced based on the number of density tests that do not meet minimum plant mix pavement density requirements as shown in the Ride Incentive Reduction Table (3) below.

*Table 3. Ride Incentive Reduction.*

Project Size	% of Density Tests Not Meeting Specifications		
	No Reduction of Ride Incentive	Incentive Reduced	No incentive Allowed
0 to 25,000 Tons	0 to 10 %	% Failing Tests * 8 - 60	25%
> 25,000 Tons	0 to 5 %	% Failing Tests * 6.67 - 33.33	20%

If more than 10% of the ride sections are subject to price reductions, no other sections will qualify for a pay factor greater than 1.00.

Price reductions will be calculated using the greater of the Contract Bid Price or base unit price for the grade of Plant Mix Bituminous Surfacing specified in the contract.

For Category 1 roadways and for any segment with a post-pave IR greater than 90 in/mi (1.42 m/km), the contractor is required to remove and replace the segment by milling 0.15 feet (3.81 mm) and replacing with new material meeting the original contract requirements. The maximum pay adjustment factor possible for the affected segment after corrective action is taken will be 1.0.

For Category 2 roadways and for any segment with a post-pave IR greater than 95 in/mi (1.50 m/km), the contractor is required to remove and replace the segment by milling 0.15 feet (3.81 mm) and replacing with new material meeting the original contract requirements. The maximum pay adjustment factor possible for the affected segment after corrective action is taken will be 1.0.

All work to prepare the roadway for testing, including but not limited to sweeping, is incidental to the work and is not measured for payment. Include all cost and resources to prepare the roadway for surface tolerance testing in the Plant Mix Bituminous Surfacing bid item. Requests for additional compensation by reason of this provision will not be considered nor allowed.