

Item 585

Ride Quality for Pavement Surfaces



1. DESCRIPTION

Measure and evaluate the ride quality of pavement surfaces.

2. EQUIPMENT

2.1. **Surface Test Type A.** Provide a 10-ft. straightedge or where allowed, a high-speed or lightweight inertial profiler, certified at the Texas A&M Transportation Institute.

2.2. **Surface Test Type B.** Provide a high-speed or lightweight inertial profiler, certified at the Texas A&M Transportation Institute. Provide equipment certification documentation. Display a current decal on the equipment indicating the certification expiration date.

Use a certified profiler operator from the Department's MPL. When requested, furnish documentation for the person certified to operate the profiler.

2.3. **Diamond Grinding Equipment.** Provide self-propelled powered grinding equipment specifically designed to smooth and texture pavements using circular diamond blades when grinding is required. Provide equipment with automatic grade control capable of grinding at least 3 ft. of width longitudinally in each pass without damaging the pavement.

3. WORK METHODS

Measure and evaluate profiles using Surface Test Types A and B on surfaces as described below unless otherwise shown on the plans.

3.1. **Transverse Profile.** Measure the transverse profile of the finished riding surface in accordance with Surface Test Type A.

3.2. **Longitudinal Profile.** Measure the longitudinal profile of the surface, including horizontal curves.

3.2.1. **Travel Lanes.** Unless otherwise shown on the plans, use Surface Test Type B on the final riding surface of all travel lanes except as follows:

3.2.1.1. **Service Roads and Ramps.** Use Surface Test Type A on service roads and ramps unless Surface Test Type B is shown on the plans.

3.2.1.2. **Short Projects.** Use Surface Test Type A when project pavement length is less than 2,500 ft. unless otherwise shown on the plans.

3.2.1.3. **Bridge Structures.** Measure the profile in accordance with the pertinent item or use Surface Test Type A for span type bridge structures, approach slabs, and the 100 ft. leading into and away from such structures.

3.2.1.4. **Leave-Out Sections.** Use Surface Test Type A for leave-out sections and areas between leave-out sections that are less than 100 ft.

3.2.1.5. **Ends.** Use Surface Test Type A on the first and last 100 ft. of the project pavement length.

- 3.2.2. **Shoulders and Other Areas.** Use Surface Test Type A for shoulders and all other areas including intermediate pavement layers.
- 3.3. **Profile Measurements.** Measure the finished surface in accordance with Surface Test Type A or B in accordance with Section 585.3.1., "Transverse Profile," Section 585.3.2., "Longitudinal Profile," and the plans.
- 3.3.1. **Surface Test Type A.** Test the surface with a 10-ft. straightedge as directed. Use an inertial profiler to measure the surface when allowed. The Engineer will use Department software to evaluate the surface.
- 3.3.2. **Surface Test Type B.**
- 3.3.2.1. **QC Testing.** Perform QC tests on a daily basis throughout the duration of the project. Use a 10-ft. straightedge, inertial profiler, profilograph, or any other means to perform QC tests.
- 3.3.2.2. **QA Testing.** Perform QA tests using either a high-speed or lightweight inertial profiler. Coordinate with and obtain authorization from the Engineer before starting QA testing. Perform QA tests on the finished surface of the completed project or at the completion of a major stage of construction, as approved. Perform QA tests within 7 days after receiving authorization.
- The Engineer may require QA testing to be performed at times of off-peak traffic flow. Operate the inertial profiler in a manner that does not unduly disrupt traffic flow as directed. When using a lightweight inertial profiler to measure a surface that is open to traffic, use a moving traffic control plan in accordance with Part 6 of the TMUTCD and the plans.
- In accordance with Tex-1001-S, operate the inertial profiler and deliver test results within 24 hr. of testing. Provide all profile measurements in electronic data files using the format specified in Tex-1001-S.
- 3.3.2.2.1. **Verification Testing.** The Engineer may perform ride quality verification testing within 10 working days after the Contractor's QA testing is complete for the project or major stage of construction. When the Department's profiler produces an overall average international roughness index (IRI) value over 3.0 in. per mile higher than the value calculated using Contractor data, the Engineer will decide whether to accept the Contractor's data, use the Department's data, use an average of both parties' data, or request a referee test. Referee testing is mandatory if the difference is greater than 6.0 in. per mile.
- 3.3.2.2.2. **Referee Testing.** The Construction Division will conduct referee testing, and the results are final. The Construction Division may require recertification for the Contractor's or Department's inertial profiler.
- 3.4. **Acceptance Plan and Pay Adjustments.** The Engineer will evaluate profiles for determining acceptance, bonus, penalty, and corrective action.
- 3.4.1. **Surface Test Type A.** Use diamond grinding or other approved work methods to correct surface areas that have more than 1/8-in. variation between any 2 contacts on a 10-ft. straightedge. For asphalt concrete pavements, fog seal the aggregate exposed from diamond grinding. Following corrective action, retest the area to verify compliance with this Item.
- 3.4.2. **Surface Test Type B.** The Engineer will use the QA test results to determine pay adjustments for ride quality using Department software. IRI values will be calculated using the average of both wheel paths. When taking corrective actions to improve a deficient 0.1-mi. section, pay adjustments will be based on the data obtained from reprofiling the corrected area.
- 3.4.2.1. **IRI Pay Adjustment for 0.1-mi. Sections.** Unless pay adjustment Schedule 1 or 2 is shown on the plans, Schedule 3 from Table 1 and Table 2 will be used to determine the level of pay adjustment for each 0.1-mi. section on the project.

No bonus will be paid for any 0.1-mi. section that contains localized roughness.

- 3.4.2.2. **IRI Deficient 0.1-mi. Sections.** When pay adjustment Schedule 1 or 2 is specified, correct any 0.1-mi. section with an average IRI over 95.0 in. per mile. Correct the deficient section to an IRI of 65 in. per mile or less when Schedule 1 is specified or correct to an IRI of 75 in. per mile or less when Schedule 2 is specified. No corrective action is required for Schedule 3. After making corrections, reprofile the pavement section to verify that corrections have produced the required improvements.

The associated bonus shown in Table 1 applies when successful corrective action improves the IRI of a deficient 0.1-mi. section.

If corrective action does not produce the required improvement, the Engineer may require:

- continued corrective action, or
- apply the pertinent schedule penalty shown in Table 2 if the reprofiled IRI is greater than 65 in. per mile.

- 3.4.2.2.1. **Corrective Action.** Use diamond grinding or other approved work methods to correct any deficient 0.1-mi. section. For asphalt concrete pavements, fog seal the aggregate exposed from diamond grinding or other approved work methods allowed.

- 3.4.2.3. **Localized Roughness.** Measure localized roughness using an inertial profiler in accordance with Tex-1001-S. The Engineer will determine areas of localized roughness using the individual profile from each wheel path.

Use a 10-ft. straightedge, when allowed, to locate areas that have more than 1/8-in. variation between any 2 contacts on the straightedge when Schedule 3 is specified.

The Engineer may waive localized roughness requirements for deficiencies resulting from manholes or other similar appurtenances near the wheel paths.

- 3.4.2.3.1. **Corrective Action.** Use diamond grinding or other approved work methods to correct localized roughness. For asphalt concrete pavements, fog seal the aggregate exposed from diamond grinding or other approved work methods allowed. Reprofile the corrected area, and provide results that show the corrective action was successful. If the corrective action is not successful, the Engineer will require continued corrective action or apply a localized roughness penalty.

- 3.4.2.3.2. **Localized Roughness Penalty.** Instead of continued corrective action, the Engineer may assess a penalty for each occurrence of localized roughness. No more than one penalty will be applied for any 5 ft. of longitudinal distance. For Schedule 1, a localized roughness penalty of \$500 per occurrence will be applied. For Schedule 2, a localized roughness penalty of \$250 per occurrence will be applied. For Schedule 3, localized roughness penalties will not be applied.

Localized roughness penalties will be evaluated within 0.1-mi. sections and applied unless the IRI deficient 0.1-mi. section penalty is greater. When the IRI deficient penalty is greater, the pay adjustment in Table 2 will be applied.

4. MEASUREMENT AND PAYMENT

The work performed, materials furnished, certification and recertification, traffic control for all testing, materials and work needed for corrective action, equipment, labor, tools, and incidentals will not be measured or paid for directly but will be subsidiary to pertinent Items. Sections shorter than 0.1 mi. and longer than 50 ft. will be prorated in accordance with Tex-1001-S.

Table 1
Bonus Pay Adjustments for Ride Quality

Average IRI for each 0.10 mi. of Traffic Lane (in./mi.)	Pay Adjustment \$/0.10 mi. of Traffic Lane	
	Schedule 1 and Schedule 2	Schedule 3
≤ 30	600	300
31	580	290
32	560	280
33	540	270
34	520	260
35	500	250
36	480	240
37	460	230
38	440	220
39	420	210
40	400	200
41	380	190
42	360	180
43	340	170
44	320	160
45	300	150
46	280	140
47	260	130
48	240	120
49	220	110
50	200	100
51	180	90
52	160	80
53	140	70
54	120	60
55	100	50
56	80	40
57	60	30
58	40	20
59	20	10
60 to 65	0	0

Table 2
Penalty Pay Adjustments for Ride Quality

Average IRI for each 0.10 mi. of Traffic Lane (in./mi.)	Pay Adjustment \$/0.10 mi. of Traffic Lane	
	Schedule 1	Schedule 2
66	-20	0
67	-40	0
68	-60	0
69	-80	0
70	-100	0
71	-120	0
72	-140	0
73	-160	0
74	-180	0
75	-200	0
76	-220	-20
77	-240	-40
78	-260	-60
79	-280	-80
80	-300	-100
81	-320	-120
82	-340	-140
83	-360	-160
84	-380	-180
85	-400	-200
86	-420	-220
87	-440	-240
88	-460	-260
89	-480	-280
90	-500	-300
91	-520	-320
92	-540	-340
93	-560	-360
94	-580	-380
95	-600	-400
> 95	-3,000	