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.

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 MPL. When requested, furnish documentation for the person certified to operate the profiler.

2.3. **Diamond Grinding and Grooving Equipment**. Provide self-propelled powered grinding and grooving equipment specifically designed to smooth and texture pavements using circular diamond blades when grinding or grooving 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. When grooving, configure blades to produce grooves 0.10–0.16 in. wide and 0.19 in. deep with a land area 0.70–0.80 in. between the grooves unless otherwise shown on the plans. Meet the groove tolerances ±0.02 in. for width and ±0.06 in. for depth unless otherwise directed.

3. WORK METHODS

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

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

3.1.1. **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.

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

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

3.1.1.3. **Bridge Structures**. Measure the profile in conformance 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.

3.1.1.4. **Leave-Out Sections**. Use Surface Test Type A for leave-out sections and areas between leave-out sections that are less than 400 ft., and 100 ft. leading into and away from leave-out sections.

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

3.1.2. **Shoulders and Other Areas**. Use Surface Test Type A for shoulders and all other areas, including intermediate pavement layers.

3.2. **Profile Measurements**. Measure the finished surface using Surface Test Type A or Type B in accordance with Section 585.3.1., "Longitudinal Profile," and the plans.

3.2.1. **Surface Test Type A**. Test the surface using a 10-ft. straightedge as directed.

3.2.2. **Surface Test Type B**.

3.2.2.1. **Quality Control (QC) Testing**. Perform QC tests throughout the duration of the project. Use a 10-ft. straightedge, inertial profiler, profilograph, or any other means to perform QC tests.

3.2.2.2. **Quality Assurance (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 the TMUTCD, Part 6, 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.

3.2.2.2.1. **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 of more than 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.

3.2.2.2.2. **Referee Testing**. The Maintenance Division will conduct referee testing, and the results are final. The Maintenance Division may require recertification for the Contractor's or Department's inertial profiler when the results between the verification, Contractor, and referee testing are greater than 6.0 in. per mile.

3.3. **Acceptance Plan and Payment Adjustments**. The Engineer will evaluate profiles for determining acceptance, payment adjustment, and corrective action.

3.3.1. **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 two contacts on a 10-ft. straightedge. For asphalt concrete pavements, when directed, fog seal the aggregate exposed from diamond grinding. The Engineer will waive surface variation requirements for deficiencies resulting from manholes, permanent traffic markings, or other similar appurtenances near the wheel paths. Before performing work, the Engineer will determine whether repair areas or crack sealing may result in reflective defects, and may waive surface variation requirements. Following corrective action, retest the area to verify compliance with this Item.

3.3.2. **Surface Test Type B**. The Engineer will use the QA test results to determine payment 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, payment adjustments will be based on the data obtained from reprofiling the corrected area.

3.3.2.1. **International Roughness Index (IRI) Payment Adjustment for 0.1-mi. Sections**. For asphalt concrete pavements, unless payment adjustment Schedule 1 or Schedule 2 is shown on the plans, Schedule 3 will be used to determine the level of payment adjustment for each 0.1-mi. section on the project. Before performing work, the Engineer will determine whether Surface Test Type A will be used instead of the specified payment adjustment schedule when the following conditions exist in existing travel lanes:

- travel lane is directly adjacent to existing curb and gutter, or
- travel lane has repair areas or crack sealing that may result in reflective defects.

For concrete pavements, payment adjustment Schedule 5 will be used unless payment adjustment Schedule 4 is shown on the plans.

No positive payment adjustment will be paid for any 0.1-mi. section that contains localized roughness after corrective action is performed.

3.3.2.2. **International Roughness Index (IRI) Deficient 0.1-mi. Sections**. Correct any 0.1-mi. section with an average IRI of more than 95.0 in. per mile. The Engineer may apply a $3,000 penalty if the IRI is greater than 95 instead of requiring corrective action. No corrective action is required for Schedule 3 or Schedule 5. After making corrections, reprofile the pavement section to verify that corrections have produced the required improvements.

The associated payment adjustment shown in Table 1 and Table 2 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
- application of the pertinent payment adjustment in accordance with Table 1 or Table 2.

3.3.2.3. **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.

Before performing corrective action, the Engineer and Contractor, together, will use a 10-ft. straightedge to confirm localized roughness identified from inertial profiler results. Correct confirmed areas that have more than 1/8-in. variation between any two contacts on the straightedge.

The Engineer will waive localized roughness requirements for deficiencies resulting from manholes, permanent traffic markings, or other similar appurtenances near the wheel paths.

3.3.2.3.1. **Localized Roughness Payment Adjustment.** Instead of corrective action, the Engineer may assess a payment adjustment for each occurrence of confirmed localized roughness. No more than one payment adjustment will be applied for any 5 ft. of longitudinal distance. No payment adjustment will be applied where the Engineer waived localized roughness requirements. For Schedule 1, a localized roughness payment adjustment of $500 per occurrence will be applied. For Schedule 2 and Schedule 4, a localized roughness payment adjustment of $250 per occurrence will be applied. For Schedule 3 and Schedule 5, a localized roughness payment adjustment will not be applied; however, corrective action will be required in areas not waived by the Engineer.

Localized roughness payment adjustments will be evaluated within 0.1-mi. sections and applied unless the IRI deficient 0.1-mi. section payment adjustment is greater. When the IRI deficient payment adjustment is greater, the payment adjustment in Table 1 or Table 2 will be applied.

3.3.2.4. **Corrective Action**. Use diamond grinding or other approved work methods to correct IRI deficient sections and localized roughness. After corrective action is complete, perform the following.

- For asphalt concrete pavements, when directed, fog seal the aggregate exposed from diamond grinding or other approved work methods allowed.
- For concrete pavements, when directed, groove the pavement longitudinally after diamond grinding.

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
Payment Adjustments for Ride Quality of Asphalt Concrete Pavements

Average IRI for Each 0.10 mi. of Traffic Lane	Payment Adjustment for $/0.10 mi. of Traffic Lane		
(in./mi.)	Schedule 1	Schedule 2	Schedule 3
≤30	600	600	300
31	580	580	290
32	560	560	280
33	540	540	270
34	520	520	260
35	500	500	250
36	480	480	240
37	460	460	230
38	440	440	220
39	420	420	210
40	400	400	200
41	380	380	190
42	360	360	180
43	340	340	170
44	320	320	160
45	300	300	150
46	280	280	140
47	260	260	130
48	240	240	120
49	220	220	110
50	200	200	100
51	180	180	90
52	160	160	80
53	140	140	70
54	120	120	60
55	100	100	50
56	80	80	40
57	60	60	30
58	40	40	20
59	20	20	10
60–65	0	0	0
66	-20	0	0
67	-40	0	0
68	-60	0	0
69	-80	0	0
70	-100	0	0
71	-120	0	0
72	-140	0	0
73	-160	0	0
74	-180	0	0
75	-200	0	0
76	-220	-20	0
77	-240	-40	0
78	-260	-60	0
79	-280	-80	0
80	-300	-100	0
81	-320	-120	0
82	-340	-140	0
83	-360	-160	0
84	-380	-180	0
85	-400	-200	0
86	-420	-220	0
87	-440	-240	0
88	-460	-260	0
89	-480	-280	0
90	-500	-300	0
91	-520	-320	0
92	-540	-340	0

Average IRI for Each 0.10 mi. of Traffic Lane	Payment Adjustment for $/0.10 mi. of Traffic Lane		
(in./mi.)	Schedule 1	Schedule 2	Schedule 3
93	-560	-360	0
94	-580	-380	0
95	-600	-400	0
>95	See Section 585.3.3.2.2.		0

Table 2
Payment Adjustments for Ride Quality of Concrete Pavements

Average IRI for Each 0.10 mi. of Traffic Lane	Payment Adjustment for $/0.10 mi. of Traffic Lane	
(in./mi.)	Schedule 4	Schedule 5
≤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
60–85	0	0
86	-40	0
87	-80	0
88	-120	0
89	-160	0
90	-200	0
91	-240	0
92	-280	0
93	-320	0
94	-360	0
95	-400	0
>95	See Section 585.3.3.2.2.	0