

ITEM 585

RIDE QUALITY FOR PAVEMENT SURFACES

585.1. Description. Measure and evaluate the ride quality of pavement surfaces.

585.2. Equipment.

- A. Surface Test Type A.** Provide a 10-ft. straightedge.
- B. Surface Test Type B.** Provide a high-speed or lightweight inertial profiler, certified at the Texas Transportation Institute. Provide the Engineer with equipment certification documentation. Display a current decal on the equipment indicating the certification expiration date.

Use a certified profiler operator from the Construction Division's approved list. When requested, furnish the Engineer documentation for the person certified to operate the profiler.
- C. Diamond Grinding Equipment.** When grinding is required, provide self-propelled powered grinding equipment that is specifically designed to smooth and texture pavements using circular diamond blades. Provide equipment with automatic grade control capable of grinding at least 3 ft. of width longitudinally in each pass without damaging the pavement.

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

- A. Transverse Profile.** Measure the transverse profile of the finished riding surface in accordance with Surface Test Type A.
- B. Longitudinal Profile.** Measure the longitudinal profile of the surface, including horizontal curves.
 - 1. Travel Lanes.** Unless otherwise shown on the plans, use Surface Test Type B on the finished riding surface of all travel lanes except as follows.
 - a. Service Roads and Ramps.** Use Surface Test Type A on service roads and ramps unless Surface Test Type B is shown on the plans.
 - b. Short Projects.** Use Surface Test Type A when project pavement length is less than 2,500 ft. unless otherwise shown on the plans.

- c. **Bridge Structures.** For span type bridge structures, approach slabs, and the 100 ft. leading into and away from such structures, measure the profile in accordance with the pertinent item or use Surface Test Type A.
 - d. **Leave-out Sections.** Use Surface Test Type A for areas listed on the plans as leave-out sections.
 - e. **Ends.** Use Surface Test Type A on the first and last 100 ft. of the project pavement length.
2. **Shoulders and Other Areas.** Use Surface Test Type A for shoulders and all other areas including intermediate pavement layers.
- C. **Profile Measurements.** Measure the finished surface in accordance with Surface Test Type A or B in accordance with Section 585.3.A, “Transverse Profile”; Section 585.3.B, “Longitudinal Profile”; and the plans.
- 1. **Surface Test Type A.** Test the surface with a 10-ft. straightedge at locations selected by the Engineer.
 - 2. **Surface Test Type B.**
 - a. **Quality Control (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.
 - b. **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 by the Engineer. 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 determined by the Engineer. 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 to the Engineer within 24 hr. of testing.

Provide all profile measurements to the Engineer in electronic data files using the format specified in Tex-1001-S.

(1) Verification Testing. Within 10 working days after the Contractor's QA testing is completed for the project or major stage of construction, the Engineer may perform ride quality verification testing. When the Department's profiler produces an overall average international roughness index (IRI) value that is 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 party's data, or request a referee test. Referee testing is mandatory if the difference is greater than 6.0 in. per mile.

(2) Referee Testing. The Construction Division will conduct referee testing, and their results are final. The Construction Division may require recertification for the Contractor's or Department's inertial profiler.

D. Acceptance Plan and Pay Adjustments. The Engineer will evaluate profiles for determining acceptance, bonus, penalty, and corrective action.

- 1. Surface Test Type A.** Use diamond grinding or other methods approved by the Engineer 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 correction, retest the area to verify compliance with this Item.
- 2. Surface Test Type B.** The Engineer will use the QA test results and the corresponding values in Table 1 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.
 - a. 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 will be used to determine the level of bonus or penalty for each 0.1-mi. section on the project.

When Schedule 3 is specified, no associated bonuses will be paid for any 0.1-mi. section that contains localized roughness.

- b. IRI Deficient 0.1-mi. Sections.** When pay adjustment Schedule 1 or 2 is specified, use diamond grinding or other approved work methods to correct any 0.1-mi. section with an average IRI over 95.0 in. per mile (IRI deficient). Correct the deficient section to an IRI of 65 in. per mile or less when Schedule 1 is specified and to an IRI of 75 in. per mile or less when Schedule 2 is specified. After making corrections, reprofile the pavement section to verify that corrections have produced the required improvements. Associated bonuses apply when successful corrective action improves the IRI of a deficient 0.1-mi. section.

(1) Hydraulic Concrete Pavement. Use diamond grinding to correct deficient 0.1-mi. sections.

(2) Asphalt Concrete Pavement. For asphalt concrete pavement, the Engineer may assess a \$3,000 penalty per 0.1-mi. section instead of requiring corrective action. Use diamond grinding or other approved methods to correct deficient 0.1-mi. sections. If corrective action does not produce the required improvement, the Engineer may require continued corrective action, assess the pertinent schedule penalty if the reprofiled IRI is 95 in. per mile or less, or assess the \$3,000 penalty if the reprofiled IRI is greater than 95 in. per mile. Fog seal the aggregate exposed from diamond grinding or other corrective methods allowed.

- c. Localized Roughness.** Localized roughness will be measured using an inertial profiler in accordance with Tex-1001-S. The Engineer will determine areas of localized roughness using the average profile from both wheel paths.

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

(1) Corrective Action. When Schedule 1 or 2 is specified, use diamond grinding or other approved methods to remove localized roughness.

When Schedule 3 is specified, use a 10-ft. straightedge to further evaluate areas with localized roughness, and use

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diamond grinding or other approved methods to correct areas that have more than 1/8-in. variation between any 2 contacts on the straightedge.

For asphalt concrete pavements, fog-seal the aggregate exposed from diamond grinding.

Reprofile the corrected area, and provide the Engineer the results that show the corrective action was successful. For asphalt concrete pavement, if the corrective action is not successful, the Engineer will require continued corrective action or assess a localized roughness penalty.

- (2) **Localized Roughness Penalty Assessed.** For asphalt concrete pavement, in lieu of corrective action, the Engineer may assess a penalty for each occurrence of localized roughness. No more than 1 penalty will be assessed for any 5 ft. of longitudinal distance. No localized roughness penalties will be assessed in deficient 0.1-mi. sections where the Engineer elects to assess the \$3,000 penalty instead of corrective action. For Schedule 1, a localized roughness penalty of \$500 per occurrence will be assessed. For Schedule 2, a localized roughness penalty of \$250 per occurrence will be assessed. For Schedule 3, localized roughness penalties will not be assessed.

585.4. 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
Pay Adjustment Schedules 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	Schedule 3
< 30	600	600	300
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	0	0	0
61	0	0	0

Table 1 (continued)
Pay Adjustment Schedules 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	Schedule 3
62	0	0	0
63	0	0	0
64	0	0	0
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
93	-560	-360	0
94	-580	-380	0

Table 1 (continued)
Pay Adjustment Schedules 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	Schedule 3
95	-600	-400	0
> 95	Corrective Action	Corrective Action	Not Applicable