

**KANSAS DEPARTMENT OF TRANSPORTATION  
SPECIAL PROVISION TO THE  
STANDARD SPECIFICATIONS EDITION OF 1990**

**SECTION 502**

**PORTLAND CEMENT CONCRETE PAVEMENT  
(Pavement Smoothness)**

**Page 290, subsection 502.06. Delete this subsection and replace with the following:**

**502.06 PAVEMENT SMOOTHNESS.**

**a. General.**

The pavement smoothness will be determined by profilographing the finished surfaces of the mainline pavement, sideroads, auxiliary lanes, and ramps.

(1) Excluded from profilograph testing are:

- (a) Bridge Decks,
- (b) Acceleration and deceleration lanes for at-grade intersections,
- (c) Shoulders,
- (d) Pavement on horizontal curves with centerline radius of curvature of less than 300 m, and pavement within the superelevation transition of such curves,
- (e) Individual sections of pavement less than 15 m in length,
- (f) The first (or last) five meters of a pavement section where the Contractor is not responsible for the adjoining surface.

On surfaces excluded from profilograph testing, the Engineer will determine the pavement smoothness using a three-meter straightedge. The Engineer will select the locations to be tested. The variation of the surface from the testing edge of the straightedge shall not exceed 3 mm between any two contacts, longitudinal or transverse. The Contractor shall correct all irregularities exceeding the specified tolerance using equipment and methods approved by the Engineer. After the Contractor has corrected an irregularity, the Engineer will retest the area to verify compliance with the specified tolerance.

**b. Equipment.**

The Contractor shall provide and operate a California type profilograph to determine the pavement profile. Other types of profilographs that produce compatible results may be used if approved by KDOT's Bureau of Materials and Research. The Contractor's operator shall be certified according to Kansas Test Method KT-54.

If the Contractor's profilograph has a mechanical recorder, the Contractor shall provide a ProScan electronic scanner, with motorized paper transport, to reduce the trace. The motorized paper transport shall be used when scanning the profilograph traces. KDOT's Bureau of Materials

and Research can provide the information necessary for the Contractor to obtain a ProScan electronic scanner. Other types of automated trace reduction equipment may be used if approved by KDOT's Bureau of Materials and Research.

If the Contractor's profilograph has a computerized recorder, the trace produced will be evaluated without further reduction.

#### **c. Surface Tolerances and Testing.**

The Contractor shall produce pavement with an average profile index of 475 mm/km or less per 0.1 km section (710 mm/km or less on roadways with a posted speed of 45 mph or less). Pavement with initial profiles that exceed 475 mm/km per 0.1 km section (710 mm/km on roadways with a posted speed of 45 mph or less) may be accepted after corrective measures by the Contractor have been completed.

The Contractor shall determine the pavement profiles for each lane according to the procedures for one lane, as shown in Kansas Test Method KT-54. Additional profiles may be taken only to define the limits of an out-of-tolerance surface variation. The Engineer may use a three-meter straightedge (or other means) to detect irregularities outside the required trace paths. The Engineer may also use the straightedge to delineate the areas that require corrective action.

The Contractor shall repair or replace any curing membrane or protective cover that is damaged or removed during the testing.

#### **d. Pavement Smoothness Evaluation.**

The Contractor shall determine a profile index (mm/km) for each section of finished pavement surface. A pavement section is defined as a continuous area of finished pavement 0.1 km in length and one lane (3.7 m nominal) in width. A partial section resulting from an interruption of the continuous pavement surface (i.e. bridge approaches, sideroad tie-ins, the cessation of the daily paving operations, etc.) is subject to the same evaluation as a whole section.

The Contractor shall determine a daily average profile index for each day's paving operation. A day's paving operation is defined as a minimum of 0.1 km section of pavement placed in a day. If less than 0.1 km section is paved, the day's production will be grouped with the next day's production. If the production of the last day of project paving is less than 0.1 km section, it will be grouped with the previous day's production.

During the initial paving operations (and after long shut-down periods), the pavement will be tested as soon as the concrete has cured sufficiently to permit testing. The Engineer and the Contractor will use the results of the initial testing to evaluate the paving methods and equipment. If the initial paving operations produces acceptable results, the Contractor may continue paving.

If the day's average profile index exceeds 630 mm/km (1025 mm/km on roadways with posted speeds of 45 mph or less), the paving operation will be suspended until corrective action is taken by the Contractor. When the paving is resumed, the paving operations will be evaluated with the initial testing procedures shown above.

The Contractor shall furnish the profilogram and his evaluation to the Engineer. The evaluation of the traces shall be performed according to KT-54. Results shall be furnished to the

Engineer within two working days after placement of the pavement and again within two working days after any corrections are made.

**e. Corrective Actions.**

For determining pavement sections where corrective work or pay adjustments will be necessary, the pavement will be evaluated in 0.1 km sections using the profilograph. Each individual profilograph trace will be evaluated (not the average of multiple traces) to determine the areas where corrective action is needed.

Within each 0.1 km section, all areas representing high points (bumps) with deviations in excess of 7.5 mm in a length of 7.5 m or less shall be corrected by the Contractor regardless of the profile index value.

(1) For roadways with a posted speed greater than 45 mph.

Any 0.1 km section, including bumps, having an initial profile index between 476 and 630 mm/km shall be corrected to reduce the profile index to 400 mm/km or less on each trace. Any 0.1 km section, including bumps, having an initial profile index of 631 mm/km or greater shall be corrected to reduce the profile index to 400 mm/km or less on each trace, or replaced at the Contractor's option.

On sections where corrections are made, the pavement will be tested by the Contractor to verify that corrections have produced a profile index of 400 mm/km or less for each trace.

(2) For roadways with a posted speed of 45 mph or less and:

- Ramps from the nose to the intersection of the adjoining roadway.
- Acceleration and deceleration lanes including the taper. Acceleration lanes that become a through lane are limited to 150 m from the nose.

Any 0.1 km section, including bumps, having an initial profile index between 711 and 1025 mm/km shall be corrected to reduce the profile index to 710 mm/km or less on each trace. Any 0.1 km section, including bumps, having an initial profile index of 1026 mm/km or greater shall be corrected to reduce the profile index to 710 mm/km or less on each trace, or replaced at the Contractor's option.

On sections where corrections are made, the pavement will be tested by the Contractor to verify that corrections have produced a profile index of 710 mm/km or less for each trace.

(3) Corrections shall be made using an approved profiling device or by removing and replacing the pavement. Bush hammers or other impact devices will not be permitted.

The corrective methods used by the Contractor shall be applied to the full lane width. When completed, the corrected area (full lane width) shall have uniform texture and appearance, with the beginning and ending of the corrected area squared normal to centerline of the paved surface. Where surface corrections are made, transverse grooving will not be required.

Corrective work shall be at the Contractor's expense and shall be completed prior to determining pavement thickness.

(4) The Engineer may perform profilograph testing on the surface for monitoring and comparison purposes. The Engineer may test the entire project length if he determines that the Contractor-certified test results are inaccurate, and the Contractor will be charged for this work at a rate of \$400.00 per kilometer, per profile track, with a minimum charge of \$800.00. Furnishing inaccurate tests may result in decertification of the Contractor's certified operator.

**f. Pay Adjustments.**

Pay adjustments will be based on the initial average profile index determined for the "sections" prior to performing any corrective work.

If the Contractor elects to remove and replace the sections, the Contractor will be paid the price adjustment that corresponds to the initial average profile index obtained on the pavement sections after replacement.

Areas excluded from the profilograph testing will not be subject to price adjustments.

When the Plans dictate that an area of pavement is to be hand finished, the area will not be subject to reduced payment. However, the area is to be profiled and corrected as necessary to meet these specifications. If the initial average profile index is 285 mm/km or less per 0.1 km section (400 mm/km on roadways with a posted speed of 45 mph or less & ramps), the incentive payment will be applied as shown in TABLE 2.

**TABLE 2**  
**SCHEDULE FOR ADJUSTED PAYMENT**

Ave. Profile Index mm per km per 0.1 km section (greater than 45 mph)	Ave. Profile Index mm per km per 0.1 km section (45 mph or less & ramps)	Contract Price Adjustment per 0.1 km section per lane
95 or less		+\$760.00
96 to 160	240 or less	+\$630.00
161 to 240		+\$470.00
	241 to 400	+\$310.00
241 to 285		+\$240.00
286 to 475	401 to 710	+\$0.00
476 to 630	711 to 1025	+\$0.00*
631 or more	1026 or more	-\$470.00*

\* Correct to 400 mm/km (710 mm/km for 45 mph or less & ramps)

Payments made for "Concrete Pavement Smoothness" will be shown as an added item to the Contract.

12-21-00 M&R (WHP)