

**STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION**

**SPECIAL PROVISION
FOR
PCC PAVEMENT SMOOTHNESS**

SEPTEMBER 20, 2005

I. DESCRIPTION

This work consists of providing smoothness requirements for those sections of PCC pavement as identified on the plans. See plan notes for locations where this provision will apply.

II. MATERIALS (None Required)

III. CONSTRUCTION REQUIREMENTS

A. PROFILOGRAPH TEST

1. **Equipment and Calibration:** Equipment & calibration shall conform to Section 380.3 B.7 of the Standard Specifications except for the following exception:

The Contractor shall supply and use a California type profilograph. The computer shall smooth the profile using only a third-order Butterworth filter with a cutoff wavelength of 2.0 feet (600 mm). The computer shall generate a profile index using a 0.2 inch blanking band and shall use a 0.3 inch (8 mm) bump threshold to identify "must grind" locations.

2. **Operation:** The profilograph shall be operated at a speed no greater than a normal walk. Two passes shall be made in each driving lane, one in each approximate wheel path. Each trace shall be labeled to show the project, stationing, lane, wheel path, date ground, date tested, and the name of the operator.

Tests cannot be run sooner than the next working day following placement. Segments less than 1000 linear feet (300 m) may be grouped with the subsequent days production. Results will be furnished to the Engineer in a timely manner.

All areas that need to be ground will have the retest results attached to the original trace.

Curing membrane damaged or protective cover removed during testing operation shall be repaired or replaced by the Contractor as directed by the Engineer at no cost to the Department.

3. **Evaluation:** Evaluation consists of determining the Profile Index to the nearest 0.5 inch per mile (1 mm/km) by measuring and summing scallops that appear outside a 0.2 inch (5 mm) blanking band. The average profile index will be determined from the two wheel paths in each driving lane. Individual bumps will be evaluated using a 0.3 (8 mm) inch bump template. Average profile indexes will be rounded to the nearest 0.1 inch (1 mm).

The Department will spot check or retest areas it desires, with the Department profilograph. If a discrepancy between the traces exist, the cause of the discrepancy shall be determined and the area rerun if necessary, as determined by the Engineer.

4. **Requirements:** Pavement on tangent alignment or on horizontal curves having a centerline radius of 1000 feet (300 m) or more and pavement within their superelevation transitions shall not exceed an average Profile Index of 10 inches (158 mm/km) per mile.

Pavement on horizontal curves having a centerline radius less than 1000 feet (300 m) and their superelevation transitions will not be tested with the profilograph.

5. Driving lanes with an average Profile Index between 10.1 and 20 inches (159 mm/km and 315 mm/km) per mile in any 0.1 mile (100 m) section will be subject to one of the following at the discretion of the Contractor.

- 1) Satisfactorily correct deficient area by grinding. Grinding will be accomplished with specially prepared circular diamond blades mounted on a horizontal shaft. Areas that have been ground will not be left smooth or polished, but will have a uniform texture equal in roughness to the surrounding unground concrete. This will require that the 0.1 mile section be reprofiled by the Contractor.

- 2) Accept affected area with a price reduction as per the table located in this special provision.

If the Contractor chooses to correct the deficient area by grinding, the resultant Profile Index after grinding will be used for payment in accordance with Section 9, except that the sections ground to a Profile Index less than 10.0 inches per mile shall earn no more than 100 percent pay.

6. Driving lanes with an average Profile Index exceeding 20 inches per mile (315 mm/km) in any 0.1 mile (100 m) section will be subject to the following at the discretion of the Engineer:

- 1) Satisfactorily correct deficient area by grinding as specified in 5.1 above.

- 2) Remove and replace deficient areas.

If the Engineer requires the pavement to be ground, the deficient area shall be ground to a Profile Index less than 20.0 inches per mile.

Once the pavement is ground to a Profile index less than 20.0, any subsequent grinding shall be done at the discretion of the Contractor, in accordance with Section 5 above. The section shall be reprofiled and the resultant Profile Index after grinding will be used for payment in accordance with Section 9, except that the sections ground to a Profile Index less than 10.0 inches per mile shall earn no more than 100 percent pay.

7. Individual bumps in excess of 0.3 inches in 25 feet (8 mm in 8 m) shall be subject to one of the following at the discretion of the Engineer:
 - 1) Satisfactorily correct deficient area by grinding as specified in 5.1 above.
 - 2) Bumps less than 1/4 inch in 10 feet (6 mm in 3 m) may be accepted without correction.
 - 3) Remove and replace deficient areas.

Pavement, with profile smoothness values exceeding 10 inches/mile (159 to 315 mm/km), in any 0.1 mile section with bumps in excess of 0.3 inch in 25 feet (8mm in 8 m) may be ground and corrected to a lesser profile index as specified in sections 5 and 6 above.

8. Coring for pavement thickness measurement may be performed after all corrective action has been completed.
9. **Incentive/Disincentive Payment:** Payments will be made based on the chart below:

<u>Profile Index Inches/mile</u>	<u>Profile Index mm/km</u>	<u>Price Adjustment % of Contract Unit Price</u>
0 to 2.9	0 to 46	103.5
3 to 3.9	47 to 62	102.4
4 to 4.9	63 to 78	101.2
5 to 10.0	79 to 158	100.0
10.1 to 12.9	159 to 204	98.8
13 to 15.9	205 to 251	97.7
16 to 20	252 to 315	96.5

Incentive payments cannot be improved due to grinding regardless of the average profile index.

The adjustments in the unit price will apply to the total area of the 0.1 mile (100 m) long section. The area will be computed using the total lane width (12 feet [3.7 m] or less) and the total length of the section (0.1 mile [100 m] or less if it is the segment at the end of the project.

Areas excluded from profilograph testing shall be checked for surface deviations using a 10 foot (3 m) straightedge as per Section 380.3 O.1.

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