

**OKLAHOMA DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION
FOR
ACCEPTANCE OF
PORTLAND CEMENT CONCRETE PAVEMENT**

These Special Provisions revise, amend and where in conflict, supersede applicable sections of the 1999 Standard Specifications for Highway Construction, English and Metric, as applicable. Units of measurement are provided in the subsections in both English and Metric equivalents. The units applicable for this project will be those specified in the project plans. These special provisions apply to Portland cement concrete pavements.

414.01. Description. *(Add the following.)*

These acceptance procedures will apply to all Class A and class AP concrete and related reinforcing steel used in pavement and shoulders.

414.04. Construction methods. *(Amend to include the following:)*

- (l) **Contractor's Quality Control Testing and Inspection.** The contractor shall provide quality control personnel as necessary to assure the production of quality products as specified. He shall be responsible for the process control of all materials during handling, blending, mixing and placing operations to produce acceptable concrete pavement. At no time will the Engineer issue instructions to the Contractor or producer as to setting of dials, gauges, scales and meters. However, he/she may advise the Contractor against the continuance of any operations or sequence of operations which will result in noncompliance with specification requirements.
- (m) **Acceptance.** While the Contractor shall be fully and exclusively responsible for producing an acceptable products, acceptance responsibility rests with the Engineer.
1. *Basis of Acceptance and Payment.* The following characteristics will be considered when determining the acceptability and pay factors for Portland cement concrete pavement. However, all of the requirements of the standard specifications on materials and workmanship shall remain in effect.
- (a) gradation
 - (b) air content
 - (c) strength
 - (d) thickness

Several methods are available to test for characteristics (a), (b), (c) and (d). While only one method will be used, several tests may be made to measure these characteristics. The greater the number of tests conducted for each characteristic the less average deviation will be allowed for full payment. The basis for individual acceptance and pay factors will be the average of the deviations from target values as indicated in the Table I. For the characteristics of gradation and air content, signs of the deviation will be disregarded when computing averages. (Deviation above the target will be considered the same as those below the target). Signs of the deviation will, however, be considered for strength and thickness. (Deviations above minimum for strength and thickness are considered beneficial). The pay factors in the Table I that relate to the gradation will be considered in a group with only the lowest pay factor for the individual sieves to be considered in determining payment. (All of the sieves specified in sections 701.05(e) and 701.06(c) of the standard specifications or as modified by other special provisions or plan notes must be run.) The remaining pay factors will be

considered individually in determining payment. The total pay adjustments for deviations from specified standards will be based on the following procedures: general. (a) all pay adjustments will be based on the individual pay factors shown in the Table I. (b) except for smoothness, they will be applied on lot to lot basis. (c) for smoothness, they will be applied on an extent to extent basis. Pay adjustments on lots, (all characteristics except smoothness) as each 10,000 square yard lot is complete, will be made for deviations from standards for strength, thickness, gradation and air content using the following formulas. If test results are incomplete at that time, an interim adjustment will be made assuming pay factors of 1.00 for the then unknown characteristics and corrected later when testing is completed.

$$CPF = \frac{4(S + T) + G + AC}{10}$$

$$PA = (CPF - 1)(Q_c \times CUP_c + Q_p \times CUP_p)$$

Where:.

CPF = combined pay factor

S = pay factor for strength

T = pay factor for thickness

G = lowest pay factor for gradation

AC = pay factor for air content

PA = pay adjustment

CUP_c = contract unit price of concrete only (\$Yd³(\$/m³))

CUP_p = contract unit price of concrete placement(\$/Yd²(\$/m²))

Q_c = Cubic yards(meters) of concrete in a 10,000 square yard(meter) lot (partial lots prorated.)

Q_p = Square yards(meters) of concrete in a 10,000 square yard(meter) lot (partial lots prorated.)

Note: CUP_c and Q_c include only the concrete material. CUP_p and Q_p include all other labor and materials required in the concrete pavement (reinforcing steel, dowels, curing compound, etc.)

Summary of pay adjustment (Table I).

The total adjustment in pay for the four characteristics in the Table I will be the sum of the pay adjustments on individual lots (gradation, air content, strength and thickness).

2. *Lot and Sublot Selection.* The concrete will be randomly Sampled and tested for all control test characteristics except smoothness on a lot to lot basis in accordance with the following requirements. However, any load of mixture which is visually unacceptable for reasons of being too wet, excessively segregated or otherwise obviously deficient will be rejected for use in the work. Furthermore, sections of completed pavement which from visual observation or known deficiencies appears to be seriously inadequate will be extensively tested. The results of such tests will not be used for pay adjustment purposes but will be used to determine whether the Section is totally unacceptable and must be removed. In the event that it is determined to be unacceptable its removal and replacement shall be at no additional cost to the Department. A standard size lot will consist of four equal sublots of 2500 Yd² (m²) each. Any partial lot (one less than 10,000 Yd² (m²)) resulting from completion or suspension of operations for more than seven calendar days may be treated as a separate lot, combined with the previous lot or combined with the following lot, at the option of the Contractor. When a partial lot is treated separately its sublots will be reduced in size as

necessary to permit four tests for that lot. On a multiple project contract, the lots of the concrete will carry over from project to project within that contract.

3. *Engineer's Acceptance Procedures.* Once a lot has been defined, its identity will be maintained throughout the mixing and placement process. Pay factors, determined from random sampling and testing the lot at appropriate locations, will be used in computing its payment adjustment.

In general the following schedule will be used for acceptance purposes, however, depending on the available time and his confidence in the Contractor's process control, the Engineer may elect to perform more or less sampling and testing.

Table I
Acceptance Schedule

Characteristics	4 tests ¹	Pay Factor ²
Average of deviations from the target (without regard to signs)		
Gradation⁴	0	1.00
Coarse or fine Aggregates	0.01-0.60	1 - 0.10x
% passing No. 200 sieve Target Spec. Range	0.61-1.80	1.03 - 0.15x
%	over 1.80	Unacceptable
Average of deviations from the target (without regard to signs)		
Gradation⁴	0	1.00
Coarse or fine Aggregates	0.01-1.20	1 - 0.05x
% passing No. 100 thru No. 8 sieve Target Spec. Range	1.21-3.60	1.03 - 0.075x
%	over 3.60	Unacceptable ³
+Average of deviations from the target (without regard to signs)		
Gradation⁴	0	1.00
Coarse or fine Aggregates	0.01-3.00	1 - 0.04x
% Passing no. 4 & larger sieve Target Spec. Range	3.01-5.00	1.06 - 0.06x
%	over 5.00	Unacceptable ³

Characteristics	4 tests ¹	Pay Factor ²
Air content – Average of deviations from the target (without regard to signs)		
Target 6.0%	0-1.50	1.00
	1.51-2.87	$- 0.107952x^2 + 0.331153x + 0.742652$
	over 2.87	Unacceptable ³
Strength ⁵ – Average of deviations from minimum (considering signs) (English)		
Minimums Class A 4200 psi Class AP 3700 psi	0-500	1.00
	501-625	$1.08 - 0.00016x$
	626-750	$1.13 - 0.00024x$
	751-875	$1.25 - 0.0004x$
	876-1000	$1.6 - 0.0008x$
	over 1000	Unacceptable ³
Thickness ⁶ – Average of deviations from minimum (considering signs) (English)		
Minimum Plans – inches 1 Test	0-0.20	1.00
	0.21-1.00	$0.87889x^2 - 1.560865x + 1.237511$
	Over 1.00	Unacceptable ³
Strength – Average of deviations from minimum (considering signs) (Metric)		
Minimums Class A 29 MPa Class AP 25.5 MPa	0-3.45	1.00
	3.45-6.90	$- 0.17181x^2 + 0.122096x + 0.779629$
	over 1000	Unacceptable ³
Thickness – Average of deviations from minimum (considering signs) (Metric)		
Minimum Plans – mm 1 Test	0-5.1	1.00
	5.2-25.4	$0.001296x^2 - 0.0161386x + 1.237524$
	Over 1.00	Unacceptable ³

(1) To determine the pay factor if fewer or more than four tests are used, calculate the corrected deviation by multiplying the average of deviations by the square root of the number of tests and dividing by two. Then use the corrected deviation in the given Pay Factor formula. Normally four random tests shall be taken for a 10,000 Yd2 (m2) lot. Use of more than four tests to determine

allowable deviation for a lot shall be utilized only when partial lots are combined with full lots or when additional tests are requested by the contractor and there is no reason to eliminate any previous test results. Fewer than four tests per lot will be utilized only for partial lots with three sublots or in the extremely rare situation where additional valid test results are unavailable from either the Engineer or Contractor. Tests taken for the sole purpose of correlation of test results will not be used for pay purposes.

- (2) Where x is Average of Deviations.
- (3) Unless otherwise directed by the Engineer, products testing in this range are unacceptable and shall be removed and replaced at no additional cost to the Department.
- (4) Only the smallest of the gradation pay factors shall be considered in determining adjustment in pay for each lot.

Gradation , slump and air content - 1 specimen and 1 test for each characteristic per subplot.

- (5) It is the intent of this specification that uniform strength of concrete be obtained. In addition to average strength requirements, the allowable range (difference between the highest and lowest strengths from acceptability test of the affected lot) is limited to 2500 psi (17.2 Mpa). The strength pay factors for lots exceeding this limit shall be 0.98 or the strength pay factors shown on the Table I, whichever is less.

Strength - 3 cylinders per subplot averaged and considered as 1 test in the Table I.

- (6) In calculating the average thickness of the pavement, measurements which are in excess of the specified thickness by more than 0.2 inches (5 mm) will be considered as the specified thickness plus 0.2 (5 mm) inches, and measurements which are less than the specified thickness by more than 1.0 inch (25 mm) will not be included in the average. When any area is determined to be more than 1.0 inch (25 mm) less than the specified thickness, it shall be treated in accordance with subsection 414.04(t)2 of the standard specifications. Thickness determinations (cores) will be made after all surface corrections (grinding, etc.) are complete.

Thickness - 3 cores per subplot with additional cores taken as necessary in accordance with subsection 414.04(t) (3) of the standard Specifications.