

300 BASES

ITEM 301 BITUMINOUS AGGREGATE BASE

- 301.01 Description**
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- 301.03 Materials**
- 301.04 Mixing Plants**
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- 301.07 Thickness Tolerance**
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301.01 Description. This work shall consist of constructing a base course of aggregate and bituminous material, mixed in a central plant and spread and compacted on a prepared surface in accordance with these specifications and in reasonably close conformity with the lines, grades, and typical sections shown on the plans or established by the Engineer.

The general plant mix specifications, 401, shall apply; deviations from these are as follows:

301.02 Composition. The gradation of the aggregate portion of the mix shall be within the limits in the following table:

<u>Sieve</u>	<u>Total Passing, % by wt.</u>
2 inch	100
1 inch	75-100
1/2 inch	50-85
No. 4	25-60
No. 8	15-45
No. 16	10-35
No. 50	3-18
No. 200	1-7

The Contractor shall submit for the Laboratory's approval the desired percentage of the aggregate passing the No. 4 sieve which will produce a satisfactory mix. The Laboratory will then establish the required bitumen content within a range of 4 to 8 percent. Changes in these job-mix formula values due to unsatisfactory results or other conditions shall be made only as authorized by the Laboratory.

301.03 Materials. Materials shall be:

301.04

Aggregate	703.04
Asphalt Binders	702.01
Mineral Filler	703.07

For asphaltic concrete 301 the Contractor shall have a choice of using all virgin materials, or a combination of virgin materials with reclaimed materials up to a maximum of 30 percent recycled materials.

All asphaltic materials removed shall become the property of the Contractor unless otherwise noted on the plan or in the Proposal.

All recycled hot mix projects shall be constructed in accordance with the following:

- a. Option of crushing or milling of pavement to be left to the Contractor.
- b. The job mix formula shall fall within the specification limits of the item specified.
- c. The combination of reclaimed asphalt, and new asphalt shall meet requirements of PG64-28 when recovered by the Abson Method.
- d. The Contractor shall submit test results showing the percentages of reclaimed materials, new aggregates, and new asphalt required to meet the Job Mix Formula for the Engineers approval.
- e. Reclaimed materials shall be identified as to material contents.

When reclaimed materials are used, the acceptance procedures shall be the same as for the original specified bid item of work.

301.04 Mixing Plants. As specified in 401.05.

301.05 Plant Ticket. Total net weight of all loads of mixture shall be recorded in triplicate upon Plant Ticket forms.

With each load delivered to the project, the driver shall present one copy of the plant ticket to the Engineer or Inspector in charge, and another to the authorized representative of the Contractor. Any changes in the amount set forth on the tickets, necessitated by the rejection of any material or in the designation as to where material is used, shall be noted by the Engineer or Inspector upon all copies, and a reason stated for such rejection. At any time during the delivery of material, for the purpose of checking the operation and weighing equipment of the plant, the Engineer may direct the Contractor to weigh or cause to be weighed on tested and approved scales at the Contractor's expense, the contents of any truck that is to be delivered to the project.

301.06 Spreading and Finishing. The maximum compacted depth of any one layer shall be four inches. The variation of the surface from the testing edge of a 10-foot straightedge shall not exceed 3/8 inch, except that when this item is used as a subbase for 305, 451, or 452 the variation shall not exceed 1/4 inch.

Variations in excess of slope or surface tolerances shall be corrected by adding or removing material in a manner satisfactory to the Engineer. The Contractor may use asphalt concrete approved by the Engineer.

At no time shall the temperature of the mixture upon arrival at the project site be below a minimum of 140° C (280° F) or above a maximum of 165° C (325° F).

The temperature of the mixture at the time of placement shall be a minimum of 120° C (250° F).

301.07 Thickness Tolerance. The average thickness of the base shall not be more than 1/4 inch less than the specified thickness, determined as hereinafter specified. As used herein, a lot shall be defined as the amount of bituminous aggregate base completed to design thickness in one day's work.

The lot average thickness shall be determined from the mean thickness of five cores taken at random from each lot. The thickness of each core shall be determined by the average of three measurements of each core. No allowance shall be made for bases exceeding the specified thickness. If the thickness of a core as determined above exceeds the specified thickness, the specified thickness shall be used to determine the average thickness of the lot.

In areas designated by the plan as variable thickness, no cores will be taken.

Lots will be paid for in accordance with the following schedule:

Thickness Adjustment of Bid Price Per Lot

<u>Lot average (5 samples) deficiency in thickness</u>	<u>Percent of contract price paid</u>
0 to .25 inch	100
.26 to .35 inch	90
.36 to .45 inch	70
.45 to .55 inch	40*
.55 and over	0*

*The Contractor will be given the opportunity to use accepted methods, approved by the Engineer, to bring the course into tolerance. If this cannot be accomplished, the course shall be removed and replaced at the Contractor's expense.

301.08

301.08 Method of Measurement. The quantity of Bituminous aggregate base course to be paid for under this item shall be the number of cubic yards of base course placed and finished in accordance with the plans and these specifications.

The gross, tare and net weight of each truck load of mixture shall be recorded to the nearest 100 pounds in duplicate on plant ticket forms. The Engineer reserves the right to assign an RPR and/or ticket writer to the Contractor’s plant. One copy of the plant ticket shall accompany each load delivered to the paver and shall be presented to the Engineer.

The total of the weights recorded on the plant tickets representing mixture finished in accordance with contract requirements shall be converted to cubic yards for payment using the conversion factors in the following table. However, when there is a mix design available on the project, the Laboratory shall establish the conversion factor to be used for the approved mix design.

When courses of uniform thickness are specified, the number of cubic yards to be paid for shall not exceed the quantity calculated from plan lines and dimensions.

<u>Aggregate</u>	<u>Pounds per Cubic Yard</u>
Gravel and Stone	4000

301.09 Basis of Payment. Payment for accepted quantities shall be made at the contract unit price bid which price shall constitute full compensation for the base course complete in place, including the furnishing of materials, labor, equipment, tools and incidentals necessary to complete this Item as specified; provided, however, that for Bituminous Aggregate Base course found deficient in thickness, only the reduced price as determined in 301.07 shall be paid.

No payment will be made for quantities of Bituminous Aggregate Base course in excess of the quantity calculated from plan lines and dimensions.

Payment will be made at the contract unit price for:

<u>Item</u>	<u>Unit</u>	<u>Description</u>
301	Cubic Yard	___ inch Bituminous aggregate base

ITEM 302 ASPHALT CONCRETE

- 302.01 Description**
- 302.02 Composition**
- 302.03 Spreading and Finishing**
- 302.04 Surface Tolerances**

302.05 Basis of Payment

302.01 Description. This work shall consist of constructing an intermediate course of aggregate and asphalt cement mixed in a central plant and spread and compacted on a prepared surface in accordance with these specifications and in reasonably close conformity with the lines, grades and typical sections shown on the plans or established by the Engineer.

The general plant mix pavement specifications, 401, shall apply; deviations from these are as follows.

302.02 Composition. Prior to producing bituminous mixtures, the Contractor shall submit, in writing to the Engineer for review and approval, a proposed job-mix formula for the proposed aggregate. The job-mix formula shall be in accordance with 441.02 of the 2002 Ohio Department of Transportation Construction and Material Specifications for Type 2 Asphalt Concrete. As an alternative, the Contractor may submit a job-mix formula which has been approved within 15 months of the date of submission by the Ohio Department of Transportation for Item 302 Asphalt Concrete for the proposed aggregate.

302.03 Spreading and Finishing. Where the mixture is placed for correcting irregularities in the existing pavement, the maximum compacted depth of any one layer shall be 3 inches.

302.04 Surface Tolerances. The variation of the surface from the testing edge of the 10-foot straightedge shall not exceed 1/4 inch. Variations in excess of slope or surface tolerances shall be corrected by adding or removing material in a manner satisfactory to the Engineer.

302.05 Basis of Payment. Measurement shall be made in accordance with 401.21.

Payment for accepted quantities shall be made at the contract unit price bid which price shall constitute full compensation for the asphalt concrete complete in place, including the furnishing of materials, labor, equipment, tools and incidentals necessary to complete this item as specified.

When courses of uniform thickness are specified, the number of cubic yards to be paid for shall not exceed the quantity calculated from plan lines and dimensions.

Payment will be made at the contract unit price for:

<u>Item</u>	<u>Unit</u>	<u>Description</u>
302	Cubic Yard	Asphalt Concrete, _____ Inch Thickness
302	Cubic Yard	Asphalt Concrete, Variable Thickness

ITEM 304 AGGREGATE BASE

304.01	Description
304.02	Aggregate
304.03	Placing
304.04	Compaction
304.05	Method of Measurement
304.06	Basis of Payment

304.01 Description. This work shall consist of furnishing, placing and compacting one or more courses of aggregate, including furnishing and incorporating all water required for compacting, on a prepared surface in accordance with these specifications, in reasonably close conformity with the lines, grades, thicknesses and typical cross sections shown on the plans or established by the Engineer.

304.02 Aggregate. The aggregate shall be crushed limestone, crushed gravel, crushed air-cooled slag, granulated slag, a mixture of crushed and granulated slags, slacker aggregate or other types of suitable materials meeting the requirements of this item and having the approval of the Engineer. Crushed limestone, crushed gravel, crushed air-cooled slag or mixtures of crushed and granulated slags shall meet the following gradation requirements and the requirements of 703.04. In addition, open-hearth and basic-oxygen furnace slags shall conform to the stockpiling and aging requirements of 703.01. Shale shall not exceed 5 percent.

Sieve	Total Percent Passing
2 inch	100
1 inch	70 - 100
3/4 inch	50 - 90
No. 4	30 - 60
No. 40	7 - 30
No. 200	0 - 13

Unblended granulated slag shall meet the requirements of 703.08. Slacker aggregate shall meet the requirements of 703.09.

Aggregate acceptance shall be determined prior to incorporation into the work based on samples taken from stock piles.

Prior to placing, aggregate shall have a reasonably uniform moisture content at or near optimum for compaction.

Material used for Item 203, Aggregate Refill Type 1, shall be crushed limestone. No other 304 materials are permitted for use as aggregate refill if paid for as Aggregate Refill, Type 1.

304.03 Placing. When vibratory equipment is used in conjunction with other methods of compaction, the compacted depth of a single layer shall not exceed 6 inches. When vibratory compaction equipment is not used, the maximum compacted thickness of one layer shall not exceed 3 inches. When the required compacted depth of the base course exceeds 6 inches, the base shall be constructed in two or more layers of approximately equal thickness.

The aggregate shall be placed with self-propelled spreading machines capable of placing the aggregate true to line and grade. Approved hand placing methods may be used in small areas where machine spreading is impractical.

Unless the base course is placed in a trench section, the edges shall be backed up with an 18-inch width of soil, placed to such a height that it will be consolidated to the height of the lift being compacted and furnish positive lateral support during compaction of the course.

Adequate surface drainage of the berm shall be provided at all times.

304.04 Compaction. At the beginning of the compaction operation, the density requirement shall be determined by compacting a short section, at the direction of the Engineer, until no further increase in density is obtained. The remainder of the course shall be compacted to a density not less than 98 percent of the test density. A new density requirement may be determined when the aggregate characteristics change appreciably. The surface of each layer shall be maintained during the compaction operations in such a manner that a uniform texture is produced and the aggregates firmly keyed. Water shall be uniformly applied over the base materials during compaction in the amount necessary to maintain the moisture at or near optimum.

The finished surface shall not vary more than 3/8 inch from a 10-foot straightedge parallel to the centerline nor more than 1/2 inch from a template conforming to the required cross section. The Contractor shall furnish straightedges, templates or other devices satisfactory to the Engineer and check the surface for conformance with these requirements.

The base shall be sprinkled as required to maintain the moisture content until covered by subsequent construction.

304.05 Method of Measurement. Aggregate base course will be measured by the number of cubic yards computed from plan lines, compacted in place.

When variable depth is specified, the number of cubic yards of aggregate will be measured by conversion from weight on the following basis:

Crushed stone	4000 lbs. per cu. yd.
Crushed gravel.....	4000 lbs. per cu. yd.
Crushed slag, less than 90 lbs. per cu. ft.	3600 lbs. per cu. yd.

304.06

Crushed slag, 90 to 100 lbs. per cu. ft.....4000 lbs. per cu. yd.
 Crushed slag, more than 100 lbs. per cu. ft.*.....4500 lbs. per cu. yd.
 Slacker aggregate.....3400 lbs. per cu. yd.
 Granulated slag.....2800 lbs. per cu. yd.

*Based on average dry rodded weight on record at the Laboratory.

The pounds per cubic yard for mixtures of crushed and granulated slags shall be determined by use of the density of the short section required under 304.04 Compaction.

304.06 Basis of Payment. Payment for accepted quantities, complete in place, will be made at contract prices for:

<u>Item</u>	<u>Unit</u>	<u>Description</u>
304	Cubic yard	Aggregate base

ITEM 305 PORTLAND CEMENT CONCRETE BASE

305.01 Description

305.02 Method of Measurement

305.03 Basis of Payment

305.01 Description. This work shall consist of constructing a portland cement concrete base on a prepared subgrade or base course in accordance with these specifications and in reasonably close conformity with the lines, grades, thickness, and typical cross sections shown on the plans or established by the Engineer. This work shall conform to the same specifications and requirements as 451 except that:

- (a) Concrete shall be 499 Class "C".
- (b) Fabricated steel reinforcement is not required. Load transfer devices are required only at transverse construction and expansion joints.
- (c) A minimum of one gallon of curing membrane shall be applied for each 200 square feet of surface treated.
- (d) Transverse contraction joints shall be constructed in accordance with standard drawings or as shown on the plans.

Standard longitudinal joints shall be constructed between lanes in accordance with 451.09(a).

Sealing is required for transverse joints only, using material meeting requirements of 705.01 or 705.02.

- (e) The final surface shall have a uniform gritty texture as obtained with a burlap drag or other approved method.
- (f) Smoothness shall be as specified in 451.13 except that the specified tolerance shall be 1/4 inch.

305.02 Method of Measurement. The quantity under this item will be the number of square yards completed and accepted in place. The width for measurement will be the width of the base shown on the typical cross section of the plans and additional widening where called for, or as otherwise directed in writing by the Engineer. The length will be measured horizontally along the center line of each street, roadway or ramp. The quantities as adjusted for changes, errors, and deviations in excess of allowable tolerances as specified in 451.17 will be the method of measurement.

305.03 Basis of Payment. The accepted quantities of concrete base will be paid for at the contract unit price per square yard, which price and payment shall be full compensation for furnishing and placing all materials; provided, however, that for base found deficient in thickness only the reduced price stipulated in 451.17 shall be paid.

No additional payment over the unit contract bid price will be made for any base which has an average thickness in excess of that shown on the plans.

Payment will be made for:

<u>Item</u>	<u>Unit</u>	<u>Description</u>
305	Square Yard	____ inch Portland cement concrete base

ITEM 310 SUBBASE

01

- 310.01 Description**
- 310.02 Materials**
- 310.03 Construction Methods**
- 310.04 Method of Measurement**
- 310.05 Basis of Payment**

310.01 Description. This work shall consist of furnishing, placing and compacting subbase, including furnishing and incorporating water required for

310.02

compaction, in reasonably close conformity with the lines, grades and cross sections shown on the plans or established by the Engineer.

Type I subbase shall meet one of the gradations listed in 310.02 at the time of incorporation into the work. Type II subbase shall meet Grading A, 310.02, after all operations of placing and compaction have been completed.

310.02 Materials. Materials furnished under this item shall be crushed gravel, crushed slag, crushed stone, sand, granulated slag, a mixture of crushed and granulated slags, slacker aggregate or other types of suitable materials meeting the requirements of this item and having the approval of the Engineer. The sodium sulfate soundness loss for all aggregates except sandstone shall not exceed 15 percent. However, where the major portion of the unsound material in a coarse aggregate acquires a mud-like condition when tested for soundness, the maximum loss shall be five percent for all uses. In addition, open-hearth and basic-oxygen furnace slag shall conform to stockpiling and aging requirements of 703.01. Material for Grading C shall meet requirements of 703.01 and 703.04

Total Passing - Percent			
Sieve	Grading A	Grading B	Grading C
2-1/2 inch	100	100	Size No. 4
1 inch	70-100	70-100	
No. 4	25-100	25-100	
No. 40	5-50	10-50	
No. 200	0-10	5-15	

Broken salvaged road material, unblended granulated slag, and slacker aggregate may be used for either Type I or Type II. For Type I, unless otherwise specified, these materials shall meet the following requirements.

Broken salvaged road material shall pass a 3-inch square sieve and not more than 20 percent shall pass a No. 200 sieve.

Unblended granulated slag shall conform to 703.08.

Slacker aggregate shall conform to 703.09.

The fraction of these materials passing a No. 40 sieve shall have a liquid limit not greater than 30 and a plasticity index not greater than six.

Materials containing free water shall not be placed upon the subgrade.

Where material from an untested and/or undeveloped source is furnished, the Contractor shall submit to the Engineer, at least ten days in advance of delivery of such material to the work, a report of exploration including a plan showing the

location of the source, the depth of overburden to be removed, and the area and depth to which the source is to be operated. The report shall include test data, satisfactory to the Engineer, which show the source is capable of furnishing material meeting the requirements of these specifications, in sufficient quantity for the work. After the report and test data have been reviewed and the roadside source inspected, the Engineer may conditionally authorize the Contractor to furnish material from the source, provided samples selected from the material produced for delivery to the work and from material delivered conforms to the requirements of these specifications. In addition, the Engineer may require that the material be stockpiled in quantities of at least 100 cubic yards for sampling and testing prior to delivery to the work. Engineer reserves the right to use Type I or Type II.

310.03 Construction Methods. The subbase material shall be spread upon the subgrade after the prescribed subgrade and subbase drainage has been placed except that for portland cement concrete pavements, pipe underdrains need not be placed prior to placing subbase material, providing adequate surface drainage of the subgrade is maintained during construction.

The subbase shall be constructed in layers not to exceed 6 inches compacted depth, except that for variable depth subbase used under concrete pavement or in the shoulder adjacent to concrete pavement, the material may be placed in single course thickness of not more than 8 inches compacted depth. The moisture content shall be as determined by the Engineer to obtain the desired compaction. Subbase material which does not contain sufficient moisture to compact in accordance with this section shall be sprinkled with water as directed by the Engineer. The water shall not be applied in a manner that will soften the subgrade. Water shall be applied when ordered by the Engineer.

Compaction of the subbase course shall immediately follow the spreading operation. Compaction to be a minimum of 98% of maximum density as determined by AASHTO T-99.

The finished surface of this course shall have sufficient stability to support loaded construction equipment used in construction of this and the subsequent course without rutting or deflection in excess of the surface tolerance permitted herein. When material falling within a grading permitted by this specification is used and surface stability cannot be obtained, a sufficient quantity of crushed angular material shall be added to secure the required stability.

The finished surface for the subbase shall conform to the plan requirements within the tolerances set forth under 203.06, except that when this item is used as a subbase for 451 or 452 pavement, the variation shall not exceed 1/4 inch.

Any irregularities or depressions that develop in the finished surface of the subbase under rolling shall be corrected by loosening the surface and adding or removing material until the surface presents a smooth regular appearance.

310.04

310.04 Method of Measurement. The quantity measured shall be the number of square yards computed from plan lines, of subbase material compacted in place.

310.05 Basis of Payment. Payment for accepted quantities, complete in place, will be made at the contract price for:

<u>Item</u>	<u>Unit</u>	<u>Description</u>
310	Square Yard	_____ inch Subbase
310	Cubic Yard	#4 Limestone