

SECTION 32 15 00

AGGREGATE SURFACING

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

JAPANESE STANDARDS ASSOCIATION (JSA)

JIS A 1102	(2014) Method of Test for Sieve Analysis of Aggregates
JIS A 1103	(2014) Method of Test for Amount of Material Passing Test Sieve 75 µm in Aggregates
JIS A 1121	(2007) Method of Test for Resistance to Abrasion of Coarse Aggregate by Use of the Los Angeles Machine
JIS A 1201	(2009) Practise for Preparing Disturbed Soil Samples for Soil Testing
JIS A 1205	(2009) Test Method for Liquid Limit and Plastic Limit of Soils
JIS A 1210	(2009) Test Method for Soil Compaction Using a Rammer
JIS A 1214	(2013) Test Method for Soil Density by the Sand Replacement Method
JIS A 5001	(2008) Crushed Stone for Road Construction
JIS Z 8801	(2006) Test Sieves Part 1: Test Sieves of Metal Wire Cloth

1.2 DEGREE OF COMPACTION

Degree of compaction required, except as noted in the second sentence, is expressed as a percentage of the maximum laboratory dry density obtained by the test procedure presented in JIS A 1210 abbreviated as a percent of laboratory maximum dry density.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. Submittals with an "S" are for inclusion in the Sustainability eNotebook, in conformance to

Section 01 33 29 SUSTAINABILITY REPORTING. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-03 Product Data

Plant, Equipment, and Tools;

SD-06 Test Reports

Initial Tests; G  
In-Place Tests; G

1.4 EQUIPMENT, TOOLS, AND MACHINES

All plant, equipment, and tools used in the performance of the work will be subject to approval by the Contracting Officer before the work is started. Maintain all plant, equipment, and tools in satisfactory working condition at all times. Submit a list of proposed equipment, including descriptive data. Provide adequate equipment having the capability of minimizing segregation, producing the required compaction, meeting grade controls, thickness control, and smoothness requirements as set forth herein.

1.5 QUALITY ASSURANCE

Sampling and testing are the responsibility of the Contractor. Perform sampling and testing using a laboratory approved in accordance with Section 01 45 00.00 1001 45 00.00 2001 45 00.00 40 QUALITY CONTROL. Work requiring testing will not be permitted until the testing laboratory has been inspected and approved. Test the materials to establish compliance with the specified requirements and perform testing at the specified frequency. The Contracting Officer may specify the time and location of the tests. Furnish copies of test results to the Contracting Officer within 24 hours of completion of the tests.

1.5.1 Sampling

Take samples for laboratory testing in conformance with JIS A 1201. When deemed necessary, the sampling will be observed by the Contracting Officer.

1.5.2 Testing

1.5.2.1 Sieve Analysis

Perform sieve analysis in conformance with JIS A 1103 and JIS A 1102 using sieves conforming to JIS Z 8801.

1.5.2.2 Liquid Limit and Plasticity Index

Determine liquid limit and plasticity index in accordance with JIS A 1205.

1.5.2.3 Moisture-Density Determinations

Determine the laboratory maximum dry density and optimum moisture content in accordance with paragraph DEGREE OF COMPACTION.

#### 1.5.2.4 Field Density Tests

Measure field density in accordance with JIS A 1214.

#### 1.5.2.5 Wear Test

Perform wear tests on aggregate surface course material in conformance with JIS A 1121.

### 1.6 ENVIRONMENTAL REQUIREMENTS

Perform construction when the atmospheric temperature is above 2 degrees C. It is the responsibility of the Contractor to protect, by approved method or methods, all areas of surfacing that have not been accepted by the Contracting Officer. Bring surfaces damaged by freeze, rainfall, or other weather conditions to a satisfactory condition.

## PART 2 PRODUCTS

### 2.1 AGGREGATES

Provide aggregates consisting of clean, sound, durable particles of natural gravel, crushed gravel, crushed stone, sand, slag, soil, or other approved materials processed and blended or naturally combined. Provide aggregates free from lumps and balls of clay, organic matter, objectionable coatings, and other foreign materials. The Contractor is responsible for obtaining materials that meet the specification and can be used to meet the grade and smoothness requirements specified herein after all compaction and proof rolling operations have been completed. Aggregates shall conform to JIS A 5001, M-30/RM-30.

#### 2.1.1 Coarse Aggregates

The material retained on the 5 mm sieve is known as coarse aggregate. Use only coarse aggregates that are reasonably uniform in density and quality. Use only coarse aggregate having a percentage of wear not exceeding 50 percent after 500 revolutions as determined by JIS A 1121. The amount of flat and/or elongated particles must not exceed 20 percent. A flat particle is one having a ratio of width to thickness greater than three; an elongated particle is one having a ratio of length to width greater than three. When the coarse aggregate is supplied from more than one source, aggregate from each source must meet the requirements set forth herein.

#### 2.1.2 Fine Aggregates

The material passing the 5 mm sieve is known as fine aggregate. Fine aggregate consists of screenings, sand, soil, or other finely divided mineral matter that is processed or naturally combined with the coarse aggregate.

#### 2.1.3 Gradation Requirements

Gradation requirements specified in TABLE I apply to the completed aggregate surface. It is the responsibility of the Contractor to obtain materials that will meet the gradation requirements after mixing, placing, compacting, and other operations. TABLE I shows permissible gradings for granular material used in aggregate surface roads and airfields. Use sieves conforming to JIS Z 8801.

## GRADATION OF AGGREGATES

### Percentage by Weight Passing Square-Mesh Sieve

Sieve Designation	M-30 / RM-30
37.5	100
31.5	95-100
19.0	60-90
4.75	30-65
2.36	20-50
0.425	10-30
0.075	2-10

## 2.2 LIQUID LIMIT AND PLASTICITY INDEX

The portion of the completed aggregate surface course passing the 0.425 mm sieve must have a maximum liquid limit of 35 and a plasticity index of 4 to 9.

## 2.3 TESTS, INSPECTIONS, AND VERIFICATIONS

### 2.3.1 Initial Tests

Perform one of each of the following tests, on the proposed material prior to commencing construction, to demonstrate that the proposed material meets all specified requirements when furnished. Complete this testing for each source if materials from more than one source are proposed.

- a. Sieve Analysis.
- b. Liquid limit and plasticity index.
- c. Moisture-density relationship.
- d. Wear.

Submit certified copies of test results for approval not less than 30 days before material is required for the work.

### 2.3.2 Approval of Material

Tentative approval of material will be based on initial test results.

## PART 3 EXECUTION

### 3.1 STOCKPILING MATERIAL

Prior to stockpiling the material, clear and level the storage sites. Stockpile all materials, including approved material available from

excavation and grading, in the manner and at the locations designated. Stockpile aggregates in such a manner that will prevent segregation. Stockpile aggregates and binders obtained from different sources separately.

### 3.2 PREPARATION OF UNDERLYING COURSE SUBGRADE

Clean the underlying course subgrade and shoulders of all foreign substances. Do not construct the surface course on underlying course subgrade that is frozen material. Correct ruts or soft yielding spots in the underlying course subgrade, areas having inadequate compaction and deviations of the surface from the requirements set forth herein by loosening and removing soft or unsatisfactory material and by adding approved material, reshaping to line and grade and recompact to density requirements specified in Section 31 00 00 EARTHWORK Section 32 11 20 BASE COURSE FOR RIGID AND SUBBASES FOR FLEXIBLE PAVING. Do not allow traffic or other operations to disturb the completed underlying course subgrade and maintain in a satisfactory condition until the surface course is placed.

### 3.3 GRADE CONTROL

During construction, maintain the lines and grades including crown and cross slope indicated for the aggregate surface course by means of line and grade stakes placed by the Contractor in accordance with the SPECIAL CONTRACT REQUIREMENTS.

### 3.4 MIXING AND PLACING MATERIALS

Mix and place the materials to obtain uniformity of the material and a uniform optimum water content for compaction. Make adjustments in mixing, placing procedures, or in equipment to obtain the true grades, to minimize segregation and degradation, to obtain the desired water content, and to ensure a satisfactory surface course.

### 3.5 LAYER THICKNESS

Place the aggregate material on the underlying course subgrade in layers of uniform thickness. Compact the completed aggregate surface course to the thickness indicated. No individual layer may be thicker than 150 mm nor be thinner than 75 mm in compacted thickness. Compact the aggregate surface course to a total thickness that is within 13 mm of the thickness indicated. Where the measured thickness is more than 13 mm deficient, correct such areas by scarifying, adding new material of proper gradation, reblading, and recompact as directed. Where the measured thickness is more than 13 mm thicker than indicated, the course will be considered as conforming to the specified thickness requirements. The average job thickness will be the average of all thickness measurements taken for the job and must be within 6 mm of the thickness indicated. Measure the total thickness of the aggregate surface course at intervals of one measurement for each 500 square meters of surface course. Measure total thickness using 75 mm diameter test holes penetrating the aggregate surface course.

### 3.6 COMPACTION

Degree of compaction is a percentage of the maximum density obtained by the test procedure presented in JIS A 1210 abbreviated herein as percent laboratory maximum density. Compact each layer of the aggregate surface

course with approved compaction equipment, as required in the following paragraphs. Maintain the water content during the compaction procedure at optimum or at the percentage specified by the Contracting Officer. Compact the mixture with mechanical tampers in locations not accessible to rollers. Continue compaction until each layer through the full depth is compacted to at least 100 percent of laboratory maximum density. Remove any materials that are found to be unsatisfactory and replace them with satisfactory material or rework them to produce a satisfactory material.

### 3.7 EDGES OF AGGREGATE SURFACE COURSE

Place approved material along the edges of the aggregate surface course in such quantity as to compact to the thickness of the course being constructed. Simultaneously roll and compact at least 300 mm of shoulder width with the rolling and compacting of each layer of the surface course when the course is being constructed in two or more layers.

### 3.8 SMOOTHNESS TEST

Construct each layer so that the surface shows no deviations in excess of 10 mm when tested with a 3 m straightedge applied both parallel with and at right angles to the centerline of the area to be paved. Correct deviations exceeding this amount by removing material, replacing with new material, or reworking existing material and compacting, as directed.

### 3.9 FIELD QUALITY CONTROL

#### 3.9.1 In-Place Tests

Perform each of the following tests on samples taken from the placed and compacted aggregate surface course. Take samples and test at the rates indicated.

- a. Perform density tests on every lift of material placed and at a frequency of one set of tests for every 250 square meters, or portion thereof, of completed area.
- b. Perform sieve analysis on every lift of material placed and at a frequency of one sieve analysis for every 500 square meters, or portion thereof, of material placed.
- c. Perform liquid limit and plasticity index tests at the same frequency as the sieve analysis.
- d. Measure the thickness of the aggregate surface course at intervals providing at least one measurement for each 500 square meters of base course or part thereof. Measure the thickness using test holes, at least 75 mm in diameter through the aggregate surface course.

#### 3.9.2 Approval of Material

Final approval of the materials will be based on tests for gradation, liquid limit, and plasticity index performed on samples taken from the completed and full compacted aggregate surface course.

### 3.10 MAINTENANCE

Maintain the aggregate surface course in a condition that will meet all specification requirements until accepted.

-- End of Section --