NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

STANDARD SPECIAL PROVISION

GRAVEL SURFACING

DESCRIPTION

This work consists of furnishing and placing aggregate as a roadway surface course.

ATTACHMENTS

Appendix A: Aggregate Sampling and Testing

EQUIPMENT

Equipment	Section
Tow-Type Pneumatic-Tired Rollers	151.01 B
Self-Propelled Pneumatic-Tired Rollers	151.01 C
Water Trucks	152.01 B
Aggregate Trucks	152.01 C

MATERIALS

A. General.

	Aggregate	
Sieve Size or Testing Method	Gravel Surfacing	
	Percent passing or Test Limit	
1"	100	
3/4"	70 – 100	
No. 4	38 – 75	
No. 8	22 - 62	
No. 30	12 – 50	
No. 200	7.0 – 18.0	
Plasticity Index (PI)	3 - 10	
ND T 113, Shale (max %)	12.0%	
AASHTO T 96, L.A. Abrasion (max %)	50%	
NDDOT 4, Fractured Faces ¹	20%	

¹Minimum weight percentage allowable for the portion of the aggregate retained on a No. 4 sieve having at least 1 fractured face.

B. Acceptance of Aggregate.

1. General.

The Engineer will perform acceptance testing specified in Section 350.01 of Appendix A and NDDOT will perform the independent assurance testing specified in Section 350.02 of Appendix A. Independent assurance tests are not acceptance tests and have no bearing on the payment for material.

2. Gradation.

The Engineer will collect three samples for each 1,000 tons of material placed, except when more than 1,000 tons are placed in a day. If more than 1,000 tons are placed in a day, the Engineer will collect three samples for that day's placement. If the aggregate fails to meet the specified gradation, the Engineer will apply a price reduction as specified in Section B, "Contract Price Adjustments" under the "Basis of Payment" portion of this Special Provision.

Do not incorporate additional aggregate if two consecutive lots deviate from the specified gradation. Restart placement operations after taking corrective actions and passing a gradation test.

3. Plasticity Index (PI).

Before placement of material is allowed, the Engineer will collect three samples from the aggregate stockpile and average the PI of the samples to determine the project PI.

Make corrections to the stockpile before If the average of the samples is outside of the specified range. The Engineer will retest the stockpile until the average of the three samples is within the specified range.

4. Miscellaneous Properties.

The Engineer will collect three samples for each 10,000 ton lot of material produced. If a fractional lot is less than 2,500 tons it will be included in the previous lot. The Engineer will determine shale content and the number of fractured faces.

If the material fails to meet the requirement for fractured faces, make corrections to the stockpile before incorporating additional material into the work.

If the material exceeds the maximum shale content by less than 3 percentage points, the Engineer will apply a price reduction as specified in Section B, "Contract Price Adjustments" under the "Basis of Payment" portion of this Special Provision. The Engineer will reject the material if the maximum shale content is exceeded by 3 or more percentage points.

CONSTRUCTION REQUIREMENTS

A. Stockpiling Aggregate.

In addition to the requirements of Section 106.05, "Stockpiling Aggregate and Salvaged Materials", do not operate equipment on stockpiles that will remain the property of the Department.

B. Placement and Compaction.

1. General.

Place aggregate in lifts not exceeding 6 inches of compacted material.

Uniformly mix aggregate placed in windrows before spreading.

Compact aggregate, utilizing pneumatic-tired rollers, until the surface is tightly bound and shows no rutting or displacement occurs under the roller operation.

2. Limitations.

Do not place material on frozen subgrade.

When the roadway is open to traffic, the following limitations apply:

- The maximum windrow length is three miles; and
- Spread material within 48 hours of placing the material in a windrow.

METHOD OF MEASUREMENT

The Engineer will measure, completed and in place, as specified in Section 109.01, "Measurement of Quantities".

BASIS OF PAYMENT

A. General.

Spec and Code	Pay Item	Pay Unit
350 - 0500	Gravel Surfacing	Ton
350 - 0501	Gravel Surfacing	Cubic Yard
350 - 0600	Stockpiled Gravel Surfacing	Ton
350 - 0601	Stockpiled Gravel Surfacing	Cubic Yard

Such payment is full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work as specified.

B. Contract Price Adjustments.

1. General.

The Engineer will determine contract price adjustments by multiplying the applicable adjustment factor by the contract unit price for the aggregate and the amount of material in the lot represented by the test.

If contract price adjustments are warranted in more than one category, a contract price reduction will be applied for each area of deficiency.

2. Aggregate Gradation Adjustment Factor.

The Engineer will determine the aggregate gradation adjustment factor if aggregate base does not meet the specified gradations for all required samples, as calculated:

Aggregate Gradation	- 5 v	Sum of deviations from range
Adjustment Factor	- 0 ^	limits on all sieves

3. Shale Content Adjustment Factor.

The Engineer will determine the shale content adjustment factor if the limits for shale are exceeded, as calculated:

Shale Content Adjustment Factor = 5 × (Average of 3 Samples – Allowable Percentage)

Appendix A Aggregate Sampling and Testing

350.01 ACCEPTANCE SAMPLES AND TESTS

A. Engineer Responsibility

The Engineer will collect material and conduct testing to verify the material meets the requirements in this Special Provision. Obtain and split aggregate samples according to ND T 2, "Sampling of Aggregates," and ND T 248, "Reducing Samples of Aggregate to Testing Size."

Table 350-1 shows test methods and test frequency.

Table 350-1		
Tests	Frequency/Lot Size	
*ND T 27, "Sieve Analysis of Fine and Coarse	1 test result per 1,000	
Aggregates"	tons or 1 per day if more	
	than 1,000 tons is	
	placed	
*ND T 11, "Materials Finer Than No. 200 Sieve in	1 test result per 1,000	
Mineral Aggregates by Washing"	tons or 1 per day if more	
	than 1,000 tons is	
	placed	
*NDDOT 4, "Percentage of Fracture Particles in	1 test result per 10,000	
Coarse Aggregate"	tons	
*ND T 113, Lightweight Pieces in Aggregate"	1 test result per 10,000	
	tons	
ND T 90, "Determining the Plasticity Limit and	1 per project	
Plasticity Index of Soils"		
AASHTO T 96, "Resistance to Degradation of Small-	1 per project	
Size Coarse Aggregate by Abrasion and Impact in the		
Los Angeles Machine"		

*Obtain three random samples for each lot of material placed at a location determined by the Engineer. Test each sample and determine acceptance based on the average of the three tests.

Compute the sieve analysis results on SFN 9987, "Aggregate Sample Worksheet" and record on SFN 10072, "Aggregate Quality Test Summary."

350.02 INDEPENDENT ASSURANCE (IA) TESTING

A. Engineer Responsibility

Perform tests on split samples taken by the District Materials Coordinator in addition to acceptance tests. Testing performed will be as directed by the District Materials Coordinator.

B. District Materials Coordinator Responsibility

The District Materials Coordinator will obtain these samples and perform these tests. These samples will be an equal split sample with the Engineer. Obtain and split samples according

to ND T 2, "Sampling of Aggregates," and ND T 248 "Reducing Samples of Aggregate to Testing Size."

Table 350-2 shows test methods and test frequency for IA Testing.

Table 350-2		
Tests	Frequency	
ND T 27, "Sieve Analysis of Fine and Coarse	1 test result per project	
Aggregates"		
ND T 11, "Materials Finer Than No. 200 Sieve in	1 test result per project	
Mineral Aggregates by Washing"		
NDDOT 4, "Percentage of Fracture Particles in Coarse	1 test result per project	
Aggregate"		
ND T 113, Lightweight Pieces in Aggregate"	1 test result per project	
ND T 90, "Determining the Plasticity Limit and	1 test result per project	
Plasticity Index of Soils"		

The District Materials Coordinator and the Engineer will compare the test results for IA tolerances in Table 350-3.

Table 350-3		
Tests	Tolerance	
ND T 27, "Sieve Analysis of Fine and Coarse Aggregates," and ND T		
11, "Materials Finer than No. 200 Sieve in Mineral Aggregates by		
Washing":		
No. 4 sieve and larger	±5	
No. 30 sieve	±3	
• No. 200 sieve	±2	
NDDOT 4, "Percentage of Fracture Particles in Coarse Aggregate"	±5	
ND T 113, "Lightweight Pieces in Aggregate"	±2	
ND T 90, "Determining the Plastic Limit and	±2	
Plasticity Index of Soils" (IA)		

If the IA testing is not within specified tolerances, the Engineer will obtain an additional sample for testing under the observation of the IA Tester. The Engineer and IA Tester will examine equipment used and review test procedures until the differences are resolved.