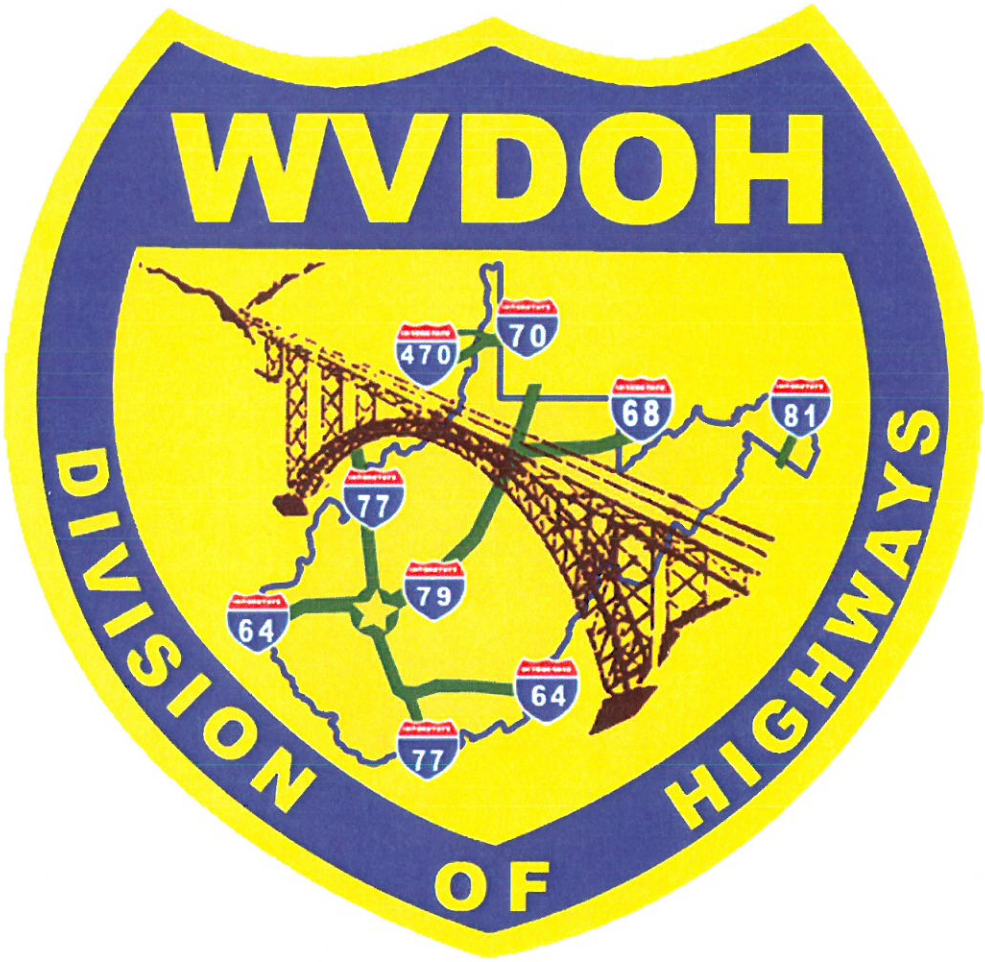
SOIL & AGGREGATE COMPACTION TECHNICIAN PROGRAMMED INSTRUCTION MANUAL



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DEFINITION OF TERMS

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BASELINE

A reference line for project control usually located along one edge of the project. The baseline is usually abbreviated as ℄

CENTERLINE

Also a reference line established for project location purposes. This line establishes the center of a specific part of the project such as centerline of roadway, centerline of pipe, etc. The centerline is abbreviated as ℄

STATION NUMBER

For location purposes, the baseline and centerline are divided into increments referred to as stations. Stations are usually established on 50 foot intervals and are used to determine distance along the centerline or baseline. Station numbers normally start at the beginning of a baseline of centerline. Each individual foot up to 99 feet is documented on the right side of the + sign. Increment of 100 feet are documented on the left side of the + sign.

For example:
50 feet is written as 0+50
150 feet is written as 1+50
2,250 feet is written as 22+50

OFFSET

Distance perpendicular (at 90 degrees) from the baseline or centerline. Offsets are followed by notation "right" or "left" to establish which side of the line the distance is measured from. In the direction that the stations progress along the baseline or centerline, everything located along the right side is referred to as "right of baseline" and everything located along the left side is referred to as "left of baseline".

For example:
60 feet right is 60 feet right of the baseline or centerline.

15 feet left is 15 feet left of the baseline or centerline.

BITUMINOUS CONCRETE

Commonly referred to as asphalt. A roadway paving material consisting of a mixture of asphaltic materials (bitumen) and fine and coarse aggregates. The wet density of bituminous concrete is measured during compaction testing.

AGGREGATE Relatively inert granular mineral material such as sand, gravel, slab, crushed stone, etc. Fine aggregate is material that will pass the No. 4 sieve. Coarse aggregate is material that will not pass the No. 4 sieve. Aggregates are used in making concrete and asphalt, and select granular backfill. The dry density of aggregate is measured during compaction testing.

SOIL Sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks, and which may or may not contain organic matter. Soils can be categorized by particle size.

Gravels	3 inches to No. 4 sieve
Sand	No. 4 sieve to No. 200 sieve
Silt and Clay	No. 200 sieve and smaller

ROCK Natural solid and mineral matter occurring in large masses or fragments.

BASE OR BASE COURSE A layer of specified or selected material of planned thickness, constructed on the subgrade or subbase for the purpose of serving one or more functions such as distributing load, providing drainage or minimizing frost action.

EMBANKMENT A raised structure of soil, shale, rock or random material, constructed in layers to a predetermined elevation and cross-section.

FILL Man-made deposits of natural soils and waste materials.

LIFT The thickness of an individual layer of soil, aggregate or rock, that is being placed as fill or backfill. The lift thickness can be specified loose or compacted. Example: 8 inches loose or 6 inches compacted. Excessive lift thickness results in poor and non-uniform compaction and the potential for future settlement of the fill.

GRADE The finished surface elevation of a specified layer.

SUBGRADE The soil prepared and compacted to support a structure of pavement or pavement system.

PROCTOR A test method used to determine the relationship between the moisture content and density of soils. The Proctor is named after the person who developed the test method, R. R. Proctor. Some types of Proctors are as follows:

Standard	ASTM D 986 or AASHTO T-99
Modified	ASTM D 1557 or AASHTO T-180
WVDOH 1-point	MP 207.07.20

ROLLER PASS A WVDOT DOH method of determining the maximum density of a material. This method is applicable to treated and untreated aggregate base courses, select backfill, crushed aggregate backfill, granular subgrade, and random material containing 40% or more (by weight) particles that are retained on the ¾ inch sieve (plus ¾ inch material). The WVDOH procedure for the roller pass method is MP 700.00.24.

COMPACTION The application of force or vibration to a material in an effort to densify the material.

DENSITY Weight per unit volume. The standard unit for soil, aggregate and asphalt testing is pounds per cubic feet.

WET DENSITY The total unit weight per unit volume including water.

DRY DENSEITY Weight per unit volume of a material after the moisture has been removed.

MAXIMUM DRY DENSITY Maximum dry weight of a material under optimum moisture conditions.

MOISUTRE CONTENT Moisture content or water content is the ratio expressed as a percentage of the weight of water in a given soil mass to the weight of solid particles.

OPTIMUM MOISTURE

Optimum moisture content is the ideal moisture that a particular material requires to achieve its maximum density.

SPECIFIC GRAVITY

Specific gravity is the ratio of the mass of a unit volume of a material at a stated temperature to the mass of the same volume of water at a stated temperature. Example: Limestone has a specific gravity of 2.7. Therefore, an equal volume is 2.7 times heavier than water.

LOT

Unit of measurement for the quantity of material being placed and tested. A lot of compaction tests consists of 5 tests.

SUBLOT

An equal 1/5 portion of a lot. For example, if a lot of bituminous concrete was 1000 feet X 12 feet, then each sublot would be 200 feet X 12 feet.

MATERIALS PROCEDURES

Abbreviated as MP. These are specific test methods that explain how to perform the individual tests. MP's were generated by the WVDOT DOH and are mostly derived from AASHTO specifications and re-written in step by step progression to ease interpretation.

OVERVIEW OF EMBANKMENT CONSTRUCTION

(B)

OVERVIEW OF EMBANKMENT CONSTRUCTION

PREPARATION

NOTE: - As a certified Compaction Inspector you must be in possession of or have immediate access to the standard specifications, project plans, special provisions, contractor's quality control plan, etc. These documents govern the control of construction, testing and inspection throughout the course of a project.

WHERE TO BEGIN?

Embankments are the biggest component of a highway system.

Embankment construction can be broken down into three general phases of construction that a Compaction Technician may be involved:

1) Clearing and Grubbing – Section 201 of the WV standard specifications
2) Excavation and Embankment – Section 207 of the WV standard specifications.
3) Crushed Aggregate Base Course – Section 307 of the WV standard specifications.

SLOPES

Slopes – Section 207.3.1 WV Standard Specifications:

1) Slope lines shall conform to plans.
2) Slope lines may only be altered by the engineer.
3) The typical slope line for soil is 2:1.
4) Slope lines for rock may vary depending on rock hardness.

EMBANKMENT CONSTRUCTION

Placing Embankment - WV Specification 207.7.3.1:

1) No Embankment shall be placed on frozen ground.
2) During the process of excavation and embankment construction, the roadway shall be maintained in such a condition that it will be well drained at all times.
3) Deposited and compacted embankment in layers shall be started at the lowest point of the fill below grade.
4) Each layer shall be placed horizontally across the entire length and width of the fill.
5) Each layer shall be compacted prior to the placement of the next layer.

LIFT THICKNESS

Lift Thickness – WV Standard Specification 207.7.3.2

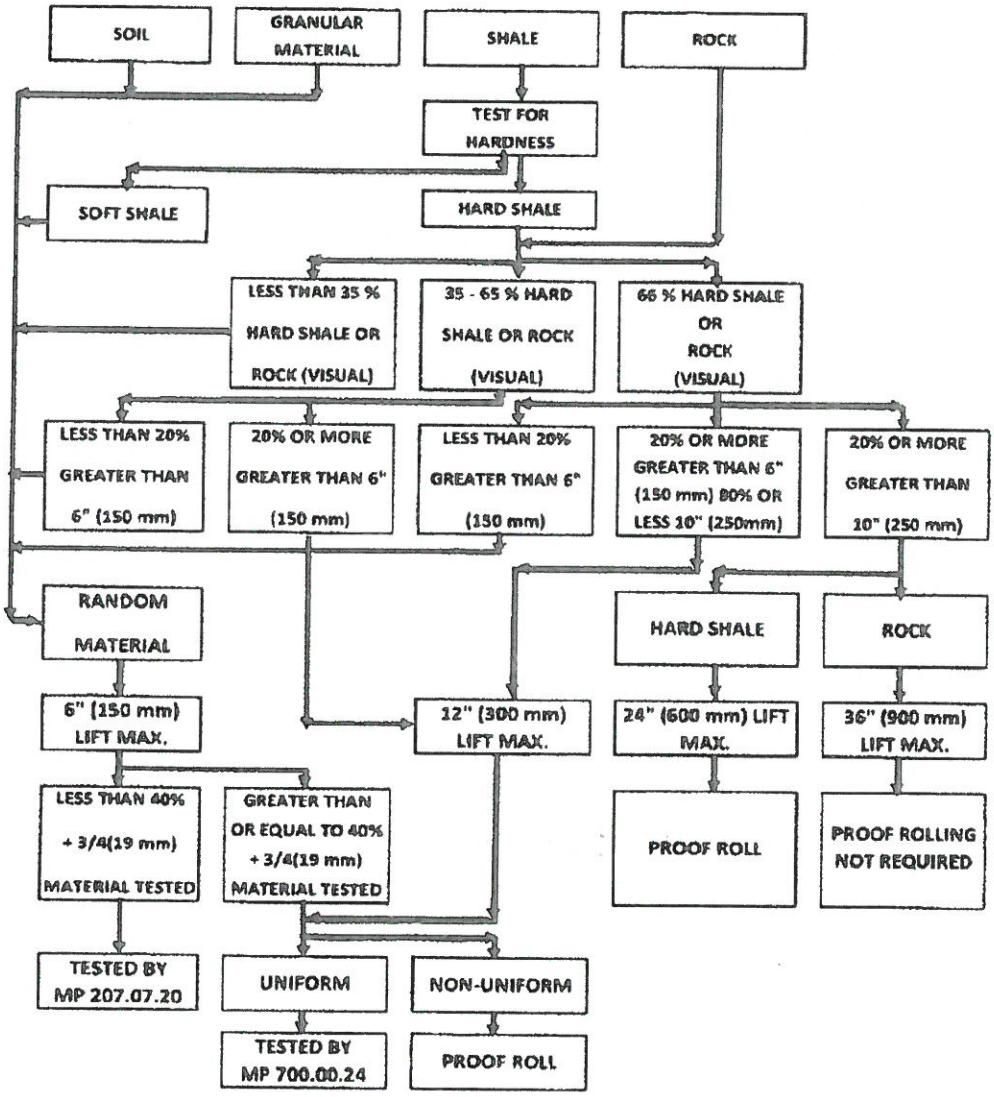
1) The contractor shall record the material type and lift thickness for all types of embankment.
2) The lift thickness will be determined by the material type and rock hardness in accordance with the WV standard specifications.
3) The lift thickness can also be determined by using table (C) of MP 717.04.21.
4) The lift thickness shall be as thin as the excavated material will permit.
5) The largest rock size permitted in any embankment lift is 36 inches.

TABLE C

MP 717.04.21

ATTACHMENT NO. 3

GUIDE FOR CONTROL OF EMBANKMENT MATERIAL



EMBANKMENTS

Embankment materials are the most important components of a highway system. The materials can be broken down into three different categories.

1) Select Embankment
2) Embankment Fill
3) Sub-Grade & Base

SELECT EMBANKMENT

Select embankment – WV Standard Specifications 207.7.3.2.3

Rock lifts that are designated as Select Embankment shall contain no more than 15% of other suitable embankment material by visual inspection. The dominate rock size shall be 6 inches or greater.

Select embankment – WV Standard Specification 211.6

Shall be placed in accordance with the plans or as designated by the engineer.

Select embankment – WV Standard Specification 704.5

Select Embankment may be designated as special Rock Fill in the plans. Special Rock Fill may be limestone or sandstone having no more than 30% loss after 5 cycles of the sodium sulfate soundness test.

EMBANKMENT MATERIALS – "F" LOTS

Embankment material – WV Standard Specification Section 716

1) Section 716.1.1 – Random Material
2) Section 716.1.1.1 – Soil
3) Section 716.1.1.2 – Granular Material
4) Section 716.1.1.3 – Soft Shale
5) Section 716.1.2 – Rock
6) Section 716.1.3 – Hard Shale

SUBGRADE – "S" LOTS

Subgrade Material – WV Standard Specifications Section 207.9

1) The subgrade shall be 6 inches compacted thickness for all embankment and excavation sections.
2) The subgrade material shall consist of granular material.
3) The subgrade shall be free of all particles larger than 3 inches.
4) The subgrade shall be uniformly compacted to the requirements of section 716.

BASE "B" LOTS

Base Material – WV Standard Specifications Section 307.

1) The base materials shall be placed according to the compacted thickness on the plans.
2) The base material shall consist of granular material conforming to the requirements of section 704.6.
3) The aggregate class of base material will be designated in the plans. (Typically, class 1)
4) The base material shall be uniformly compacted to the requirements of section 717.

RANDOM MATERIAL

RANDOM MATERIAL

WV Standard Specifications

716.1.1 - Random material shall be considered as a mixture of any or all of soil, granular material, or soft shale as described which are permitted by the Engineer to be used in embankment. These are materials that can be incorporated in a 6 inch (150 mm) compacted layer.

SOFTSHALE

716.1.1.3 – Shale "Softshale" shall be considered as any of the shales, weak limestone, weak sandstone, claystones, or siltstones that break down under three complete coverages with a 1.5 ton per linear foot steel drum roller.

ROCK

716.1.2-Rock: Rock is defined as sandstone, limestone, or concrete that cannot be incorporated in a 6 inch (150 mm) compacted lift and shall be medium hard or harder.

HARD SHALE

716.1.3-Hard Shale: Material that meets the description of shale in 716.1.1.3 except that is does not break down under the hardness test shall be considered as hard shale and placed as specified in 207.7.3.2.2 when used as embankment material.

2 PRIMARY SOFT ROCKS

1. Shale
    - Can be sandy or silty
    - Thin 1/8" laminations (layers)
2. Claystone
    - Can be sandy or silty
    - Chunky

SOIL

- WV Standard Specifications 716.1.1.1 – Soil material shall be considered as layers or deposits of disintegrated rock, lying on or near the surface of the earth; which has resulted from natural processes, such as weathering, decay or chemical action or a combination of these processes. Material shall be considered as soil when more than

25% by weight of the grains or particles pass the number 200 sieve.

SOIL

- Residual Soil – is a mineral material that has weathered or disintegrated in place from primary bedrock. Residual soils are soils that develop from their underlying parent rocks and have the same general chemistry as those rocks.

- Colluvium – Loose earth material that has accumulated at the base of a hill, through the action of gravity, avalanche debris, and sheets of detritus moved by soil creep or frost action.

- Alluvium – A deposit of sand, silt, etc., formed by flowing water and usually deposited in the valleys of large rivers.

SOIL CLASSIFICATIONS

- Clay
    1. Lean Clay
    2. Fat Clay
- Silt
- Sand
    1. Fine Grain
    2. Medium Grain
    3. Coarse Grain
- Top Soil – Peat, Loam, etc.
- (Soil is classified by particle size.)

SOIL COMBINATIONS

- Clay
    1. Sandy Clay
    2. Silty Clay
- Silt
    1. Clayey Silt
    2. Sandy Silt
- Sand
    1. Clayey Sand
    2. Silty Sand

CLAY CHARACTERISTICS

- Very Fine Grained (0.004 mm to 0.001 mm)
- Cohesive
- Moisture Sensitive (+3-4 of Optimum Moisture)
- Easy to Compact at Optimum Moisture (Can Use Vibration or Static Weight)
- Shrink/Swell potential (Especially with finer particle sizes)

SAND CHARACTERISTICS

- Coarse Grained (Minus No. 4 to No. 200 sieves)
- Non-Cohesive
- Moderately Moisture Sensitive (Needs some Moisture, but not a lot)
- Easy to Compact with a little Moisture. (Best to Compact with Vibration)
- Good Friction Resistance
- High Bearing Capacity if Contained

SILT CHARACTERISTICS

- Fine Grained (0.074 mm to 0.005 mm)
- Low Cohesive to Non-Cohesive
- Moisture Sensitive (Water rises to surface under Pressure)
- Difficult to Compact (Prone to pumping and Rutting at Optimum Moisture, Best to Compact with Static Weight)
- Low Bearing Capacity
- If possible, silt should be wasted or used to dress slopes!

THEORY OF COMPACTION

COMPACTION CONCEPTS - AN OVERVIEW

Compaction is very important when soil is used as an engineering material; that is, when the structure itself is constructed of soil. Earth dams and highway embankments are typical examples of earth structures. If soils are dumped or otherwise placed at random in a fill, the result will be an embankment with low stability and high settlement.

The embankment and base materials provide the foundation for the pavement. The performance of the pavement depends on the quality of materials and construction techniques used to place the underlying materials. The placement of materials in an embankment, subgrade, base, or pipe and structure backfill, involves several factors which influence the quality of the final product. The goal is to provide materials that possess the engineering properties required by the design.

Construction personnel must be experienced and knowledgeable in the placement of materials and recognize and resolve problems as they are encountered. Each type of material has unique properties which must be addressed in design and construction. Failure to correctly place materials can have devastating effects. The problems can range from rutting of the pavement to excessive settlement and other instabilities such as landslides. Settlement always occurs to some degree but must be minimized and uniform over a large area. Differential settlement can be very detrimental to the performance of the roadway.

Earthwork construction consists of placing lifts of material. Sound engineering decisions must be made before each lift is covered. The performance of the roadway depends on the daily decisions and workmanship as the construction progresses. Errors are difficult to correct and poor construction can lead to failures and large financial expenditures.

COMPACTION

Compaction is the densification of soils by the application of mechanical energy. It may also involve modification of water content and blending of soils. Coarse-grained soils are efficiently compacted by vibration. In the field, hand-operated vibrating plates and motorized vibratory rollers of various sizes are quite efficient for compacting shallow deposits of sand and gravel soils. Rubber-tired equipment can also be used efficiently to compact sands. In certain situations, large free-falling weights are used to dynamically compact loose granular deposits and fills.

Fine-grained and cohesive soils may be compacted in the laboratory by falling weights and hammers, by special "kneading" compactors, and even statically. In the field, common compaction equipment includes hand-operated tampers,

sheepsfoot rollers, rubber-tired rollers, vibratory rollers, and other types of heavy compaction equipment.

The objective of compaction is to improve the engineering properties of the soil mass. By compaction:

- Detrimental settlements can be reduced or prevented;
- Soil strength can be increased and slope stability improved;
- Bearing capacity of pavement subgrades can be improved; and
- Undesirable volume changes, for example, caused by frost action, swelling, and shrinkage, may be controlled.

THEORY OF COMPACTION

Soils form the foundation for most highway structures. The final structure, whether it is a pavement or a bridge structure, can only be as durable as the foundation upon which it rests. Compaction of the soil is necessary in order to assure that the soil or soil aggregate structure will perform and support its intended design loads. Material that is densely compacted will support more load than uncompacted material.

The fundamentals of compaction of cohesive soils were developed by R. R. Proctor in the early 1930s. Proctor published a series of articles in Engineering News-Record (Proctor 1933) on the principles of compaction, and in his honor, the standard laboratory compaction test the he developed is called the Proctor test.

Proctor noted that compaction is a function of four variables: (a) dry density, γ_d; (b) water content, w; (c) compactive effort; and (d) soil type. Compactive effort is a measure of the mechanical energy applied to a soil mass. In the field, compactive effort is the number of passes of "coverages" of the roller of a certain type and weight on a given volume of soil. In the laboratory impact compaction test, a hammer is dropped several times on a soil sample in a mold. The mass of the hammer, height of drop, number of drops, number of layers of soil, and the volume of the mold are specified.

The "percent compaction" is a comparison between the compaction actually achieved in the field (in place density) and the maximum compaction possible for that soil type when compaction is performed under a set of controlled conditions. These controlled conditions exist in the laboratory. AASHTO T 99 and T 180 are used to determine the maximum possible density that can be expected for that specific soil type using normal construction compacting efforts.

Maximum density of a soil or soil-aggregate is also dependent on the optimum moisture content of the soil being tested. Since it is possible that several types of soil will be used on a particular construction project, it is

necessary for a laboratory to test and develop the different moisture-density relationships for each soil or soil aggregate that will be encountered. A soil or soil aggregate mixture which is not compacted to the required density may subside or undergo excessive settlement due to its own mass or traffic loadings, causing failure of the highway structure. It is critical that these tests and procedures, which determine the maximum density and the optimum moisture content, be performed properly.

The process of compaction for cohesive soils can best be illustrated by the Proctor test. Several samples of the same soil, but at different water contents, are compacted according to the standard Proctor test specifications given earlier. The total or wet density and the actual water content of each compacted sample are measured. Then the dry density for each sample can be calculated from

$$\text{Wet density, } D_{wet} = \frac{\text{total mass of wet sample, } W_s}{\text{Total volume of sample, } V_t}$$

$$\text{Dry density, } D_{dry} = \frac{\text{wet density, } D_{wet}}{100 + \text{water content, w\%}} \times 100$$

When the dry densities of each sample are determined and plotted versus the water contents for each sample, a curve called a compaction curve for standard Proctor compaction is obtained (See Figure 4.1) Each data point on the curve represents a single compaction test, and usually four or five individual tests are required to completely determine the compaction curve. This curve is unique for a given soil type, method of compaction, and (constant) compactive effort. The peak point of the curve determines the maximum dry density $\gamma_{d\,max}$ at a water content known as the optimum water content w_{opt} [also called the optimum moisture content (OMC)].

Note the maximum dry density is only a maximum for a specific compactive effort and method of compaction. This does not necessarily reflect the maximum dry density that can be obtained in the field. Increasing the compactive effort tends to increase the maximum dry density, as expected, but it also decreases the optimum water content.

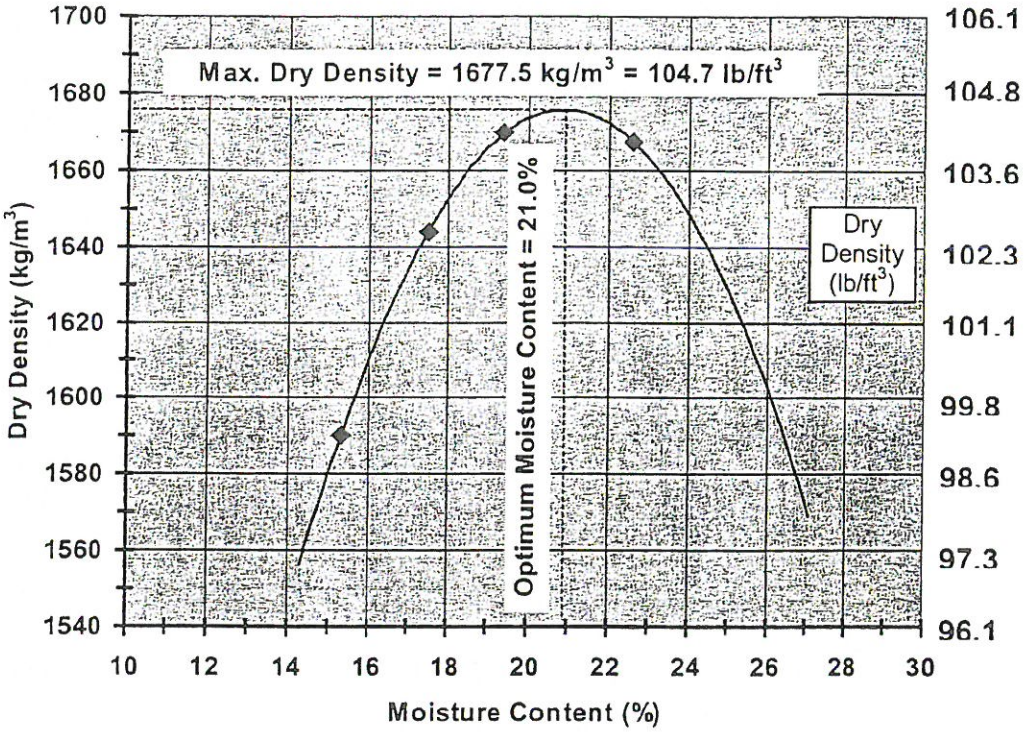


Fig. 4.1 Example Moisture-Density Curve

As the water content increases, the particles develop larger and larger water films around them, which tend to "lubricate" the particles and make them easier to be moved about and reoriented into a denser configuration. However, eventually a water content is reached at which the density does not increase any further. At this point, water starts to replace soil particles in the mold, and because the density of water is much less than the density of the mineral grains, the dry density curve starts to fall off.

EMBANKMENTS

Usually, materials that are to be used to construct the embankment are selected by the contractor and approved by the engineer. Many agencies have general requirements in their standard specifications for the soil types that are acceptable for embankment construction. These requirements or any special provision for the project should be strictly adhered to so that only suitable materials are used.

Suitable materials, if properly placed and compacted, will make satisfactory embankments. Water content in the natural state has no bearing on suitability. However, materials with excessive moisture will require drying before compaction, or they must be replaced with materials having proper water content. During excavation, if materials are uncovered that have an excessive water content, construction personnel should refer to the contract specifications. If there is still a question about whether to use the wet soils, the engineer should be consulted.

COMPACTION OPERATIONS

General

Compaction of a soil layer is probably the most important aspect of proper embankment construction. A uniform, densely compacted embankment will provide a satisfactory platform upon which to place the base courses and pavement. The word "uniform" is important in that uniform conditions during construction of the embankment will result in uniform behavior of the pavement, assuming that foundation conditions do not enter the picture. The benefits of good compaction are substantial and the consequences of poor compaction are severe. Compaction increases bearing capacity, slope stability, and resistance to frost action. It also decreases permeability and future settlement. Inadequate compaction may result in general and differential subsidence, which causes depressions and potential for premature failure of the pavement.

Heaving or Pumping

Heaving or pumping is an elastic-type deformation of the soil. When loaded, the material deforms and as the load is removed, the material springs back to its original position. The construction equipment looks as if it is riding on a wave as it travels over the fill. The soil will deflect and a wave will be created ahead of the wheel, but once the equipment moves on, the area looks the same, although there may be some cracking of the surface. Heaving occurs when there is excess moisture in the soil that does not have time to drain as the load is applied. The load is then borne jointly by the soil and the pore water pressure. This gives a temporary elasticity to the soil, thus creating the heaving or pumping effect. Note that, when in this condition, the strength of the soil is substantially reduced. Repeated loadings will continue to create cumulative pore pressures and may ultimately result in shear failure or rutting. Continued compaction operations can only worsen the situation.

Rutting

Rutting is a surface shear or bearing failure. As the equipment moves across the embankment, the loads imposed exceed the shear strength of the soil, the wheels sink, and rutting occurs. Rutting destroys the previous compaction, and

makes it impossible to place the next lift to a uniform thickness. This is particularly critical at the top of subgrade.

Compaction Equipment

There are many types and sizes of compaction equipment. The equipment ranges from large rollers such as pneumatic tired, vibratory, tamping foot etc. to small walk behind or hand held compactors. In any case, the equipment should be of the proper type and size to provide the compactive effort required for the material being placed. For example, a vibratory roller is well suited for a granular type material. Vibrations move the finer particles into void spaces. For cohesive soils, a tamping foot (sheeps foot) roller is ideal. The tamping feet provide a kneading action which compacts the material.

The efficiency of compaction equipment often depends on such things as ballast, roller speed, vibration amplitude and frequency, etc. Checking the equipment should be part of the construction activities. The compaction equipment selected should be determined by the type of soils encountered.

Pneumatic-tired compactors achieve compaction by the interaction of (a) wheel load, (b) tire size, (c) tire ply, (d) inflation pressure, and (e) the kneading action of the rubber tires as they pass over the lift. Pneumatic-tired rollers should be ballasted to meet at least the minimum wheel load.

Vibratory drum compactors develop their compactive effort by load and vibrations. Five machine features must be known in order to rate vibratory rollers: (a) unsprung drum weight, (b) rated dynamic force, (c) frequency at which the rated dynamic force is developed, (d) amplitude of the drum vibration, and (e) drum width. The dynamic force is proportional to the square of the frequency. A reduction in the frequency will significantly reduce the compactive force.

Compaction of granular soils is mostly due to the dynamic force created by a rotating eccentric weight. Vibratory compactors dramatically lose their effectiveness when the vibration is shut off because the compaction is due solely to the weight of the machine.

When sheepsfoot rollers are used, the feet must penetrate into the loose lift. If they ride on top, the machine is too light and the ballast must be increased. With succeeding passes, the feet should "walk out" of the layer. The number of passes required for the feet to walk out of the layer will be used to control compaction of subsequent layers. If the feet do not walk out, the machine is too heavy and is shearing the soils, or the soil is too wet.

MATERIALS

Materials to be compacted must be of a satisfactory quality and possess the necessary properties for the particular use. Poor quality materials may not perform properly or require extensive time and expense to improve.

In many cases embankment materials are excavated on the project. The quality of these materials may vary and it is the designer's responsibility to adequately evaluate the material properties and address their use in design. The disposition of poor materials should be addressed in the design and not left to construction personnel to handle without specific guidelines.

Poor quality materials may be improved. This might include reducing the moisture content by aeration, adding a stabilizer such as lime or cement, mixing with higher strength materials, etc.

If off-site borrow sources are used, the material must be of satisfactory quality.

The following tables and figures provide general descriptions, properties and classification of various soils and soil components. Table 4.1 defines soil components and their properties. Table 4.2 and Figure 4.2 define the AASHTO classification system of soils and soil-aggregate mixtures. Table 4.3 and Figure 4.3 define the Unified Soil Classification System (USCS). Table 4.4 provides a comparison and cross referencing of the AASHTO and USCS methods.

Table 4.1 Soil Components and Significant Properties				
	Soil Component	Symbol	Grain Size Range And Description	Significant Properties
Coarse-grained components	Boulder	None	Rounded to angular, bulky, hard, rock particle, average dia. Smaller than 300 mm (12 in.)	Boulders and cobbles are very stable components, use for fills, ballast, and to stabilize slopes (riprap). Because of size and weight, their occurrence in natural deposits tens to improve the stability of foundation. Angularity of particles increase stability.
	Cobble	None	Rounded to angular, bulky, hard, rock particle, average dia. Smaller than 300 mm (12 in.) but larger than 76 mm (3 in.)	
	Gravel	G	Round to angular, bulky, hard, rock particle, passing 76 mm (3 in.) sieve retained on 4.75 mm (#4) sieve	Gravel and sand have essentially the same engineering properties differing mainly in degree. The 4.75mm sieve is arbitrary division, and does not correspond to significant change in properties. They are easy to compact, little affected by moisture, not subject to frost action. Gravels are generally more pervious and stable, resistant to erosion and piping than are sands. The well-graded sands and gravels are generally less pervious and more stable than those which are poorly graded and uniform in gradation. Irregularity of particles increases the stability slightly. Finer, uniform sands approaches the characteristics of silts, i.e. decreases in permeability and reduction in stability with increase in moisture.
	Coarse		76 mm to 19 mm (3 in. to 0.75 in.)	
	Fine		19 mm to 4.75 mm (0.75 in. to #4 sieve)	
	Sands	S	Rounded to angular, bulky, hard, rock particle, passing 4.75 mm (#4) sieve, retained on 0.075 mm (#200) sieve	
	Coarse		4.75 mm to 2.0 mm (#4 to #10) sieves	
	Medium		2.0 mm to 0.425 mm (#10 to #40) sieves	
	Fine		0.425 mm to 0.075 mm (#40 to #200) sieves	

Table 4.1 Soil Components and Significant Properties - continued				
	Soil Component	Symbol	Grain Size Range And Description	Significant Properties
Fine-grained components	Silt	M	Particles smaller than 0.075 mm (#200) sieve identified by behavior: that is, slightly or non-plastic regardless of moisture and exhibits little or not strength when air dried.	Silt is inherently unstable, particularly when moisture is increased, with a tendency to become quick when saturated. It is relatively impervious, difficult to compact highly susceptible to frost heave, easily erodible and subject to piping and boiling. Bulky grains reduce compressibility; flaky grains, i.e., mica, diatoms, increase compressibility, produce an 'elastic' silt. The distinguishing characteristic of clay is cohesion or cohesive strength, which increases with decreases in moisture. The permeability of clay is very low, it is difficult to compact when wet and impossible to drain by ordinary means, when compacted is resistant to erosion and piping, is not susceptible to frost heave, is subject to expansion and shrinkage with changes in moisture. The properties are influenced not only by size and shape, flat, plate-like particles, but also by their mineral composition; i.e., the type of clay mineral, and chemical environment or base exchange capacity. In general, the montmorillonite clay mineral has greatest illite and kaolinite the least adverse effect on the properties.
	Clay	C	Particles smaller than 0.075 mm (#200) sieve identified by behavior: that is, it can be made to exhibit plastic properties within a certain range of moisture and exhibits considerable strength when air dried.	

Table 4.1 Soil Components and Significant Properties - continued				
	Soil Component	Symbol	Grain Size Range And Description	Significant Properties
Organic Matter	Organic Matter	O	Organic matter in various sizes and stages of decomposition	Organic matter present even in moderate amounts increases the compressibility and reduces the stability of the fine-grained components. It may decay causing voids or by chemical alteration change the properties of the soil, hence organic soils are not desirable for engineering uses.

TABLE 4.2 - AASHTO Classification of Soils and Soil-Aggregate Mixtures

General Classification	Granular Materials (35 Percent or Less Passing 0.075 mm (No. 200) Sieve)							Silt-Clay Materials (More than 35 Percent Passing 0.0075 mm (No. 200) Sieve)			
Group Classification	A-1		A-3	A-2				A-4	A-5	A-6	A-7
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				
Sieve Analysis, percent passing											
2.00 mm (No. 10)	50 max	-	-	-	-	-	-	-	-	-	-
0.425 mm (No. 40)	30 max	50 max	51 min	-	-	-	-	-	-	-	-
0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of fraction passing 0.425 mm (No. 40) sieve											
Liquid Limit	-	-	40 max	41 max	40 max	41 min	41 min	40 max	41 min	40 max	41 min
Plasticity Index	6 max	N.P.	10 max	10 max	11 min	11 min	11 min	10 max	10 max	11 min	11 min
Usual types of significant constituent materials	Stone fragments, gravel and sand	Fine sand	Silty or clayey gravel and sand					Silty soils		Clayey soils	
General rating as subgrade	Excellent to Good							Fair to Poor			

Note: Plasticity index of A-7-5 subgroup is equal to or less than LL minus 30. Plasticity index of A-7-6 subgroup is greater than LL minus 30. See Figure 4.2.

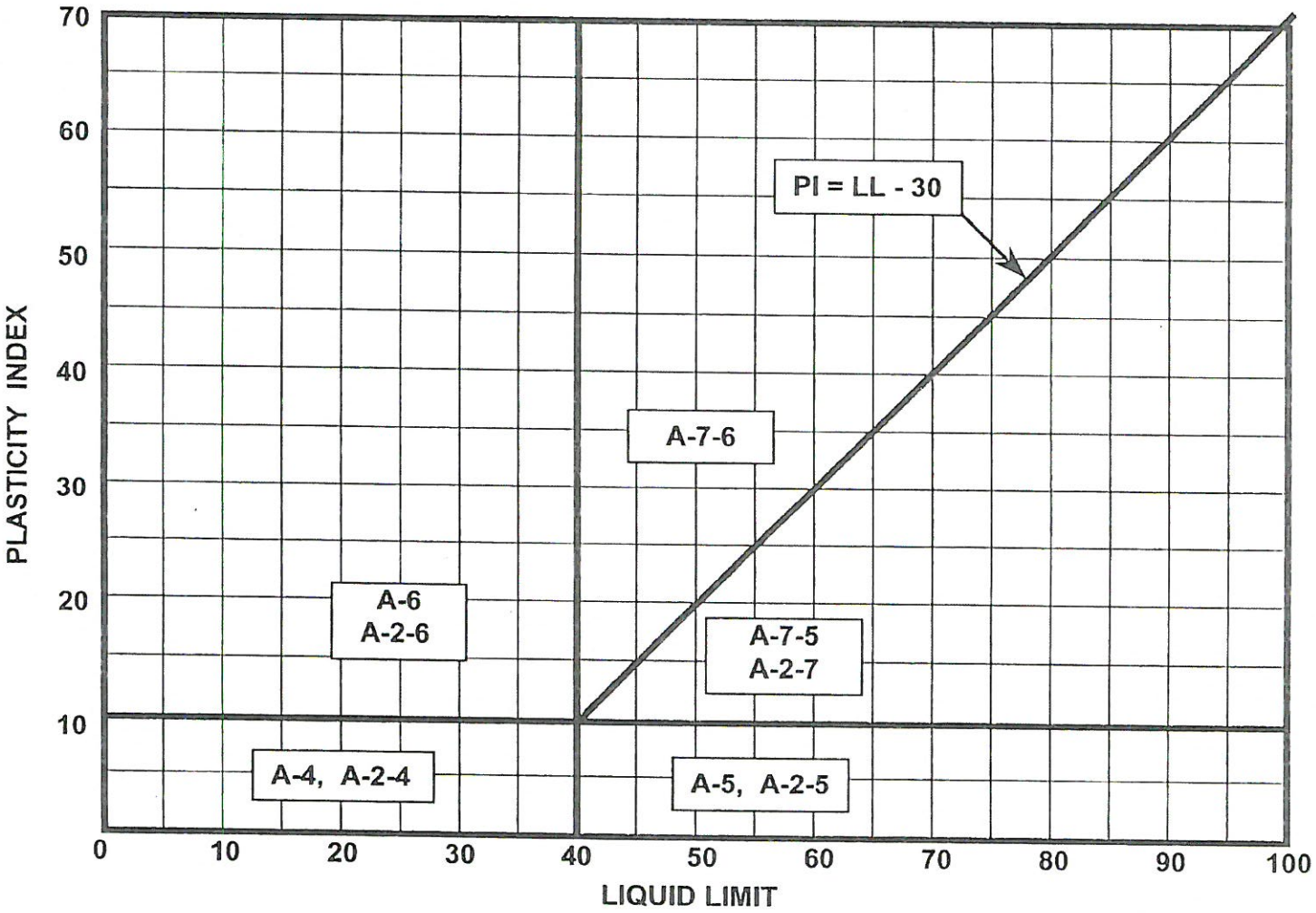


Figure 4.2 – Liquid and Plasticity Index Ranges for Silt-Clay Materials

Table 4.3 – Unified Soil Classification System

Major Division		Group Symbol	Laboratory Classification Criteria		Soil Description
			Percent finer than 0.075 mm (No. 200) sieve	Supplementary Requirements	
Coarse-grained (over 50% by weight retained on the 0.075 mm (No.200) sieve)	Gravelly soils (over half of coarse fraction retained on #4 sieve	GW	0 to 5	C_u greater than 4; C_c between 1 and 3	Well-graded gravels, sandy gravels
		GP	0 to 5	Not meeting above gradation requirements for GW	Gap-graded or uniform gravels, sandy gravels
		GM	12 or more	PI less than 4 or below A-line	Silty gravels, silty sandy gravels
		GC	12 or more	PI greater than 7 and above A-line	Clayey gravels, clayey sandy gravels
	Sandy soils (over half of coarse fraction passing #4 sieve)	SW	0 to 5*	C_u greater than 4; C_c between 1 and 3	Well-graded, gravelly sands
		SP	0 to 5*	Not meeting above gradation requirements for SW	Gap-graded or uniform sands, gravelly sands
		SM	12 or more*	PI less than 4 or below A-line	Silty sands, silty gravelly sands
		SC	12 or more*	PI greater than 7 and above A-line	Clayey sands, clayey gravelly sands
Fine-grained (over 50% by weight passing the 0.075 mm No. 200) sieve)	Low compressibility (liquid limit less than 50)	ML	Plasticity Chart (Figure 4.3)		Silts,very fine sands, silty or clayey fine sands, micaceous silts
		CL	Plasticity Chart (Figure 4.3)		Low plasticity clays, sandy or silty clays
		OL	Plasticity Chart (Figure 4.3), organic odor or color		Organic silts and clays of low plasticity
	High compressibility (liquid limit more than 50)	MH	Plasticity Chart (Figure 4.3)		Micaceous silts, diatomaceous silts, volcanic ash
		CH	Plasticity Chart (Figure 4.3)		Highly plastic clays and sandy clays
		OH	Plasticity Chart (Figure 4.3), organic odor or color		Organic silts and clays of high plasticity
Soils with fibrous organic matter		Pt	Fibrous organic matter; will char, burn or glow		Peat, sandy peats and clayey peat

* Note: For soils having 5 to 12 percent passing the 0.075 mm (No. 200) sieve, use dual symbol (e.g. GW-GC)

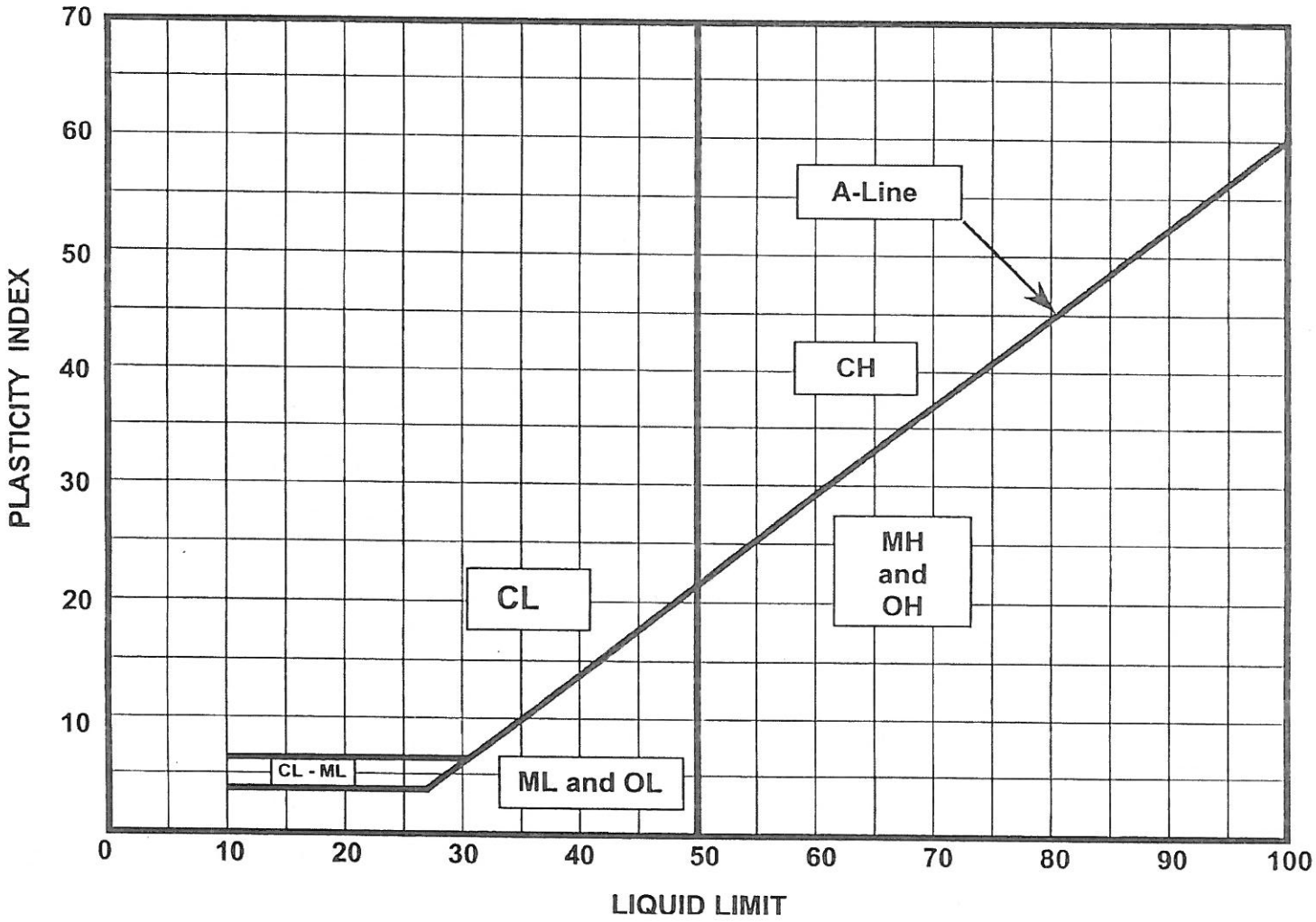


Figure 4.3 – Liquid and Plasticity Index Ranges for Silt-Clay Materials

TABLE 4.4
COMPARISON OF AASHTO & USCS SOILS CLASSIFICATION SYSTEMS

SOIL GROUP IN AASHTO SYSTEM	COMPARABLE SOIL GROUPS IN UNIFIED SYSTEM			SOIL GROUP IN USCS SYSTEM	COMPARABLE SOIL GROUPS IN AASHTO SYSTEM		
	MOST LIKELY	POSSIBLE	POSSIBLE BUT NOT LIKELY		MOST LIKELY	POSSIBLE	POSSIBLE BUT NOT LIKELY
A-1-a	GW, GP	SW, SP	GM, SM	GW	A-1-a	-----	A-2-4 A-2-5 A-2-6 A-2-7
A-1-b	SW, SP GM, SM	GP	-----	GP	A-1-a	A-1-b	A-3, A-2-4 A-2-5 A-2-6 A-2-7
A-3	SP	-----	SW, GP	GM	A-1-b A-2-4 A-2-5 A-2-7	A-2-6	A-4, A-1-a A-5, A-7-5 A-6, A-7-6
A-2-4	GM, SM	GC, SC	GW, GP SW, SP	GC	A-2-6 A-2-7	A-2-4 A-6	A-4 A-7-5 A-7-6
A-2-5	GM, SM	-----	GW, GP SW, SP	SW	A-1-b	A-1-a	A-3, A-2-4 A-2-5 A-2-6 A-2-7
A-2-6	GC, SC	GM, SM	GW, GP SW, SP	SP	A-3 A-1-b	A-1-a	A-2-4 A-2-5 A-2-6 A-2-7
A-2-7	GM, GC SM, SC	-----	GW, GP SW, SP	SM	A-1-b A-2-4 A-2-5 A-2-7	A-4 A-5 A-2-6	A-6 A-1-a A-7-5 A-7-6
A-4	ML, OL	CL, SM SC	GM, GC	SC	A-2-6 A-2-7	A-4 A-6 A-2-4 A-7-6	A-7-5
A-5	OH, MH ML, OL	-----	SM, GM	ML	A-4 A-5	A-6 A-7-5	-----
A-6	CL	ML, OL SC	GC, GM SM	CL	A-6 A-7-6	A-4	-----
A-7-5	OH, MH	ML, OL CH	GM, SM GC, SC	OL	A-4 A-5	A-6 A-7-5 A-7-6	-----
A-7-6	CH, CL	ML, OL SC	OH, MH GC, GM SM	MH	A-5 A-7-5	-----	A-7-6
				CH	A-7-6	A-7-5	-----
				OH	A-5 A-7-5	-----	A-7-6
				PT	-----	-----	-----

COMPACTION CONTROL

Compaction is more than just operating a piece of equipment. There is a tendency to assume that, as long as compaction equipment is being used, the necessary degree of compaction is being achieved. This is quite often the case with embankment materials, especially materials that are not tested. Uniform compaction is just as important as adequate compaction. The operator should develop a roller pattern so that all of the material in a lift receives the same compactive effort.

The reaction of the compaction equipment to changes in the material can aid the roller operator. For example, when compacting cohesive soils with a tamping foot roller, the feet will initially sink into the material. As the material is compacted, the feet will sink in less (walk out) and continue until there are very small feet impressions. The roller operator should observe the effects and incorporate the observations in his/her rolling technique.

The equipment must be operated properly. Roller speed is particularly important with vibratory rollers. If the roller speed is too fast, the vibrations are too far apart to effectively compact. A granular material, such as a base, should be seated with one or two initial passes with the vibrator off to avoid displacing the material.

The entire lift should receive the same number of roller passes. Compaction problems occur when there are more than one type of material in the same lift. The materials may require different compactive efforts. Some materials may be over compacted while others may be under compacted.

For a base material, a gradation requirement is generally specified. Once the material is compacted to the point that the maximum density has been achieved, further compaction may start to break down the particles and the gradation will no longer be according to specifications. On the other hand, materials such as shales often break down to a soil material when exposed to air and water. Breaking these materials down during construction prevents excessive consolidation.

LIFT THICKNESS

The lift thickness depends on the type material and particle size. Materials must be placed in lifts thin enough to insure that adequate compaction can be achieved. Soils and aggregates are generally placed in thin lifts, from say 4 to 8 inches, while bedrock materials are placed in thicker lifts depending on the size of the particles and material type. Compaction testing is generally restricted to the finer materials (soils and aggregates). The lift thickness should be uniform throughout the lift. If the lift thickness is variable, some material may be under compacted and some over compacted.

Embankment lift thicknesses are often difficult to control. Lift thickness should be controlled by the dominant particle size rather than the largest pieces. For example, when a small quantity of large durable pieces are mixed with fine material (soil), the roller rides on top of the large pieces, especially when drum rollers are used, and the soil between the large pieces is not compacted. The large pieces should be removed or isolated during the excavation to prevent this problem.

DENSITY

AASHTO T 99 and AASHTO T 180 have been the standards for determining the maximum dry densities and optimum moistures for soils and aggregates. Roller pass test sections are also used to determine the maximum dry densities in the field. This involves compacting a material with a specified piece(s) of compaction equipment until the material no longer appreciably increases in density. From the test section a roller pattern can also be developed which determines the number of roller passes with a specfic roller(s) necessary to achieve the desired degree of compaction.

Compacting materials increases the internal strength and load bearing capacity. The particles are rearranged and the volume is reduced. With sufficient compactive effort, the density increases to a point that no further compaction can occur unless either the particles are broken down or water is forced from the material. Further compaction, depending on the quality of the material, may cause the particles to start breaking down. For soils and aggregate bases, the maximum densities determined by either AASHTO T 99 or AASHTO T 180 are achieved before the zero air voids is reached. Materials, such as soft shales, will break down in the compaction process and the resulting soil like material is tested as soil.

A density curve, as determined by one of the methods in AASHTO T 99 or AASHTO T 180, provides the maximum dry density and optimum moisture for a particular soil at a designated compactive effort. Soil samples can be obtained for the various soils on a project and density curves developed. When compaction tests are performed, the maximum density and optimum moisture for the soil being tested can be used to evaluate the test. Representative soil samples from a large area can be tested (such as an entire state) and a family of curves can be developed. The appropriate curve from the family of curves can be selected by performing a one-point proctor with the soil being tested. The density and moisture content of the one point proctor is used to select the correct curve and the subsequent maximum dry density and optimum moisture for the soil.

Specifications for a project state the degree of compaction required for the different materials. For density there is a specified percentage of theoretical maximum dry density to which materials must be compacted. The percentage varies; however, 95% is a common value.

The field density can be determined by several methods such as the nuclear density gauge, sand cone, rubber balloon method, etc. The nuclear density gauge is the most common method. Some soils contain materials, for example mica, which affect the accuracy of the nuclear gauge. When these soils are encountered, other methods to determine the density are required.

MOISTURE

The moisture content is a critical component of the compaction process. Moisture provides a lubricant so that the particles can move and fill void spaces. The moisture content is critical especially for cohesive soils. The ideal moisture content for a particular soil is referred to as the optimum moisture. The optimum moisture is the moisture content at which a material will compact to the maximum density for the given compactive effort. Remember that the optimum moisture and maximum density depend on the applied force. As the compactive effort increases the maximum density increases and the optimum moisture decreases. The opposite occurs when the applied force decreases; the maximum density decreases and the optimum moisture increases. This is why different maximum densities and optimum moistures are obtained between AASHTO T 99 and AASHTO T 180. These methods have proven to be adequate for highway construction and provide the necessary standards on which to base acceptance decisions.

The field moisture can be determined with the nuclear density–moisture gauge, stove drying or speedy moisture. The nuclear gauge is generally the primary method with the speedy moisture or stove drying as the secondary methods. A nuclear gauge measures the moisture content based on the presence of hydrogen. Soils with organic materials or hydrogen rich minerals (i.e. hydrogen that is not attributed to water), will affect the accuracy of the moisture reading. Stove drying or speedy moisture tests are more appropriate in this case.

Specifications for a project usually indicate an allowable range that the moisture content of the soils can vary from the optimum moisture. The ranges are generally within plus or minus four percentage points from the optimum moisture content. Base course material may or may not have a moisture tolerance.

COMPACTION TESTING

Testing is a verification process to determine if the desired degree of compaction has been achieved. Random selection of test sites reduces the influence of human bias. Test results and field observations can be used to make engineering decisions on the quality of the materials. A sound testing program provides necessary information to assure the final product will perform as intended.

STABILITY

Some materials compact to a very dense, high strength condition, while others are difficult to compact to a stable condition. Materials containing large quantities of silt and fine sand, for example, are very unstable under loading. Even though the materials can be placed and compacted to the desired degree, they are susceptible to rutting and shoving when loaded. When these materials are used, special construction precautions are required to limit loading until the materials are bridged by lifts of higher strength materials. This is also the case with some cohesive soils, which are weak and easily displaced under loading (pumping or rutting).

The performance of a roadway depends on drainage. Internal drainage, as well as surface drainage, is of utmost importance. The strength of the materials must be maintained after construction in order for the roadway to perform as intended. Free draining granular materials will not be appreciably affected by moisture. In comparison, an increase in the moisture content of cohesive soils results in swelling and the material becomes unstable as it loses shear strength. Provisions in the design for drainage layers to divert water away from the materials are essential. Construction personnel must watch for seepage areas, springs, etc. that were not addressed in the design.

Construction personnel should observe the reaction of materials to construction equipment. Areas which yield (pump) under the weight of construction equipment, need to be corrected. The method(s) of corrective action depends on the situation. Some of the possible corrective measures include removing the material and replacing with a suitable material, aerating the material to reduce the moisture content, bridging the area using a high strength material such as rock, stabilizing the material with lime or cement, etc.

COMPACTION CHARACTERISTICS OF SOILS AND AGGREGATES

No one method of compaction is equally suitable for all types of soil. The following review of methods for compacting fills are divided into three groups: those suitable for cohesionless soils, those for sandy or silty soils with moderate cohesion, and those for clays. Many different compaction methods are used, each with its own benefits and limitations that must be understood to by employed effectively. Compaction problems are often the result of the use of improper compaction equipment or its improper application.

For greatest efficiency the applied compactive force must be high enough, and of sufficient duration, to rearrange the particles. However, this effort must not be so high as to cause shearing of the compacted mass. A cohesionless materials strength is affected by confinement. This is most easily accomplished by wide area of load application. In cohesive materials, the strength is affected by void ratio and moisture, and less dependent on confinement.

In cohesionless materials efficient compaction results are obtained with moderate force applied to a wide area while using vibration. In cohesive materials efficient compaction requires higher pressure for dry versus wet material, with a smaller loaded area preferable.

Along with the following discussion, Tables 4.5 and 4.6 provide basic guidance concerning various compaction methods, equipment, applicable materials and conditions.

COMPACTION OF COHESIONLESS MATERIALS

For granular materials such as sand and gravel, the best results are achieved by use of vibratory compaction equipment (vibratory rollers). Ideally, equipment should vibrate at a frequency close to the resonant frequency of the material. When this is conducted properly, void reduction can be 20 to 40 times greater than that produced by an equivalent static load. Rock fills can also be compacted effectively using vibratory equipment.

The maximum size of particles is controlled by the thickness of compacted layers. Two to four passes of vibratory rollers, moving at a speed up to 1.5 mph, are usually sufficient to achieve the desired level of compaction. Moisture control may not be necessary for granular materials due to their high permeability. Granular materials can also be compacted by use of pneumatic-tired rollers pulled by heavy track-mounted equipment. Vibrations induced by the tracked equipment work in conjunction with the static pneumatic tired rollers. Six to eight passes of such equipment are typically required to attain a satisfactory degree of compaction. Water may be added

to the material to facilitate the compaction process by temporarily "lubricating" the granular material (i.e. temporarily reducing inter-particle friction).

In confined areas the use of small self-propelled, hand-operated vibratory compactors is often necessary. The weight of these compactors varies from several hundred to several thousand pounds. The vibrating force is delivered to the material with a flat plate or roller. Four to eight inch layers can be effectively compacted.

The use of static rollers to compact cohesionless granular materials is inefficient and generally ineffective. A high degree of saturation is necessary to achieve acceptable results.

COMPACTION OF SANDY OR SILTY MATERIALS WITH MODERATE COHESION

As cohesion (and plasticity) of a material increases, the compacting effect of vibrations decreases greatly. Even a slight bond between particles interferes with their tendancy to move into a more stable position. The lower permeability of these materials results in the development of excess pore water pressures. Use of vibratory equipment often results in shear failure of the material rather than densification. Compaction in layers by static rollers usually provides satisfactory results.

Two types of rollers are effective with materials of this type: pneumatic-tired (rubber –tired) rollers and sheepsfoot or padfoot rollers. Pneumatic-tired rollers are most effective for compacting slightly cohesive sandy materialss, mixed-grained materials ranging from gravels to silts and clays, and non-plastic silty materials (clean silts). Sheepsfoot rollers are most effective for compaction of cohesive, plastic materials.

Pneumatic-tired rollers usually consist of a cart or bin loaded with ballast, supported on a single row of four or more wheels. Tires are inflated at pressures ranging from 50 to 125 psi. The wheels have independent suspensions so that the weight is transmitted roughly equal to all wheels, even over non-uniform ground surfaces. Embankment materials are compacted in lifts or layers of six to twelve inches (when loose), using high tire pressures, and heavy loads (30 to 50 tons). Four to eight passes generally achieve the required level of compaction.

The surface of sheepsfoot rollers are usually covered with slightly rounded pads or feet. The size, shape and arrangement of the pads can vary greatly, with a typical arrangement of approximately one pad for every 100 $in.^2$ of roller surface area. The feet extend distances typically in the range of four to eight inches from the drum, with surface areas ranging from approximately 5 to 14 $in.^2$ Depending on the size and arrangement of the feet, contact pressures typically vary from 300 to 600 psi. Material lifts are generally thin, not exceeding six inches when compacted.

Regardless of the type of compaction equipment and the degree of cohesion and plasticity, the efficiency and effectiveness of the compaction procedure depends largely on the moisture content of the material – especially for low to non-plastic uniform fine grained materials. If the moisture content during compaction is not almost exactly equal to the optimum moisture content (for the specific level of compactive effort), these materials cannot be compacted to a stable condition.

If an embankment is constructed using uniform material under carefully controlled conditions (layer thickness, type of compaction equipment, and number of passes kept constant), the effectiveness of compaction depends only on the moisture content of the material at the time of compaction. If all conditions remain the same except a lighter roller is used for compaction, the value of the maximum dry density is lower, and the optimum moisture content is higher (see Figure 5.14). Similar changes in the moisture-density relation for a given material will occur with variations in layer or lift thickness, type and/or weight of compaction equipment, roller speed, and rate of energy application. Therefore, the values of maximum dry density and optimum moisture content for a given material, will be specific with a given compaction procedure.

The water content at which a material is compacted affects the resulting density, strength, stability, and permeability. An increase in initial water content from a value below optimum moisture, to a value above optimum moisture, generally accompanies a large decrease in the material's permeability. The decrease generally is larger with increasing clay content.

COMPACTION OF CLAY

If the natural water content (natural moisture content) of a clay is not near the optimum moisture content, it may be difficult to change the moisture, especially if the water content is too high. When clay is excavated, it is generally removed in solid blocks or chunks. An individual block of clay cannot be compacted by any of the conventional compaction procedures previously discussed. Neither vibration nor short duration pressures results in significant change in water content. Use of a sheepsfoot roller can be effective in reducing open spaces between clay chunks. Results are best if the moisture content is slightly greater than the plastic limit of the material.

If the moisture content is too high, the clay tends to stick to the roller, or the roller starts rutting or sinking into the surface. If the moisture content is considerably less than optimum, the chunks are too stiff and do not yield, with the spaces between clay blocks not effectively closed.

Table 4.5 Compaction Equipment and Methods (Navdocks DM-7)

Equipment Type	Applicability	Requirement for Compaction of 95 to 100 Percent Standard Proctor Maximum Density			Possible Variations in Equipment
		Compacted Lift Thickness, (inches)	Passes or Coverages	Dimensions and Weight of Equipment	
Sheepsfoot roller	For fine-grained soils or dirty coarse-grained soils with more than 20 percent assign the No. 200 sieve. Not suitable for clean coarse-grained soils. Particularly appropriate for compaction of impervious zone for earth dam or linings where bonding of lifts is important	6	4 to 6 passes for fine-grained soil; 6 to 8 passes for coarse-grained soil	Foot contact area in^2 / foot contact pressures, psi soil type fine-grained soil PI > 30: 5 to 12, 250 to 500 fine-grained soil PI <30: 7 to 14, 200 to 400 coarse-grained soil: 10 to 14, 150 to 250 Efficient compaction of soils wet of optimum requires less contact pressures than the same soils at lower moisture contents	For earth dam, highway and airfield work, drum of 60-in dia., loaded to 1.5 to 3 tons per lineal foot of drum is generally utilized. For smaller projects 40-in dia. Drum, loaded to .75 to 1.75 tons per lineal foot of drum is used. Foot contact pressure should be regulated so as to avoid shearing the soil on the third or fourth pass.
Rubber tire rollers	For clean, coarse-grained soils with 4 to 8 percent passing the No. 200 sieve For fine-grained soils or well-graded, dirty coarse-grained soils with more than 8 percent passing the No. 200 sieve	10 6 to 8	3 to 5 coverages 4 to 6 coverages	Tire inflation pressures of 60 to 80 psi for clean granular material or base course and subgrade compaction. Wheel load 18 000 to 25 000 lb Tire inflation pressure in excess of 65 psi for fine-grained soils of high plasticity. For uniform clean sands or silty fine sands, use large size tires with pressures of 40 to 50 psi	Wide variety of rubber tire compaction equipment is available. For cohesive soils, light wheel loads, such as provided by wobble-wheel equipment, may be substituted for heavy-wheel load if lift thickness is decreased. For cohesionless soils, large-size tires are desirable to avoid shear and rutting.
Smooth wheel rollers	Appropriate for subgrade or base course compaction of well-graded sand-gravel mixtures May be used for fine-grained soils other than in earth dams. Not suitable for clean well-graded sands or silty uniform sands	8 to 12 6 to 8	4 coverages 6 coverages	Tandem type roller for base course or subgrade compaction, 10 to 15 ton weight, 300 to 500 lb per lineal inch of width of rear roller 3-Wheel roller for compaction of fine-grained soil; weights from 5 to 6 tons for materials of low plasticity to 10 tons for materials of high plasticity	3-Wheel rollers obtainable in wide range of sizes. 2-Wheel tandem rollers are available in the range of 1 to 20 ton weight. 3-Axle tandem rollers are generally used in the range of 10 to 20 ton weight. Very heavy rollers are used for proof rolling of subgrade or base course.

Table 4.5 Compaction Equipment and Methods – continued (Navdocks DM-7)					
Equipment Type	Applicability	Requirement for Compaction of 95 to 100 Percent Standard Proctor Maximum Density			Possible Variations in Equipment
		Compacted Lift Thickness, (inches)	Passes or Coverages	Dimensions and Weight of Equipment	
Vibrating baseplate compactors	For coarse-grained soils with less than about 12 percent passing No. 200 sieve. Best suited for materials with 4 to 8 percent passing No. 200 placed thoroughly wet	8 to 10	3 coverages	Single pads or plates should weigh no less than 200 lb. May be used in tandem where working space is available. For clean coarse-grained soil, vibration frequency should be no less than 1600 cycles per minute	Vibrating pads or plates are available, hand-propelled of self-propelled, single or in gangs, with width of coverage from 1 ½ to 15 ft. Various types of vibraling-drum equipment should be considered for compaction in large areas.
Crawler tractor	Best suited for coarse-grained soils with less than 4 to 8 percent passing No. 200 sieve, placed thoroughly wet	10 to 12	3 to 4 coverages	No smaller than D8 tractor with blade, 34 500 lb weight, for high compaction	Tractor weights up to 60 000 lb.
Power tamper or rammer	For difficult access, trench backfill. Suitable for all inorganic soils	4 to 6 in for silt or clay, 6 in for coarse-grained soils	2 coverages	30-lb minimum weight. Considerable range is tolerable, depending on materials and conditions	Weights up to 250 lb; for diameter 4 to 10 in

Table 4.6 Compaction Equipment for Different Conditions			
Soil	**First choice**	**Second choice**	**Comment**
Rock fill	Vibratory	Pneumatic	--
Plastic soils, CH, MH	Sheepsfoot or padfoot	Pneumatic	Thin lifts usually needed
Low-plasticity soils, CL, ML	Sheepsfoot or padfoot	Pneumatic, vibratory	Moisture control often critical for silty soils
Plastic sands and gravels, GC, SC	Vibratory, pneumatic	Pad foot	--
Silty sands and gravels, SM, GM	Vibratory	Pneumatic, pad foot	Moisture control often critical
Clean sands, SW, SP	Vibratory	Impact, pneumatic	--
Clean gravels, GW, GP	Vibratory	Pneumatic, impact, grid	Grid useful for oversize particles

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION

MATERIALS PROCEDURE

NUCLEAR DENSITY TEST BY THE ROLLER PASS METHOD

1. PURPOSE

1.1 The purpose of this procedure is to determine the density of construction materials by the roller pass method. The procedure consists of two parts, with Part I to determine the required maximum density and Part II to compare field densities to the required maximum density.

2. SCOPE

2.1 This test method or method of testing is applicable to aggregate base courses, select material for backfilling, crushed aggregate backfill, granular subgrade, and random material having 40% or more of +3/4 inch (+19 mm) material as specified in MP 717.04.21.

3. REFERENCES

MP 712.21.26
MP 717.04.21

4. EQUIPMENT

4.1 One complete nuclear density gauge unit meeting the requirements specified in MP 717.04.21. This would include the manufacturer's printout of standard counts.

4.2 One measuring tape, approximately 50 feet (15 m)

4.3 Lime or other suitable material to mark test sites

4.4 Dry silica sand

4.5 Supply of data sheets

4.6 One vehicle meeting the safety and security requirements of the Nuclear Regulatory Commission for transporting nuclear gauges.

5.0 PERSONNEL TRAINING

5.1 All personnel performing the testing must have the minimum training requirements specified in MP 717.04.21.

5.2 All personnel must know and follow the requirements of the Nuclear Regulatory Commission.

6.0 ROUNDING OF DATA

6.1 Rounding procedures have been adopted from the standard method taught in schools, and may be described as follows:

6.1.1 If the number following the last number to be retained is less than 5, the last number to be retained is left unchanged and the number(s) following the last number to be retained is/are discarded.

6.1.2 If the number following the last number to be retained is 5 or larger, increase the last number to be retained by 1 and discard the number(s) following the last number to be retained.

6.2 Test values and calculations shall be rounded to the following nearest significant digit:

6.2.1 Form T–313 (Test Section)

Lift thickness compacted	0.1 in. (10 mm)
Depth below grade	1 ft (0.1 m)
Length of test section	1 ft (1 m)
Width of test section	1 ft (0.1 m)
Station number	1 ft (0.1 m)
Offset	1 ft (0.1 m)
Dry density (DA)	1 lb ft^3 (1 kg/m^3)
Average density (DB)	1 lb /ft^3 (1 kg/m^3)
Maximum density (DC)	1 lb/ft^3 (1 kg/m^3)

6.2.2 Form T-317 (Quality Control Tests)

Station number	1 ft (0.1 m)
Offset	1 ft (0.1 m)
Depth below grade	1 ft (0.1 m)
Lift thickness compacted	0.1 in. (10 mm)
Maximum density (DC)	1 lb/ft^3 (1 kg/m^3)
Dry density (DE)	1 lb/ft^3 (1 kg/m^3)
Relative density (DF)	1%
Average DF ($\overline{X}$)	0.1%
Target (T)	1%
Quality index (QL)	0.01
Within tolerance (DG)	1%
Minimum percent for 100% Pay (DH)	1%

7. PREPARATION FOR TESTING

7.1 Standardization of the Nuclear Gauge

7.1.1 Warm up the gauge according to the manufacturer's recommendations.

7.1.2 Standardization of the gauge must be performed away from metal and other objects.

7.1.3 Clean the top of the standard block and the bottom of the gauge with a cloth.

7.1.4 Standardize according to manufacturer's recommendations.

7.1.5 Compare the standard counts to the manufacturer's standard counts using tolerances acceptable to the Division. For the Troxler 3430 gauge, the standard counts must be within ± 2% for density and ± 4% for moisture from the manufacturer's standards.

7.1.6 If the gauge is not within the specified tolerances for either moisture or density, repeat section 7.1.4 -7.1.5. If the gauge will not standardize for either moisture or density after 4 attempts, there is probably something wrong with the gauge. There may be electronics problems, the gauge needs calibrated or a stability check needs to be performed. Refer to MP 717.04.21 for a more detailed explanation. In any case, do not use a gauge for testing that will not standardize.

7.1.7 A gauge must be standardized before testing and at least every four hours during testing.

7.1.8 When a gauge is to be used for testing pipe or structure backfill in a trench, first check the standardization of the gauge according to sections 7.1 - 7.1.5. If the gauge is functioning properly, standardize the gauge in the trench. The standard counts in the trench would be used for testing in the trench only and the tolerances would not be applied to the standard counts taken in the trench. When the gauge is moved to a non-trench condition for testing, new standard counts would be required.

8. PART I PROCEDURE FOR DETERMINING THE MAXIMUM DENSITY

8.1 All data and calculations for Part I of this procedure will be recorded on form T-313 (copy attached). Record the project number, lab number etc. before starting the test.

8.2 The test is to be performed at the beginning of placement of an item. However, any problems with the material, placement or compaction equipment shall be corrected prior to performing the test.

8.3 The test section will be 100 feet (30 m) long by the width being placed in one operation except in restricted areas.

8.3.1 In restricted areas, where the 100 foot (30 m) length cannot be obtained, check the project's records to determine if a maximum density for the material has been determined on the project. The maximum density shall be used for Part II of this procedure, if available. A maximum density determined in a restricted area shall not be used in a non-restricted area. If a maximum density is not available for the material, obtain as large a test section as possible. For pipe backfill, a lift on both sides of the pipe can be used.

8.4 Divide the test section into 5 equal subsections and number the subsections. Randomly locate a test site within each of the subsections according to MP 712.21.26.

8.5 Water shall be added to untreated aggregates, if necessary, in a quantity satisfactory to the Engineer. The aggregate must visually appear wet in order to properly compact.

8.6 Once the material had been placed in the test section, the material shall be rolled with compaction equipment meeting the following requirements:

8.6.1 All compaction equipment must be in good working condition.

8.6.2 The materials shall be compacted with rollers providing a minimum applied force of 10 tons (9 Mg).

8.6.3 In restricted areas, inaccessible to conventional rollers, the compaction equipment must be satisfactory to the Engineer to provide the desired compactive effort. The Division may request verification that the above compaction equipment meets the specified requirements.

8.7 The test section shall be rolled with 12 roller passes. A roller pass is one complete coverage over the material. In restricted areas, where conventional rollers can not be used, the material shall be compacted until it appears well densified.

8.8 If the material shears or breaks down during rolling, the number of roller passes may need to be reduced. The designated number of roller passes must not be changed without the approval of the Engineer.

8.9 Once the material has been rolled, testing will be performed on test sites numbers 1 and 2.

8.10 Smooth the test site and fill any voids with fines scraped from the surface, no more than 1/8 inch (3 mm).

8.10.1 Place the guide plate on the test site. Next place the drive rod in the guide plate and while standing on the plate, drive the rod at least two inches (50 mm) deeper than the location where the end of the gauge source rod will be when testing. The gauge source rod can be extended in two inch (50 mm) increments. The source rod must be as deep as possible within the lift but must not extend beyond the lift. For example, a five inch (125 mm) lift would be tested with the source rod in the four inch (100 mm) position and the hole would be six (150 mm) inches deep. Carefully remove the drive rod to prevent material from falling into the hole.

8.10.2 Place the gauge over the test site and insert the source rod to the desired depth. Pull the gauge tight against the side of the hole toward the scaler. Make sure the gauge is sitting flush on the material. Mark the outline of the gauge with lime or other suitable material so the test sites can be relocated.

8.10.3 Take a one minute density reading.

8.10.3.1 Record the dry density (DA) in Section A of form T-313. Perform the same testing on site 2.

8.11 Average the two dry densities (DA) obtained in 8.10.3.1.

8.12 Roll the material in the test section two additional roller passes. In restricted areas, the compaction equipment would pass over the material the above indicated number of passes.

8.13 After the material has been rolled the additional number of passes, perform tests again on sites 1 and 2 according to 8.10 through 8.10.3 and record the values in section B.

8.14 Average the two densities according to 8.11.

8.15 Compare the value in 8.14 to the value obtained in 8.11. If the increase in density is 1 lb/ft^3 (16 kg/m^3) or less, the material is considered to have achieved its maximum density. If the increase in density is greater than 1 lb/ft^3 (16 kg/m^3), roll the material two additional passes according to 8.12 and repeat the testing on sites 1 and 2. Continue the rolling and testing sequence until the increase in density between two consecutive rolling sequences is 1 lb/ft^3 (16 kg/m^3) or less. The Division may request the contractor to cease rolling even though the increase is more than 1 lb/ft^3 (16 kg/m^3) if the material is breaking down.

8.16 Once the increase in density is 1 lb/ft^3 (16 kg/m^3) or less, move the last two density readings to the maximum density determination section on form T-313. Then take density measurements on sites 3, 4, and 5.

8.17 The average of the five density readings is the maximum density (DC) for the material.

8.17.1 The maximum density will be used to control the material for Part II of this procedure.

8.18 Division personnel may request that Part I be repeated if the test was not performed properly or the maximum density obtained does not appear to be realistic.

9. PART II QUALITY CONTROL TESTING

9.1 All test data and calculations for Part II of this procedure will be recorded on form T-317 (copy attached). Record the project number, item number, etc. on the form before starting the testing.

9.2 The lot number would have a prefix letter based on the following designations for the use of the material being tested:

Embankment	F
Subgrade	S
Base	B
Pipe and Structure Backfill	P

9.3 Transfer the maximum density (DC) and the lab number from form T-313 to form T-317. Record the lab number in the section for reference lab number.

9.4 Randomly locate the test site according to MP 712.21.26.

9.5 Determine the dry density (DE) with the nuclear gauge according to the procedure described in sections 8.10 through 8.10.3. The test sites do not have to be marked on the roadway.

9.6 Calculate the percent relative density (DF) by using the equation on form T-317.

9.7 Perform the remaining four tests in the lot. Five tests are always required to evaluate a lot.

9.8 Calculate the average relative density ($\overline{X}$) for the five tests in the lot.

9.9 Obtain the target percentage of dry density (T) from the project's governing specifications.

9.10 Determine the range (R) of the relative densities (DF) by subtracting the smallest value from the largest.

9.11 Calculate the quality index (QL) by using the equation on form T-317.

9.12 Use the Table for Estimating the Percent of a Lot Within Tolerance (copy attached) and determine the percent within tolerance (DG) that corresponds to the QL value calculated in 9.11 above.

9.13 Obtain the minimum percent for 100% pay (DH) from the project's governing specifications.

9.14 In order for a lot to meet specifications, the percent within tolerance (DG) must be equal to or greater than the minimum percent for 100% pay (DH).

10. General

10.1 Independent tests for similarity checks can be recorded on form T-317. Use only the applicable sections of the form.

10.2.1 If the material changes or the material is supplied from a new source, repeat Part I to obtain new control data.

10.3 If the percent relative densities are consistently above 105 percent or below 95 percent, and there is no apparent cause for the high or low values, repeat Part I to obtain new control data.

10.4 Test data for several lots can be recorded on form T-317.

Aaron C Gillispie

Aaron C. Gillispie, P.E.
Director
Materials Control, Soils
And Testing Division

ACG:Lw

Attachments

TABLE FOR ESTIMATING PERCENT OF LOT WITHIN TOLERANCE

Quality Index (QL) Positive Values	Percent Within Tolerance
.66	99
.65	98
.62	97
.60	96
.58	95
.57	94
.55	93
.53	92
.51	91
.50	90
.48	89
.46	88
.45	87
.44	86
.42	85
.41	84
.40	83
.38	82
.37	81
.36	80
.34	79
.33	78
.32	77
.30	76
.29	75
.28	74
.27	73
.25	72
.24	71
.23	70
.22	69
.21	68
.19	67
.18	66
.17	65
.16	64
.15	63
.14	62
.13	61
.11	60
.10	59
.09	58
.08	57
.07	56
.06	55
.05	54
.04	53
.02	52
.01	51
.00	50

Quality Index (QL) Negative Values	Percent Within Tolerance
.00	50
.01	49
.02	48
.04	47
.05	46
.06	45
.07	44
.08	43
.09	42
.10	41
.11	40
.13	39
.14	38
.15	37
.16	36
.17	35
.18	34
.19	33
.21	32
.22	31
.23	30
.24	29
.25	28
.27	27
.28	26
.29	25
.30	24
.32	23
.33	22
.34	21
.36	20
.37	19
.38	18
.40	17
.41	16
.42	15
.44	14
.45	13
.46	12
.48	11
.50	10
.51	9
.53	8
.55	7
.57	6
.58	5
.60	4
.62	3
.63	2
.66	1

West Virginia Division of Highways
Materials Control Soil and Testing Division

Lab Number _____
Auth. Number _____
Project Number _____
District Number _____
Item Number _____
Date _____

FORM T-313
MP 700.00.24
REV. 08-08

Source of Material:			Length of Test Section:		
Roller Type:			Width of Test Section:		
Roller Weight	Static:	Working:	Gauge Number		
Lift Thickness Compacted:			Manufacturer's Standards		
Depth Below Grade:			Density:	Moisture:	
Depth of Gauge Source:			Standard Counts		
Observed	Yes	No	Density:	Moisture:	

Test Site Number	1	2	3	4	5
Station Number					
Offset					

A	Number of Passes		
	Test Site	DA	Dry Density
	1		
	2		
DB	Average		

B	Number of Passes		
	Test Site	DA	Dry Density
	1		
	2		
DB	Average		

C	Number of Passes		
	Test Site	DA	Dry Density
	1		
	2		
DB	Average		

D	Number of Passes		
	Test Site	DA	Dry Density
	1		
	2		
DB	Average		

DB = $\sum$ DA / 2

DC = $\sum$ DA / 5

Maximum Denisty Determination		
Test Site	DA	Dry Density
1		
2		
3		
4		
5		
DC	Max. Density	

Inspector's Name: _____
Inspector's Signature: _____
Project's Evaluation
Checked By: _____
Date: _____

WEST VIRGINIA DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS & TESTING DIVISION

LAB NUMBER _____
AUTH. NUMBER _____
PROJECT NUMBER _____
DISTRICT _____
ITEM NUMBER _____

FORM T-317
MP 700.00.24
REV. 08-08

GAUGE #	DATE					
MANUFACTURER'S DENSITY STANDARD	LOT NUMBER					
	BEGINNING STATION					
	ENDING STATION					
MANUFACTURER'S MOISTURE STANDARD	OFFSET					
	DEPTH BELOW GRADE					
	DEPTH OF GAUGE SOURCE					
	LIFT THICKNESS COMPACTED					
DC FROM TEST SECTION	DENSITY STANDARD					
	MOISTURE STANDARD					

$$DF = \frac{DE\ (100)}{DC}$$

$$\overline{X} = \frac{\Sigma\ DF}{5}$$

$$QL = \frac{\overline{X} - T}{R}$$

DC	**MAXIMUM DENSITY**						
	REFERENCE LAB NUMBER						
TEST NUMBER 1	**DE**	DRY DENSITY					
	DF	% RELATIVE DENSITY					
TEST NUMBER 2	**DE**	DRY DENSITY					
	DF	% RELATIVE DENSITY					
TEST NUMBER 3	**DE**	DRY DENSITY					
	DF	% RELATIVE DENSITY					
TEST NUMBER 4	**DE**	DRY DENSITY					
	DF	% RELATIVE DENSITY					
TEST NUMBER 5	**DE**	DRY DENSITY					
	DF	% RELATIVE DENSITY					
LOT EVALUATION	$\overline{X}$	AVERAGE **DF**					
	T	TARGET					
	QL	QUALITY INDEX					
	DG	% WITHIN TOLERANCE					
	DH	MIN. FOR 100% PAY					
	DI	PASS / FAIL					

INSPECTOR'S NAME: _____
INSPECTOR'S SIGNATURE: _____

PROJECT'S EVALUATION

CHECKED BY: _____ DATE: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION

MATERIALS PROCEDURE

Procedure For Determining The Random Location Of Compaction Tests

---

1.0 Purpose

1.1 This procedure provides methods for determining the random locations for compaction tests.

2.0 Scope

2.1 This procedure is applicable for locating all compaction tests.

3.0 Equipment

3.1 Measuring tape, approximately 50 feet (15 m)

4.0 Procedure

4.1 Compaction test site locations are to be randomly located along the roadway centerline (length) and offset (width) randomly from this reference line. Some test site locations, such as pipe backfill, require random selection of lifts for the tests and a random determination of the side of the pipe backfill to test.

4.2 Selection of random numbers

4.2.1 Determine the number of test sites which will be required for the lot or test section.

4.2.2 The table of random numbers (Table I attached) or a calculator, which will generate random numbers, can be used.

4.2.3 The table of random numbers contains 5 sections with 2 columns of numbers in each section.

4.2.3.1 The first column of numbers in each section is for determining the test site along the centerline. The second column of numbers is for determining the distance from the centerline (offset). Either column of numbers can be used for selecting lifts to be tested.

4.2.3.2 To use the table, select a random point on the table by tossing a pencil upon the page or blindly pointing out a location with the finger. The selection of random numbers will consist of a pair of random numbers. Once the point is located, select the number in the first column for the length and the corresponding number in the right column for the width. When more than one pair of random numbers is needed, continue selecting the pairs of numbers down the page. If the bottom of the page is reached, go to the top of the next section to the right or to the top of the first section on the left side of the page if the bottom of the right most section of the page is reached. When selecting lifts to be tested, only single random numbers are needed and can be obtained from any of the columns of numbers.

4.2.3.3 To use a calculator, which will generate random numbers, select all numbers needed for a test site before selecting numbers for additional test sites.

4.3 Location of test sites

4.3.1 There are many variations in the required number of tests and the physical dimensions of the area to be tested.

4.3.2 Random location of tests on a single lift that is rectangular in shape (Example 1 attached)

4.3.2.1 Generally the Materials Procedure used for testing a material and/or Specifications requires a lot, portion of a lot, or a test section to determine the maximum density of a material to be divided into equal sublots or subsections when more than one test is required.

4.3.2.2 Divide the length of the area along the centerline by the number of tests to determine the length of each sublot or subsection.

4.3.2.3 From the beginning station number, add the length of the subsection or sublot to the station number to determine the station number for the beginning of the next sublot or subsection. Next add the length of the subsection or sublot to this station number to determine the station number at the beginning of the next subsection or sublot. Continue this procedure until the beginning station numbers for all subsections or sublots have been calculated.

4.3.2.4 Select the random numbers according to 4.2 through 4.2.3.3.

4.3.2.5 Multiply the length of the subsections or sublots by the random numbers selected for the length.

4.3.2.6 Add the values to the corresponding station numbers for the beginning of each subsection or sublot. The station numbers locate the test sites along centerline.

4.3.2.7 Next multiply the width of the test section or lot by the random numbers selected for the offset.

4.3.2.8 Determine the offset distance of the lot or test section from the centerline when the centerline is not within the area to be tested. This will usually be a constant value. Always calculate the offset by working from the side nearest the centerline. Add each of the values calculated in 4.4.2.7 to the constant value. The values establish the offset distance of each test site from the centerline. Designate rather the offset is left or right of centerline.

When the centerline is contained within the area to be tested, the offset can be calculated from the left or right side of the test area and test location designated in relation to centerline.

4.3.3 Random location of test sites on a single lift that is irregular in shape (Example 2 attached).

4.3.3.1 Determine the dimensions of the area to be tested.

4.3.3.2 Determine the minimum dimensions of a rectangle that will contain the area to be tested and has two sides parallel to centerline.

4.3.3.3 Divide the rectangle into the desired number of subsections or sublots and randomly locate the test sites locations as in sections 4.3.2 - 4.3.2.8 above. If a test site location falls outside the area to be tested, obtain a new set of random numbers for the test site and recalculate the test site location. Continue this procedure until the test site falls within the area to be tested.

4.3.4 Random selection of lifts to be tested (Example 3 attached).

4.3.4.1 When testing certain materials, especially backfill material, where an area to be backfilled will constitute a lot of material to be tested, a random selection of lifts to be tested is required.

4.3.4.2 Determine the projected number of lifts to be contained in the lot. Divide the number of lifts by the number of tests in the lot. If the value is not an even number, assign an additional lift to the first sublot and continue to assign a lift to each consecutive sublot until all remaining lifts have been assigned to a sublot.

4.3.4.3 By starting with the bottom lift, number the lifts in the lot.

4.3.4.4 Select a single random number for each test site.

4.3.4.5 Multiply each random number by the number of lifts in each sublot and round the values to whole numbers. Each value designates which lift in each sublot that will be tested.

4.3.5 Once the lifts to be tested have been selected, the random location of the test site on the lift can be determined.

4.3.6 Random selection of the side of backfill for pipe culverts.

4.3.6.1 When a lot of pipe backfill is being tested, tests should be performed on both sides of the pipe. The side to be tested can be randomly selected by using the random numbers selected for the location of the tests along the pipe. If the random number is less than 0.500, the test is on the left side and greater than 0.500 on the right side of the pipe.

Robert K. Tinney

Robert K. Tinney, Director
Contract Administration Division

RKT:Sra

Attachments

TABLE 1

RANDOM NUMBERS

.858	.082	.886	.125	.263	.176	.551	.711	.355	.698
.576	.417	.242	.316	.960	.819	.444	.323	.331	.179
.687	.288	.835	.636	.596	.174	.866	.685	.066	.170
.068	.391	.739	.002	.159	.423	.629	.631	.979	.399
.140	.324	.215	.358	.663	.193	.215	.667	.627	.595
.574	.601	.623	.855	.339	.486	.065	.627	.458	.137
.966	.529	.757	.308	.025	.836	.200	.055	.510	.656
.608	.910	.944	.281	.539	.371	.217	.882	.324	.284
.215	.355	.645	.460	.719	.057	.237	.146	.135	.903
.761	.883	.771	.388	.928	.654	.815	.570	.539	.600
.869	.222	.115	.447	.658	.989	.921	.924	.560	.447
.562	.036	.302	.673	.911	.512	.972	.576	.838	.014
.481	.791	.454	.731	.770	.500	.980	.183	.385	.012
.599	.966	.356	.183	.797	.503	.180	.657	.077	.165
.464	.747	.299	.530	.675	.646	.385	.109	.780	.699
.675	.654	.221	.777	.172	.738	.324	.669	.079	.587
.279	.707	.372	.486	.340	.680	.928	.397	.337	.564
.338	.917	.942	.985	.838	.805	.278	.898	.906	.939
.316	.935	.403	.629	.130	.575	.195	.887	.142	.488
.011	.283	.762	.988	.102	.068	.902	.850	.569	.977
.683	.441	.572	.486	.732	.721	.275	.023	.088	.402
.493	.155	.530	.125	.841	.171	.794	.850	.797	.367
.059	.502	.963	.055	.128	.655	.043	.293	.792	.739
.996	.729	.370	.139	.306	.858	.183	.464	.457	.863
.240	.972	.495	.696	.350	.642	.188	.135	.470	.765

EXAMPLE I
ENGLISH

Length of test section = 100 ft
Width of section = 10 ft
Number of tests required = 5
5 equal subsections 100/5 = 20 ft
Test section starts at station 5+46

Station number at the beginning of each subsection

1. 5+46
2. 5+46 + 20 = 5+66
3. 5+66 + 20 = 5+86
4. 5+86 + 20 = 6+06
5. 6+06 + 20 = 6 +26

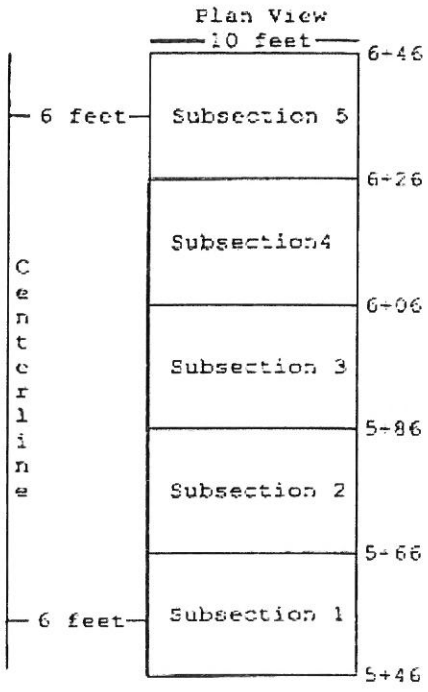
	Random Numbers Length	Width
1.	.869	.222
2.	.562	.036
3.	.481	.791
4.	.599	.966
5.	.464	.747

Multiply the length of each subsection by the random numbers for the length.

1. 20 x .869 = 17
2. 20 x .562 = 11
3. 20 x .481 = 10
4. 20 x .599 = 12
5. 20 x .464 = 9

Add the values to the beginning station numbers of each subsection to determine the station number for each test.

1. 5+46 + 17 = 5+63
2. 5+66 + 11 = 5+77
3. 5+86 + 10 = 5+96
4. 6+06 + 12 = 6+18
5. 6+26 + 9 = 6 +35



Multiply the width of each subsection by the random numbers for the width.

1. 10 x .222 = 2
2. 10 x .036 = 0
3. 10 x .791 = 8
4. 10 x .966 = 10
5. 10 x .747 = 7

Add the values to the constant distance the test section is from the centerline and label the values as right of centerline .

1. 6 + 2 = 8 ft right of centerline
2. 6 + 0 = 0 ft right of centerline
3. 6 + 8 = 14 ft right of centerline
4. 6 + 10= 16 ft right of centerline
5. 6 + 7 = 13 ft right of centerline

EXAMPLE I
METRIC

Length of test section = 30.00 m
Width of section = 3.00 m
Number of tests required = 5
5 equal subsections 30/5 = 6 m
Test section starts at station 15+340

Station number at the beginning of each subsection

1. 15+340
2. 15+340 + 6 = 15+346
3. 15+346 + 6 = 15+352
4. 15+352 + 6 = 15+358
5. 15+358 + 6 = 15+364

Random Numbers

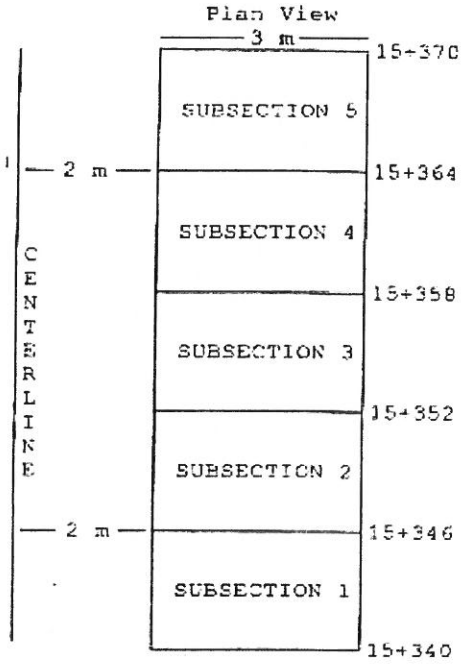
	Length	Width
1.	.869	.222
2.	.562	.036
3.	.481	.791
4.	.599	.966
5.	.464	.747

Multiply the length of each subsection by the random numbers for the length.

1. 6.00 x .869 = 5.2
2. 6.00 x .562 = 3.4
3. 6.00 x .481 = 2.9
4. 6.00 x .599 = 3.6
5. 6.00 x .464 = 2.8

Add the values to the beginning station numbers of each subsection to determine the station number for each test site.

1. 15+340 + 5.2 = 15+345.2
2. 15+346 + 3.4 = 15+349.4
3. 15+352 + 2.9 = 15+354.9
4. 15+358 + 3.6 = 15+361.6
5. 15+364 + 2.8 = 15+366.8



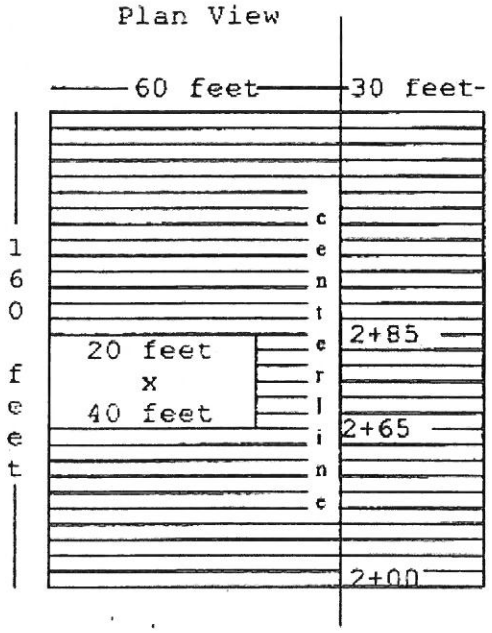
Multiply the width of the test section by the random numbers for the width.

1. 3.00 x .222 = 0.7
2. 3.00 x .036 = 0.1
3. 3.00 x .791 = 2.4
4. 3.00 x .966 = 2.9
5. 3.00 x .747 = 2.2

Add the values to the constant distance the test section is from the centerline and label the values as right of centerline.

1. 2.00 + 0.7 = 2.7 m rt of centerline
2. 2.00 + 0.1 = 2.1 m rt of centerline
3. 2.00 + 2.4 = 4.4 m rt of centerline
4. 2.00 + 2.9 + 4.9 m rt of centerline
5. 2.00 + 2.2 = 4.4 m rt of centerline

EXAMPLE 2
METRIC



The shaded area designates the lift to be tested. For this example, 2 sublots are required with 1 test in each sublot.

Since the area to be tested is not rectangular in shape, place the smallest rectangle around the area that will include all the shaded area.

Divide the rectangle into 2 equal areas (160 feet long by 90 feet wide).

Since the centerline is located within the area to be tested, the offset can be calculated and measured from either side. For this example, work from the right side.

Determine the station number for the beginning of each sublot.

Sublot No. 1 2.+00
Sublot No. 2 2+00 + 80 = 2+80

Random Numbers	
Length	Width
.902	.850
.275	.023
.794	.850

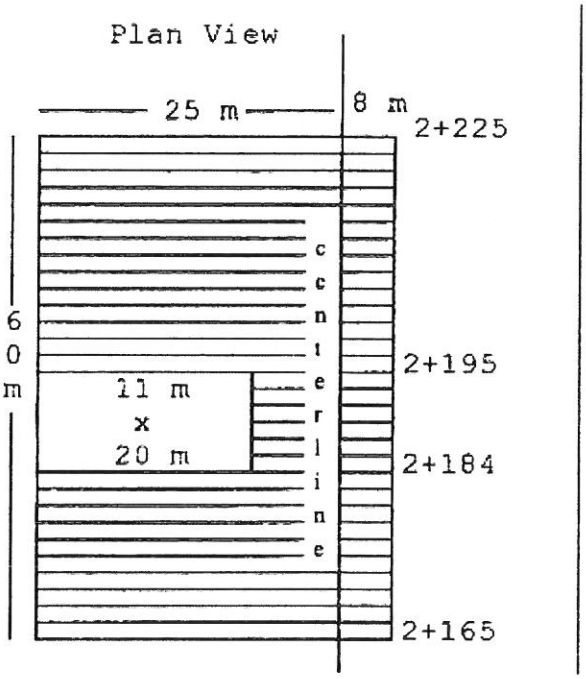
Since there is the possibility that the location of a test site may fall outside the area to be tested, an additional set of random numbers was selected.

Multiply the random number by the length of the sublot (80 x .902 = 72 feet). Add the value of the beginning station number (2+00 + 72 = 2+72). Multiply the width of the sublot by the random number (90 x .850 = 76 feet). By working from the right side, it is 30 feet to the centerline, therefore the test site is 76 - 30 = 46 feet to the left of centerline. The test site falls outside the teSt area.

By using the next set of random numbers, calculate the test site location.
80 x .275 = 22 feet
2+00 + 22 = 2+22
90 x .023 = 2 feet
30 - 2 feet = 28 feet right of centerline
The test site for sublot 1 now falls within the test area.

Calculate the test location for sublot 2.
80 x .794 = 64 feet
2+80 + 64 = 3+44
90 x .850 = 76 feet
76 - 30 = 46 feet left of centerline

EXAMPLE 2
METRIC



The shaded area designates the lift to be tested. For this example, 2 sublots are required with 1 test in each sublot.

Since the area to be tested is not rectangular in shape, place the smallest rectangle around the area that will include all the shaded area.

Divide the rectangle into 2 equal areas (30 m long by 33 m wide).

Since the centerline is located within the area to be tested, the offset can be calculated and measured from either side. For this example, work from the right side.

Determine the station number for the beginning of each sublot.

Sublot No. 1 2.+165
Sublot No. 2 2+165 + 30 = 2+195

Random Numbers

Length	Width
.902	.850
.275	.023
.794	.850

Since there is the possibility that the location of a test site may fall outside the area to be tested, an additional set of random numbers was selected.

Multiply the random number by the length of the sublot (30 x .902 = 27.1 m). Add the value of the beginning station number (2+165 + 27.1 = 2+192.1). Multiply the width of the sublot by the random number (33 x .850 = 28.1 m). By working from the right side, it is 8 m to the centerline, therefore the test site is 28.1 - 8 = 20.1 m to the left of centerline. The test site falls outside the teSt area.

By using the next set of random numbers, calculate the test site location.
30 x .275 = 8.2 m
2+165 + 8.2 = 2+173.2
33 x .323 = 0.8 m
8 - 0.8 m = 7.2 m right of centerline
The test site for sublot 1 now falls within the test area.

Calculate the test location for sublot 2
30 x .794 = 23.8 m
2+195 + 23.8 = 2+218.8
33 x .850 = 28.0 m
28 - 8 = 20 m left of centerline

EXAMPLE 3

21 lifts of material are required to backfill the pipe.

All of the backfill material is included in 1 lot. There are 5 tests required with 1 test in each sublot.

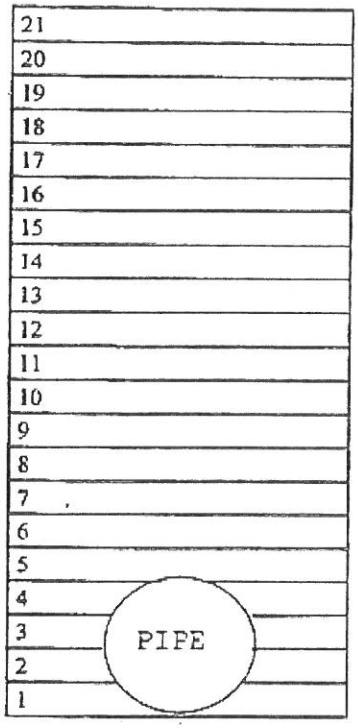
Divide the number of lifts by the number of sublots to determine the number of lifts in each sublot (21/5 = lifts with 1 lift left over). This includes the lift in sublot number 1.

Sublot Number 1	Lifts 1 - 5
Sublot Number 2	Lifts 6 - 9
Sublot Number 3	Lifts 10 - 13
Sublot Number 4	Lifts 14 - 17
Sublot Number 5	Lifts 18 - 21

Random numbers
1. .599
2. .464
3. .675
4. .279
5. .338

Multiply the number of lifts in the sublot by the random numbers. The values determine which lift in each sublot to test.

CROSS SECTION OF PIPE BACKFILL



1. 5 x .599 = 3 Test lift 3 in sublot number 1, Lift number 3
2. 4 x .464 = 2 Test lift 2 in sublot number 2, Lift number 7
3. 4 x .675 = 3 Test lift 3 in sublot number 3, Lift number 12
4. 4 x .279 = 1 Test lift 1 in sublot number 4, Lift number 14
5. 4 x .338 = 1 Test lift 1 in sublot number 5, Lift number 18

WEST VIRGINIA DEPARTMENT OF HIGHWAYS
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOIL AND TESTING DIVISION

MATERIALS PROCEDURE

METHOD FOR ACCEPTANCE OF COMPACTION TESTING

1.0 PURPOSE

1.1 To provide a procedure for the acceptance of compaction testing.

2.0 SCOPE

2.1 This procedure is applicable to all materials that require evaluation of compaction tests.

3.0 TESTING

3.1 The minimum frequency for acceptance testing shall be 10% of the contractor's individual tests. Five tests shall be performed in a lot for acceptance testing.

3.2 Acceptance testing shall be distributed throughout the placement of material.

3.3 The material should be categorized according to the base, subgrade, pipe backfill, embankment, etc.

4.0 EVALUATION

4.1 Calculations shall be rounded to the following significant digits according to NEW ROUNDING PROCEDURE | **Page 8 – 1** |

Average (X)	0.1%
Standard Deviation	0.01
Range	1%

4.2 Determine the number of lots tested by the contractor for a particular material since the last monitoring including the lot just tested. Record the percent relative densities on the attached form.

4.3 Calculate the standard deviation (S) for the percent relative densities.

4.4 Calculate the range (R) for plus and minus 1.65 standard deviations (S) from the average (X) for the contractor's tests ($R = X \pm 1.65\ S$).

4.5 Compare the acceptance tests to the calculated range.

4.5.1 If all the acceptance tests are within the range, the testing is similar. When the testing is similar , the degree of compaction for the lots of material represented by the acceptance evaluation can be accepted.

4.5.2 If any of the 5 acceptance tests are outside the range, calculate 3 standard deviations for the contractor's tests ($R = X \pm 3\ S$).

4.5.2.1 If all acceptance tests are within the range, the testing is considered similar, however, the quality control practices by the contractor should be reviewed for possible problems.

4.5.2.2 Any test outside the standard 3 deviation range indicates that there are probably problems with the quality control system and no additional material should be placed until the problem is resolved. The investigation would include checking such areas as equipment, test procedures, location of tests, variability of materials, compaction techniques, etc. The results of the investigation shall be documented in the project files.

Gary L. Robson, Director
Materials Control, Soils
and Testing Division

GLR:d

PROJECT NUMBER: _____
ITEM NUMBER (S): _____
TYPE OF MATERIAL: _____
DATE: _____

QUALITY CONTROL TESTS

LOT NUMBER				
	1 2 3 4 5			
	AVERAGE (X)		STANDARD DEVIATION	
ACCEPTANCE TESTS				
TEST NUMBER	1 2 3 4 5	X + 1.65 (S) = X - 1.65 (S) = WITHIN LIMITS	 YES NO	= UPPER LIMIT = LOWER LIMIT (SIMILAR) (DISSIMILAR)
		X + + 3 (S) = X - - 3 (S) = WITHIN LIMITS	 YES NO	= UPPER LIMIT = LOWER LIMIT (SIMILAR) (DISSIMILAR)

EVALUATED BY: _____
CHECKED BY: _____

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

GUIDE FOR QUALITY CONTROL OF COMPACTION

1.0 PURPOSE

1.1 This procedure sets forth guidelines for the contractor's Quality Control Plan for embankment, subgrade, pipe and structure backfill material and aggregate base courses.

2.0 SCOPE

2.1 This procedure is applicable to all items requiring compaction control except bituminous concrete pavements.

3.0 REFERENCES

3.1 MP 700.00.06
MP 700.00.24
MP 207.07.20
MP 712.21.26
MP 700.00.50
WV Division of Highways Construction Manual
WV Division of Highways Standard Specifications

4.0 QUALITY CONTROL PLAN

4.1 As required by the Specifications, a Quality Control Plan must be designed by the contractor and submitted to the Engineer at the Preconstruction Conference. The plan should clearly describe the methods by which the Quality Control Program will be conducted. The plan may be updated as required during the life of the contract. Changes in the plan must be approved by the Division prior to being implemented.

5.0 MINIMUM REQUIREMENTS OF THE CONTRACTOR'S QUALITY CONTROL PLAN

5.1 Identifying Information

5.1.1 The plan should include the project number, route number, location, county, district, and items to be controlled.

5.2 Personnel

5.2.1 Provide the name of the company official for the project that is responsible for quality control and liaison with the Division's personnel.

5.2.2 List all inspectors for the project including the certification number for certified compaction inspectors. All personnel performing compaction tests must be Certified Compaction Inspectors.

5.3 Field Test Methods

5.3.1 Compaction tests are performed according to MP 207.07.20 and MP 700.00.24.

5.3.2 Specify in the plan the methods by which each item will be tested. Table A and Table B (attached) summarizes the different materials, minimum frequencies, and the appropriate test procedure or method for controlling each material. A flow chart for embankment material, Table C (attached), is intended to serve as a guide for making field decisions to insure that each type of material is properly placed.

5.4 Test Equipment

5.4.1 The plan should include a statement that all necessary test equipment will be provided. Materials Procedures 700.00.24 and MP 207.07.20 lists the required test equipment for compaction tests.

5.4.2 List all nuclear gauges to be used including serial number, manufacturer, model number, calibration data, and frequency of calibration. The calibration frequency must be acceptable to the Division. Nuclear gauges must be calibrated at least once every two years.

5.4.3 Outline the procedure for performing a stability check on nuclear gauges which are not within the tolerance range for standard counts during the interval between calibrations. Standard counts derived during the stability check for stable gauges may be used in lieu of the manufacturer's standards. Gauges found to be unstable can not be used until repaired and calibrated.

5.5 Lot and Sublot Sizes

5.5.1 Include in the plan the lot and sublot sizes to be used for testing each type of installation. During construction, some flexibility in lot sizes may be made if the situation warrants in order to maintain a workable system. For example, two or more areas containing small quantities of embankment material might be combined into one lot at the contractor's option and subject to the Division's approval.

5.5.2 Specify the maximum time period for completion of a lot of embankment material. As a guide, if the desired lot size can not be obtained within seven calendar days, then the material placed up to that time would constitute the lot and the specified number of tests for a lot would still be performed.

5.5.3 Specify in the plan when quality control tests for base and subgrade will be performed. Quality control tests are to be performed after the material has been shaped and final rolling has been completed.

5.5.4 The contractor is responsible for the accuracy of their individual testing and calculations.

5.6 Forms, Documentation and Distribution

5.6.1 List the forms and method of distribution for tests and measurements.

5.6.1.1 Compaction test results are reported on forms specified in MP 207.07.20 and MP 700.00.24. The forms are supplied by the Division. Each form consists of an original and one copy. The original of a completed form is submitted to the Division's project supervisor and the other copy is for the contractor's records.

5.6.2 Indicate the length of time after tests and measurements are completed that documentation will be provided.

5.6.2.1 Test results and measurements are made available to project personnel for review on a daily basis. Formal submission of measurements should be made within 24 hours after the measurements are taken and test results within 24 hours after testing of a lot is completed.

5.6.2.2 Tests performed in a lot before final rolling is completed should be submitted to the project supervisor and retained in the project files. This includes test documents for failing lots, moisture checks, etc.

5.7 Compaction Equipment

5.7.1 List the compaction equipment giving the quantity, make, model, and weight or applied force at which each roller will be operated. If ballast will be added to a roller, indicate the type and quantity of ballast and the method for verifying the gross weight. Attach the manufacturer's specifications for compaction capabilities for each roller to the plan or state the procedure for verifying the compaction capabilities of each roller in cases where the manufacturer's specifications are not available.

5.7.2 Indicate in the plan that a minimum of a 10 ton (9.07 Mg) roller will be used for test sections as per MP 700.00.24.

5.8 Proof Rolling

5.8.1 Specify the method by which proof rolling will be conducted on embankment materials. The materials to be proof rolled are summarized in Table B (attached).

5.8.2.1.1 List the number of passes to be made and corrective measures if soft areas are detected. Documentation should include the type of material, number of passes, and corrective action if soft areas are detected.

5.8.2.2 Specify the make, model, and type of proof roller. If ballast will be added, explain how the gross weight will be determined. For alternate proof rollers, attach to the plan the calculations used to determine that the roller meets specifications. Also, attach the manufacturer's specifications for all proof rollers to the plan. The following calculation is used to determine if an alternate proof roller meets specifications:

ENGLISH	Metric
$c = \frac{\sqrt{(ab\pi)}}{2}$	$c = \frac{\sqrt{(ab\pi)}}{50.8}$

Where:

a = weight(force) on a single tire = pounds (kg x .009807 = kN)
b = operating tire pressure = psi (kPa)
c = weight (force) per inch (mm) width of tire = pounds per inch (Nm)

The weight (force) per inch (mm) width of tire must be equal to or greater than 1315 pounds (9.067 kN/mm).

5.9 Test Section

5.9.1 Outline the procedure for notifying the Division when the test section in MP 700.00.24 will be performed. The Division should be notified a minimum of 24 hours in advance unless other arrangements acceptable to the Division can be made.

5.10 Laboratory Testing

5.10.1 Specify in the plan the sampling frequency, place of sampling, and test procedures for material requiring laboratory testing. List the testing laboratory and the qualifications of the personnel performing the testing.

5.10.1.1 Laboratory testing for random material is not required unless the material has unusual characteristics or differs from the soil and rock data used to develop the design. Testing to develop density curves, specific gravities, organic content, etc. may be required. A list of test procedures is contained in Section 716 of the Standard Specifications.

5.10.1.2 Laboratory test procedures for granular material for subgrade are listed in Section 716 of the Standard Specifications. The minimum frequencies for gradation and plasticity index tests are specified in Table D (attached). Sampling of the material is according to MP 700.00.06.

5.10.1.3 Laboratory test procedures for gradation tests on select material for backfilling are listed in Section 716 of the Standard Specifications. The minimum frequency for gradation tests is specified in Table D (attached).

5.11 Non-Specification Material

5.11.1 Design a plan of action for the disposition of non-specification material, such as material with excessive moisture, excessive organic content, etc. The Project Supervisor should be immediately notified in the event a nonconformance situation is detected.

5.12 Lift Thickness Measurements

5.12.1 List the method(s) and frequencies by which lift thickness measurements will be taken. One method of measuring lift thicknesses is specified in the Construction Manual. The minimum frequency for lift thickness measurements is specified in Table E (attached).

Richard D. Genthner

Richard Donald Genthner, Director
Materials Control, Soil and Testing Division

RDG:Aw

Attachments

TABLE A

COMPACTION CONTROL OF AGGREGATE BASE COURSES

TEST PROCEDURE	LOT SIZE	NUMBER OF TEST	MATERIAL TYPE			
			PORTLAND CEMENT TREATED AGGREGATE BASE COURSE	CRUSHED AGGREGATE BASES AND SUBBASE COURSES	HOT-MIX HOT-LAID BITUMINOUS TREATED BASE COURSE	SOIL CEMENT BASE COURSE
MP 700.00.24	2000 FEET (600 METERS)	1 PER SUBLOT 5 PER LOT	X	X	X	
MP 207.07.20	2000 FEET (600 METERS)	1 PER SUBLOT 5 PER LOT				X

TABLE B

COMPACTION CONTROL OF EMBANKMENT

BACKFILL AND SUBGRADE

TEST	LOT SIZE	NUMBER OF TESTS	MATERIAL WITH LESS THAN 40% RETAINED ON ¾" (19.0 mm) SIEVE	MATERIAL WITH 40% OR MORE RETAINED ON ¾" (19.0 mm) SIEVE AND CAN BE PLACED IN A 12" (300 mm) LOOSE LIFT OR LESS		MATERIAL THAT CAN BE PLACED IN A LOOSE LIFT GREATER THAN 12" (300 mm)		GRANULAR SUBGRADE	SELECT MATERIAL FOR BACKFILLING AND CLASS I AGGREGATE
				UNIFORM	NON UNIFORM	ROCK	HARD SHALE		
MP 207.07.20	SEE STD. SPECS.	1 PER SUBLOT 5 PER LOT	X						
MP 700.00.24	SEE STD. SPECS.	1 PER SUBLOT 5 PER LOT		X [1]				X	X
PROOF ROLLING		1 REPORT PER LIFT			X [2]		X		

NOTES:

[1] If a hole for a direct transmission density reading cannot be readily made due to the coarse material, proof roll the lift.

[2] Material shall be considered non-uniform if the percent of random material varies by more than 25% by visual inspection.

TABLE C

MP 717.04.21

ATTACHMENT NO. 3

GUIDE FOR CONTROL OF EMBANKMENT MATERIAL

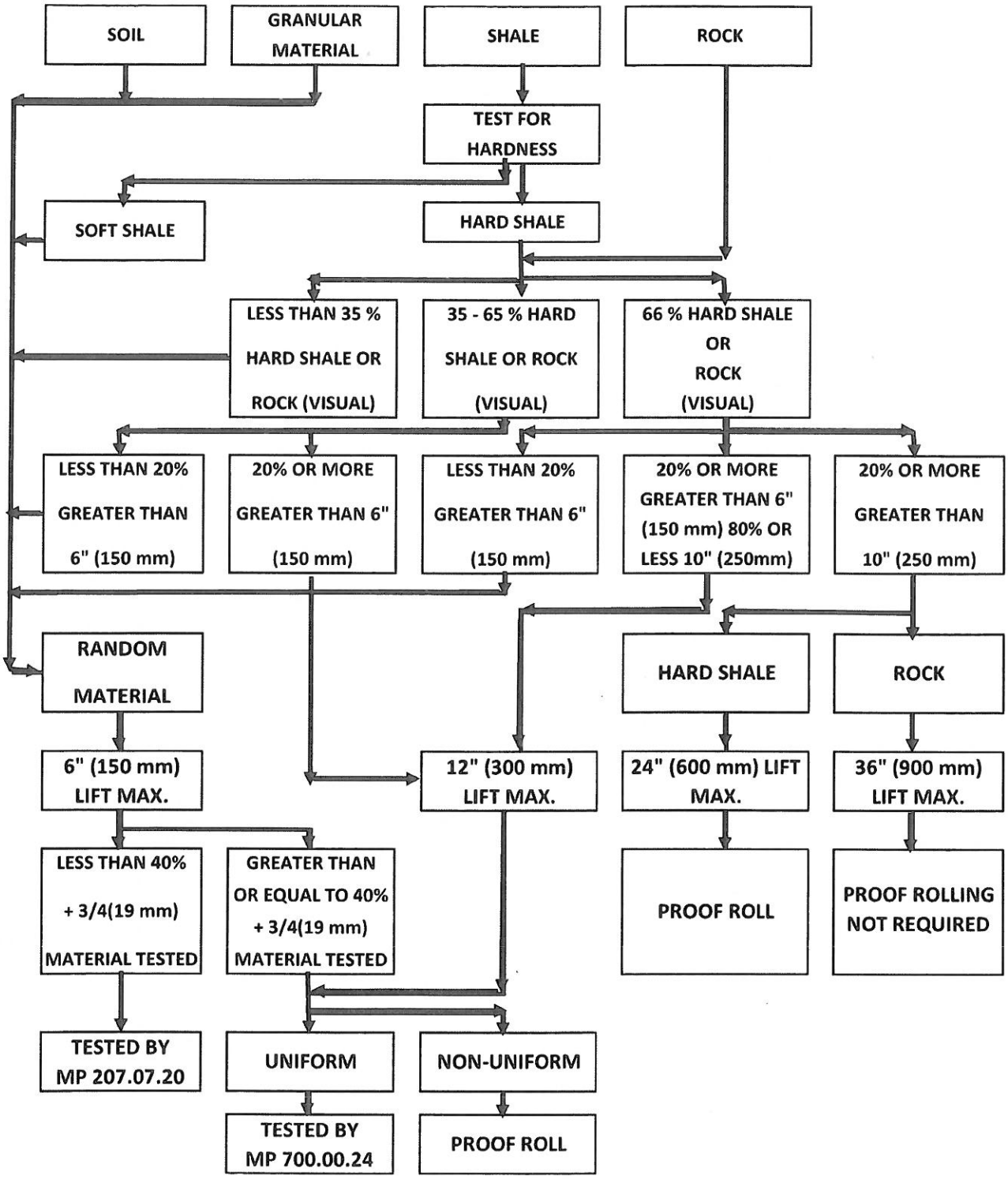


TABLE D
LABORATORY TESTING OF GRANULAR MATERIAL FOR
SUBGRADE AND SELECT MATERIAL FOR BACKFILLING

MATERIAL TYPE	TEST	FREQUENCY
GRANULAR MATERIAL FOR SUBGRADE	GRADATION	MINIMUM OF 1 PER DAY OF PLACEMENT NOTE 1
GRANULAR MATERIAL FOR SUBGRADE	PLASTIC LIMIT	MINIMUM OF 1 PER 6 DAYS OF PLACEMENT
SELECT MATERIAL FOR BACKFILLING	GRADATION	MINIMUM OF 1 PER DAY OF STOCKPILING, PRODUCTION, OR SHIPMENT

Note 1: In the event project activities are such that relatively small quantities of material are being placed per placement date, and to prevent over sampling, the Engineer may approve the following alternate sampling method: During one or more consecutive placement dates, one sample shall be taken to represent a maximum of 170 cubic yards (250 tons). In this case the sample shall be taken at a random time and place, represent the same material and production, and shall represent material placed during a period not to exceed one week.

TABLE E

LIFT THICKNESS MEASUREMENTS

MATERIAL TYPE	NUMBER OF MEASUREMENTS
EMBANKMENT	MINIMUM OF 3 PER LIFT
SUBGRADE	MINIMUM OF ONE PER 1200 FEET (350 METERS) PER WORKING WIDTH
PIPE BACKFILL	MINIMUM OF ONE PER SIDE PER LIFT
STRUCTURE BACKFILL	MINIMUM OF ONE PER LIFT

WEST VIRGINIA DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS AND TESTING DIVISION

MATERIALS PROCEDURE

NUCLEAR FIELD DENSITY - MOISTURE TEST FOR RANDOM MATERIAL HAVING LESS THAN 40% OF + 3/4 INCH (+19 mm) MATERIAL

1.0 PURPOSE

1.1 The purpose of this procedure is to determine the density and moisture content of random materials.

2.0 SCOPE

2.1 This method of testing is applicable to random materials used for embankments, subgrades, backfill, and soil cement base courses.

3.0 REFERENCES

3.1 MP 717.04.21
MP 712.21.26
AASHTO T-99, Method C

4.0 EQUIPMENT

4.1 One complete nuclear density-moisture gauge unit meeting the requirements specified in MP 717.04.21. A copy of the manufacturer's print-out of standard counts is to be included.

4.2 One 1/30 ft^3 (0.000943 m^3) proctor mold assembly with a 5.5 LB (2.5 kg) rammer meeting the requirements of AASHTO T-99.

4.3 One steel foundation plate having minimum dimensions of 15 in. x 15 in. x 5/8 in. (380 mm x 380 mm x 16 mm) or a 200 LB (91 kg) block of concrete.

4.4 One extruder for removing specimens from proctor mold.

4.5 One balance having a capacity of at least 10 kg and sensitive to 1.0 g.

4.6 One stove for drying moisture samples.

4.7 One 32 oz. (900 g) ballpeen hammer or equivalent.

4.8 Two pans with a capacity to hold 10 lbs. (4500 g) of material.

4.9 One pan suitable for drying moisture samples.

4.10 One wire brush.

4.11 One 3/4 in. (19 mm) U.S. standard sieve.

4.12 One scoop.

4.13 One ruler or tape measure.

4.14 One measuring tape (should be a minimum of 50 ft. (15 mm)).

4.15 One 2 in. (50 mm) approximate size paint brush.

4.16 One 18 in. (450 mm) chisel or equivalent.

4.17 One draw knife.

4.18 Supply of data sheets and attached tables.

4.19 One appropriate vehicle for transporting nuclear gauge and test equipment.

5.0 PERSONNEL TRAINING

5.1 All personnel performing the testing must have the minimum training requirements specified in MP 717.04.21.

5.2 All personnel must know and follow the requirements of the Nuclear Regulatory Commission.

6.0 ROUNDING OF DATA

6.1 Rounding procedures have been adopted from the standard method taught in schools, and may be described as follows:

6.1.1 If the number following the last number to be retained is less than 5, the last number to be retained is left unchanged and the number(s) following the last number to be retained is/are discarded.

6.1.2 If the number following the last number to be retained is 5 or larger, increase the last number to be retained by 1 and discard the number(s) following the last number to be retained.

6.2 Test values and calculations shall be rounded to the following nearest significant digit:

Station Number:	1 ft. (0.1m)
Offset:	1 ft. (0.1m)
Lift Thickness:	1/2 in. (10 mm)
Depth Below Grade:	1 ft. (0.1m)
Dry Density (DA):	1 lb./ft.^{3} (10 kg/m^3)
Moisture (MA):	1 lb./ft.^{3} (10 kg/m^3)
Dry Density -3/4 in. (-19 mm) (DB):	1 lb./ft.^{3} (10 kg/m^3)
Moisture (MB):	1%
Excavated Material & Pan (CA):	1 g
Pan (CB):	1 g
Excavated Material (CC):	1 g
+3/4 in. (+19 mm) Material & Pan (CD):	1 g
Pan (CE):	1 g
+3/4 in. (+19 mm) Material (CF):	1 g
+3/4 in. (+19 mm) Material (CG):	1%
Weight of Soil & Mold (PA):	1 g
Mold (PC):	1 g
Weight of Soil (PD):	1 g
Wet Density (PE):	1 lb./ft.^{3} (10 kg/m^3)
Dry Density (PF):	1 lb./ft.^{3} (10 kg/m^3)
Wet Weight & Pan (SA):	1 g
Pan (SB):	1 g
Wet Weight (SC):	1 g
Dry Weight & Pan (SD):	1 g
Dry Weight (SE):	1 g

Moisture (SF):	1 g
Moisture (SG):	1%
Optimum Moisture (OA):	1%
Maximum Density (DC):	1 LB/ft^3 (10 kg/m^3)
Relative Density (DE):	1%
Average DE (X):	0.1%
Target (T):	1%
Quality Index (L):	0.01
Within Tolerance (DF):	1%
Minimum Percent for 100% Pay (DG):	1%

7.0 PREPARATION FOR TESTING

7.1 Weigh the pans and proctor mold and record the weights on the sides of the equipment. The weights should be checked at least on a monthly basis.

7.2 All test data is to be recorded on the attached form.

7.3 Standardization of the nuclear gauge

7.3.1 Warm up the gauge according to manufacturer's recommendations.

7.3.2 Standardization of the gauge must be performed away from metal and other objects.

7.3.3 Clean the top of the standard block and the bottom of the gauge with a cloth.

7.3.4 Place the gauge on the standard block with the gauge turned the correct way. For the Troxler 3411 gauge, the scaler end of the gauge must be tight against the standard block flange.

7.3.5 Make the necessary adjustments on the gauge for standardization and take a four minute count for density and moisture.

7.3.6 Compare the standard counts to the manufacturer's standard counts. The standard count must be within ±2% for density and ±4% for moisture from the manufacturer's standards.

7.3.7 If the gauge is not within the specified tolerances for either moisture or density, repeat Section 7.3.5 - 7.3.6. If the gauge will not standardize for either moisture or density after 4 attempts, there is probably something

wrong with the gauge. There may be electronics problems, the gauge needs calibrated, or a stability check needs to be performed. Refer to MP 717.04.21 for a more detailed explanation. In any case, do not use a gauge for testing that will not properly standardize.

7.3.8 When a gauge is used for testing pipe or structure backfill in a trench, first check the standardization of the gauge according to Sections 7.3.1 - 7.3.6. If the gauge is functioning properly, then standardize the gauge in the trench. The standard counts in the trench are used for testing in the trench only and the tolerances would not be applied to the standard counts taken in the trench. When the gauge is moved to a non-trench condition for testing, new standard counts would be required.

7.3.9 Gauges are to be standardized before testing and at least every four hours during testing.

7.4 Record the project number, item number, etc.

7.5 The lot number has the following prefix letter designations based on the use of the material:

Embankment - F
Subgrade - S
Base - B
Pipe and Structure Backfill - P

7.6 Randomly locate the test site according to MP 712.21.26.

8.0 PROCEDURE

8.1 Density and moisture determination

8.1.1 Smooth the test site selected for testing. Fill any voids in the surface using the fines scraped from the surface. Avoid adding excessive fines that would form a build-up on the surface (no more than 1/8 in. (3 mm)).

8.1.2 Place the guide plate on the test site. Next, place the drive rod in the plate guide and while standing on the plate, drive the rod at least 2 in. (50 mm) deeper than the location where the end of the gauge source rod will be when testing. The gauge source rod can be extended in

2 in. (50 mm) increments. The source rod must be as deep as possible within the lift but must not extend beyond the lift. For example, a 5 inch (125 mm) lift would be tested with the source rod in the 4 in. (100 mm) position and the hole would be 6 in. (150 mm) deep. Carefully remove the drive rod to prevent material from falling into the hole.

8.1.3 Place the gauge over the test site and insert the source rod to the desired depth. Pull the gauge tight against the side of the hole toward the scaler. Make sure the gauge is sitting flush on the material.

8.1.4 Take a one minute density and moisture reading. Record the dry density (DA) and moisture (MA).

8.2 Determination of the percent + 3/4 in. (+19 mm) material.

8.2.1 Excavate approximately 10 pounds (4500 grams) of material immediately beneath the test site. Excavate the material from the test hole toward the scaler end of the gauge and to the depth of the position where the source rod was located. Keep the excavated material covered to prevent moisture loss.

8.2.2 Zero the scales. The scales are to be located in an enclosed area of the vehicle that is protected from air movement. The scales are to be checked for zero before each weighing. Weigh the excavated material (CA).

8.2.3 All of the material weighed in 8.2.2 shall be passed over the 3/4 in. (19 mm) sieve. Break up any clumps of soil that are retained on the sieve and clean the fines from the + 3/4 in. (+19 mm) material.

8.2.4 Weigh the + 3/4 in. (+19 mm) material (CD) obtained in 8.2.3.

8.2.5 Calculate the percent of + 3/4 in. (+19 mm) material (CG) by using the equations on the form. If the percent of + 3/4 in. (+19 mm) material is 40% or more, terminate the test. Refer to MP 717.04.21 for instructions on how to proceed with the material.

8.2.6 Determine the bulk specific gravity (CH) of the dominant +3/4 in. (+19 mm) material by using the values from the following table:

	Bulk Specific Gravity
Soft Shale:	2.4
Hard Shale:	2.5
Sandstone:	2.5
Gravel:	2.6
Limestone:	2.7
Red Shale (Iron Bearing)	2.7

8.3 Determination of the dry density of the -3/4 in. (-19 mm) material and percent field moisture.

8.3.1 The dry density of the -3/4 in. (-19 mm) material (DB) can be calculated by the equation on the form or obtained from the tables for converting total dry density to density of the -3/4 in. (-19 mm) material. The index with the tables explains how to use the tables.

8.3.2 Calculate the percent field moisture (MB) by the equation on the form.

8.4 One point proctor

8.4.1 Place the proctor mold with collar and base attached on the foundation plate. The foundation plate must be firmly seated so that it does not rock when compacting the material. Mix the -3/4 in. (-19 mm) material obtained in 8.2.3. Form a specimen by compacting the material in the mold in three equal layers 1 1/2 in. ± 1/4 in. (38 mm ± 7 mm). Each layer is compacted by 25 uniformly distributed blows with the metal rammer dropped freely from a height of 12 in. (305 mm). Stand on the edges of the mold base while compacting the specimen. The rammer must be held vertically.

8.4.2 After the specimen has been made, remove the extension collar. The sample must not extend more than a 1/2 in.(13 mm) above nor be below the top of the mold. A new specimen shall be made if it is too high or low. Carefully trim the material flush with the top of the mold by using the draw knife. Fill any voids in the surface with the fines obtained from the trimming. Use the paint brush to clean.

the fines from the outside of the mold. Remove the mold base and by holding the mold vertically, visually check the bottom of the mold to determine if the material extends beyond the mold. Do not turn the mold upside down nor trim the bottom. If the material extends beyond the bottom of the mold, perform another specimen with special precautions to seat and tighten the mold to the base.

8.4.3 Weigh the soil plus mold (PA). Record the values in the first column (left of dashed line) in the one point proctor section.

8.4.4 Remove the specimen from the mold by using the extruder. Place the specimen back in the remaining -3/4 in. (-19 mm) material.

8.4.5 Perform the calculations using the equations on the form to determine the dry density of the one point proctor (PE).

8.5 Determination of the maximum density and optimum moisture

8.5.1 To determine the maximum density and optimum moisture, plot the percent field moisture (MB) and the dry density of the one point proctor (PE) on the maximum density-optimum moisture table (copy attached). The values at the intersection of the density line and moisture column are the maximum density (DC) and optimum moisture (OA). If there are no values given, the sample is either too wet or too dry to determine the maximum density and optimum moisture. When the plotted point is to the right of the maximum densities and optimum moistures, the sample is too wet and when the plotted value is to the left, the sample is too dry.

8.5.2 If the sample is found to be too wet, air dry the -3/4 in. (-19 mm) material to decrease the moisture content between four percentage points below optimum and optimum moisture. The sample is dried by spreading the sample on a sheet of metal, canvas, etc. Do not dry the sample on a stove. If the sample is too dry, add water to increase the moisture content to the above moisture range. Care should be taken not to over dry or add too much water to the sample.

8.5.3 Rerun one point proctor

8.5.3.1 Once the sample has been air dried or water added, thoroughly mix the sample and perform another one point proctor according to 8.4.1 - 8.4.4. Record the data in the second column (right of dashed line) in the one point proctor section.

8.5.3.2 Calculate the wet density of the rerun one point proctor (PE) by using the equations on the form.

8.5.4 Stove dried moisture

8.5.4.1 Scoop out a representative sample between 200 g and 400 g from the sample in 8.5.3.1. The moisture determination can be made in conjunction with making the rerun one point proctor specimen. Place the sample in the pan for drying samples and determine the sample weight plus pan (SA).

8.5.4.2 Adjust the stove flame to a low heat so that the sample will not oxidize during drying. Occasionally stir the sample and be very careful not to lose any of the sample. Once the sample appears dry, weigh the sample and record the weight. Place the sample back on the stove and dry for approximately two minutes. Weigh the sample and compare the two weights. The weights should be the same (constant). If there is a decrease in weight, reheat the sample again for two minutes and weigh. Continue this process until two consecutive weighings are the same and this weight is dry weight plus pan (SD).

8.5.4.3 By using the equations on the form, calculate the percent moisture (SG).

8.5.5 Use the percent moisture (SG) from the stove dried moisture to calculate the dry density of the rerun one point proctor (PE).

8.5.6 Plot the dry density of the rerun one point proctor (PE) and the percent stove dried moisture (SG) on the maximum density-optimum table to obtain the maximum density (DC) and the optimum moisture (OA).

9.0 MOISTURE EVALUATION

9.1 Obtain the ± moisture tolerance (OB) from the project's governing specifications.

9.2 To determine the acceptable moisture range, add the plus tolerance and subtract the minus tolerance from the optimum moisture. The field moisture (MB) must be within this range for the moisture to meet specifications. If the moisture fails specifications, corrective action is required.

10.0 DENSITY EVALUATION

10.1 Calculate the percent relative density (DE) by the equation on the form.

10.2 If the percent relative density (DE) is 105 or more, the test results may be in error. Plot the dry density of the -3/4 in. (-19 mm) material (DB) and the percent field moisture (MB) on the maximum density-optimum moisture table to check the validity of the test results. The plotted point should fall on or to the left of the darkened blocks (zero air voids). Another method of checking the test results is to calculate the maximum moisture content possible (zero air voids) by the following equation:

Maximum moisture content possible (English) = (62.4/DB - .373)100

Maximum moisture content possible (Metric) = (1000/DB - 0.373)100

When the test results are equal to or less than the above evaluation, the results are acceptable.

10.3 When the conditions in 10.2 are not met, perform another complete test, including a one point proctor, at a new random location. The checks in 10.2 would again be made if the test results are 105% or more. If the conditions in 10.2 are still not met, obtain a sample and determine the specific gravity of both the +3/4 in. (+19 mm) and -3/4 in. (-19 mm) material, performed separately. Then recalculate the test results using the specific gravity of the +3/4 in. (+19 mm) material to determine the dry density of the -3/4 in. (-19 mm) material (DB). If the percent relative density is still 105% or more, perform the following calculation using the specific gravity of the -3/4 in. (-19 mm) material.

Maximum moisture content = (62.4/DB - 1/Sp. Gr.)100

Maximum moisture content = (1000/DB - 1/Sp. Gr.)100

The field moisture (MB) must be equal to or less than the maximum moisture content (new zero air voids). If the test results still appear to be invalid, an immediate investigation must be conducted.

11.0 LOT EVALUATION

11.1 Five tests are required for a lot evaluation. Each test shall be performed according to previous sections of this procedure.

11.2 Calculate the average relative density (x) for the five tests in the lot.

11.3 Obtain the target percentage of dry density (T) from the project's governing specifications.

11.4 Determine the range (R) of the relative densities (DE) by subtracting the smallest value from the largest.

11.5 Calculate the quality index (QL) by using the equation on the form.

11.6 Enter the table for estimating the percent of a lot within tolerance (copy attached). Determine the percent within tolerance (DF) which corresponds to the QL value calculated in 11.5 above.

11.7 Obtain the minimum percent for 100% pay (DG) from the project's governing specifications.

11.8 In order for a lot to meet specifications for density, the percent within tolerance (DF) must be equal to or greater than the percent for 100% pay (DG). Corrective action is required to bring a failing lot into specification requirements.

12.0 GENERAL REQUIREMENTS

12.1 In order for a lot to meet specifications, the requirements in 9.2 and 11.8 must be met.

12.2 The maximum density, optimum moisture, and percent of +3/4 in. (+19 mm) material may be used for subsequent tests in a lot if the -3/4 in. (-19 mm) material does not change. When the material changes, the determination of new control data is required. There must be at least one, one point proctor, for each lot.

12.3 If the test results indicate that the material meets specifications and the material exhibits pumping or displacing action under the weight of construction equipment, the test results are probably in error. Obtain a sample of the material and determine the maximum density and optimum moisture according to AASHTO T99, Method C. Until the laboratory test results are obtained, the material in question would be dried and recompacted until the pumping stops. The area would then be retested and this moisture content used as the upper limit for moisture during the interim period.

12.4 During the compaction of soil cement base course, if the material starts to shear, cease rolling even though the required specifications for compaction are not met. The material is accepted for compaction and the proper documentation in the project's records would be made.

12.5 Independent tests for similarity checks can be recorded on the form. Use only the applicable sections of the form.

Robert K. Tinney

Robert K. Tinney, Director
Contract Administration Division

RTK:Sra

Attachments

ONE-POINT PROCTOR

MP 207.07.20

WEST VIRGINIA DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS & TESTING DIVISION

MP 207.07.20

LAB NUMBER _____
PROJECT NUMBER _____
DISTRICT _____
LOT NUMBER _____
ITEM NUMBER _____

MP 207.07.20
FORM T-316
ENGLISH

T 316 FORM

GAUGE NUMBER		TEST NUMBER			1	2	3	4	5
MANUFACTURER'S STANDARDS			DATE						
DENSITY			STATION NUMBER	ft.					
MOISTURE			OFFSET	ft.					
GAUGE STANDARD COUNTS			DEPTH BELOW GRADE	ft.					
DENSITY			LIFT THICKNESS	in.					
MOISTURE			DEPTH OF SOURCE	in.					
DB FROM TABLES		Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft³					
			MA	MOISTURE	lb/ft³					
MB = MA (100) / DB			DB	DRY DENSITY -3/4	lb/ft³					
			MB	MOISTURE	%					
CC = CA - CB		PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams					
CF = CD - CE			CB	PAN	grams					
CG = CF (100) / CC			CC	EXCAVATED MAT.	grams					
PC = PA - PB			CD	PLUS 3/4 MAT. + PAN	grams					
PD = PC (0.066)			CE	PAN	grams					
PE = PD (100) / 100 + MB			CF	PLUS 3/4 MAT.	grams					
			CG	PLUS 3/4 MAT.	%					
			CH	SPECIFIC GRAVITY						
						RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG		ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams					
			PB	MOLD	grams					
			PC	WEIGHT OF SOIL	grams					
			PD	WET DENSITY	lb/ft³					
			PE	DRY DENSITY	lb/ft³					
SC = SA - SB		STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams					
SE = SD - SB			SB	PAN	grams					
SF = SC - SE			SC	WET WEIGHT	grams					
SG = SF (100) / SE			SD	DRY WEIGHT + PAN	grams					
DE = DB (100) / DC			SE	DRY WEIGHT	grams					
			SF	MOISTURE	grams					
			SG	MOISTURE	%					
$\bar{X} = \frac{\Sigma DE}{5}$		MOIST. EVAL.	OA	OPTIMUM MOISTURE	%					
			OB	PLUS / MINUS TOLER.						
			OC	PASS / FAIL						
$QL = \frac{\bar{X} - T}{R}$		DEN EVAL	DC	MAXIMUM DENSITY	lb/ft³					
			DE	RELATIVE DENSITY	%					
		LOT EVALUATION	$\bar{X}$	AVERAGE DE	%					
			T	TARGET	%					
			QL	QUALITY INDEX						
			DF	WITHIN TOLERANCE	%					
			DG	MIN. FOR 100% PAY	%					
			DH	PASS / FAIL	YES	NO				

INSPECTOR'S SIGNATURE	
PROJECT'S EVALUATION	
CHECKED BY:	
DATE:	

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5	
MANUFACTURER'S STANDARDS		DATE							
DENSITY	2935	STATION NUMBER	ft.						
MOISTURE	664	OFFSET	ft.						
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.						
DENSITY	2902	LIFT THICKNESS	in.						
MOISTURE	658	DEPTH OF SOURCE	in.						
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
		DB	DRY DENSITY -3/4	lb/ft^3					
MB = MA (100) / DB		MB	MOISTURE	%					
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams					
		CB	PAN	grams					
CC = CA - CB		CC	EXCAVATED MAT.	grams					
CF = CD - CE		CD	PLUS 3/4 MAT. + PAN	grams					
CG = CF (100) / CC		CE	PAN	grams					
PC = PA - PB		CF	PLUS 3/4 MAT.	grams					
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%					
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY						
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams					
		PB	MOLD	grams					
		PC	WEIGHT OF SOIL	grams					
		PD	WET DENSITY	lb/ft^3					
		PE	DRY DENSITY	lb/ft^3					

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5
MANUFACTURER'S STANDARDS		DATE						
DENSITY	2935	STATION NUMBER	ft.					
MOISTURE	664	OFFSET	ft.					
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.					
DENSITY	2902	LIFT THICKNESS	in.					
MOISTURE	658	DEPTH OF SOURCE	in.					

DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
MB = MA (100) / DB		DB	DRY DENSITY -3/4	lb/ft^3					
		MB	MOISTURE	%					
CC = CA - CB	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
		CB	PAN	grams	600				
CF = CD - CE		CC	EXCAVATED MAT.	grams	4310				
CG = CF (100) / CC		CD	PLUS 3/4 MAT. + PAN	grams					
		CE	PAN	grams					
PC = PA - PB		CF	PLUS 3/4 MAT.	grams					
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%					
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY						

					RERUN		RERUN		RERUN		RERUN		RERUN	
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams										
		PB	MOLD	grams										
		PC	WEIGHT OF SOIL	grams										
		PD	WET DENSITY	lb/ft^3										
		PE	DRY DENSITY	lb/ft^3										

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5
MANUFACTURER'S STANDARDS		DATE						
DENSITY	2935	STATION NUMBER	ft.					
MOISTURE	664	OFFSET	ft.					
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.					
DENSITY	2902	LIFT THICKNESS	in.					
MOISTURE	658	DEPTH OF SOURCE	in.					

DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
MB = MA (100) / DB		DB	DRY DENSITY -3/4	lb/ft^3					
		MB	MOISTURE	%					
CC = CA - CB	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CF = CD - CE		CB	PAN	grams	600				
CG = CF (100) / CC		CC	EXCAVATED MAT.	grams	4310				
		CD	PLUS 3/4 MAT. + PAN	grams	859				
PC = PA - PB		CE	PAN	grams	600				
PD = PC (0.066)		CF	PLUS 3/4 MAT.	grams	259				
PE = PD (100) / 100 + MB		CG	PLUS 3/4 MAT.	%					
		CH	SPECIFIC GRAVITY						

					RERUN		RERUN		RERUN		RERUN		RERUN	
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams										
		PB	MOLD	grams										
		PC	WEIGHT OF SOIL	grams										
		PD	WET DENSITY	lb/ft^3										
		PE	DRY DENSITY	lb/ft^3										

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5	
MANUFACTURER'S STANDARDS		DATE							
DENSITY	2935	STATION NUMBER	ft.						
MOISTURE	664	OFFSET	ft.						
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.						
DENSITY	2902	LIFT THICKNESS	in.						
MOISTURE	658	DEPTH OF SOURCE	in.						
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
MB = MA (100) / DB		DB	DRY DENSITY -3/4	lb/ft^3					
		MB	MOISTURE	%					
CC = CA - CB	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CF = CD - CE		CB	PAN	grams	600				
CG = CF (100) / CC		CC	EXCAVATED MAT.	grams	4310				
		CD	PLUS 3/4 MAT. + PAN	grams	859				
		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY						
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams					
		PB	MOLD	grams					
		PC	WEIGHT OF SOIL	grams					
		PD	WET DENSITY	lb/ft^3					
		PE	DRY DENSITY	lb/ft^3					

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5	
MANUFACTURER'S STANDARDS		DATE							
DENSITY	2935	STATION NUMBER	ft.						
MOISTURE	664	OFFSET	ft.						
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.						
DENSITY	2902	LIFT THICKNESS	in.						
MOISTURE	658	DEPTH OF SOURCE	in.						
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
		DB	DRY DENSITY -3/4	lb/ft^3					
MB = MA (100) / DB		MB	MOISTURE	%					
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CC = CA - CB		CB	PAN	grams	600				
CF = CD - CE		CC	EXCAVATED MAT.	grams	4310				
CG = CF (100) / CC		CD	PLUS 3/4 MAT. + PAN	grams	859				
		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY		2.6				
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams					
		PB	MOLD	grams					
		PC	WEIGHT OF SOIL	grams					
		PD	WET DENSITY	lb/ft^3					
		PE	DRY DENSITY	lb/ft^3					

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS ¾ INCH MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS ¾ INCH MATERIAL

C H

C G

D A

D D	1 %	2 %	3 %	4 %	5 %	6 %	7 %	8 %	9 %	10 %
121	121	121	120	120	120	120	119	119	119	119
122	122	122	121	121	121	121	120	120	120	120
123	123	123	122	122	122	122	122	121	121	121
124	124	124	123	123	123	123	123	122	122	122
125	125	125	124	124	124	124	124	123	123	123
126	126	126	125	125	125	125	125	125	124	124
127	127	127	127	126	126	126	126	126	125	125
128	128	128	128	127	127	127	127	127	127	126
129	129	129	129	128	128	128	128	128	128	127
130	130	130	130	129	129	129	129	129	129	129
131	131	131	131	131	130	130	130	130	130	130
132	132	132	132	132	131	131	131	131	131	131
133	133	133	133	133	132	132	132	132	132	132
134	134	134	134	134	134	133	133	133	133	133
135	135	135	135	135	135	135	134	134	134	134

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5	
MANUFACTURER'S STANDARDS		DATE							
DENSITY	2935	STATION NUMBER	ft.						
MOISTURE	664	OFFSET	ft.						
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.						
DENSITY	2902	LIFT THICKNESS	in.						
MOISTURE	658	DEPTH OF SOURCE	in.						
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
		DB	DRY DENSITY -3/4	lb/ft^3	126				
MB = MA (100) / DB		MB	MOISTURE	%	10				
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
		CB	PAN	grams	600				
CC = CA - CB		CC	EXCAVATED MAT.	grams	4310				
CF = CD - CE		CD	PLUS 3/4 MAT. + PAN	grams	859				
CG = CF (100) / CC		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY		2.6				
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams					
		PB	MOLD	grams					
		PC	WEIGHT OF SOIL	grams					
		PD	WET DENSITY	lb/ft^3					
		PE	DRY DENSITY	lb/ft^3					

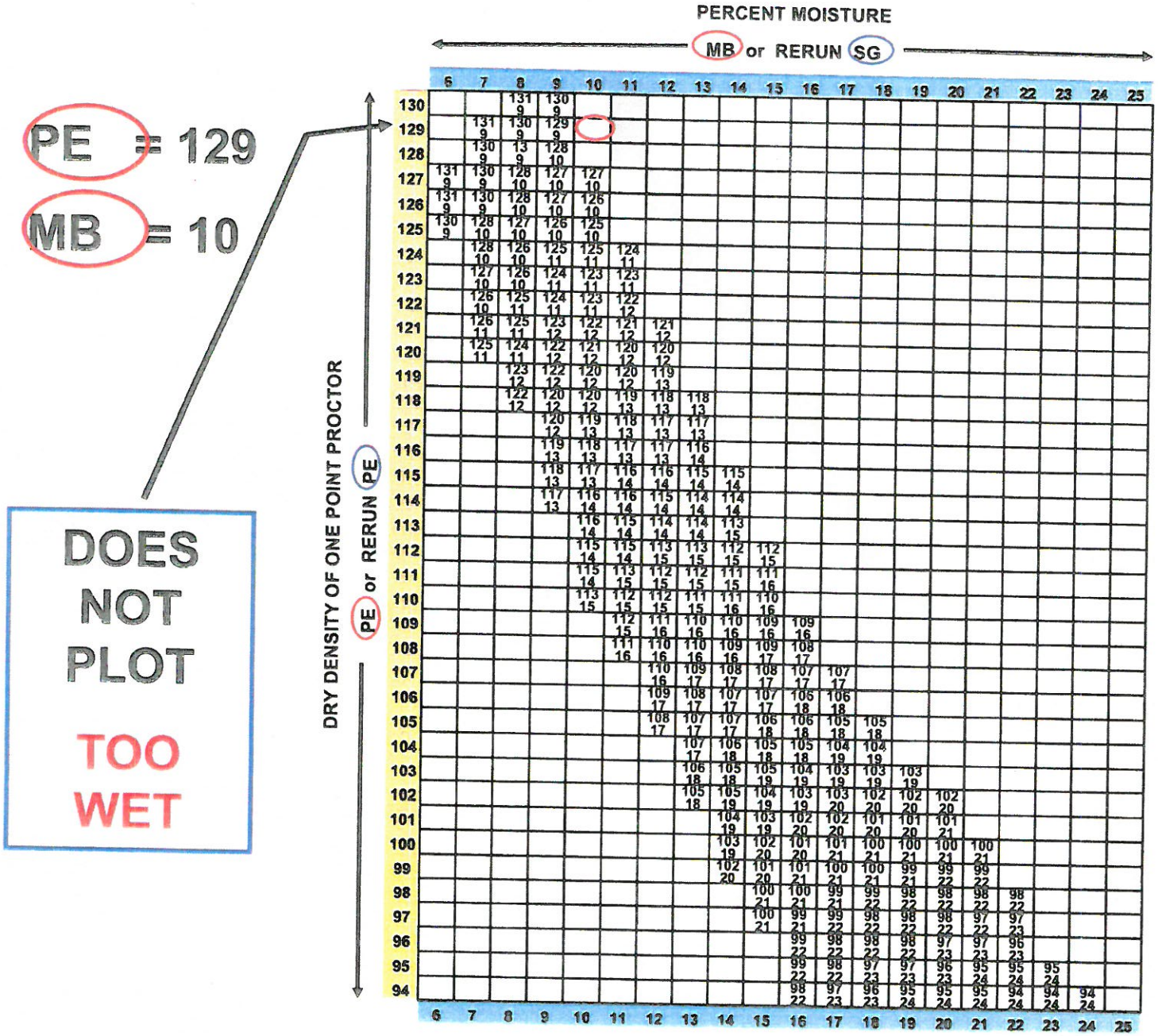
GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5	
MANUFACTURER'S STANDARDS		DATE							
DENSITY	2935	STATION NUMBER	ft.						
MOISTURE	664	OFFSET	ft.						
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.						
DENSITY	2902	LIFT THICKNESS	in.						
MOISTURE	658	DEPTH OF SOURCE	in.						
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
		DB	DRY DENSITY -3/4	lb/ft^3	126				
MB = MA (100) / DB		MB	MOISTURE	%	10				
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CC = CA - CB		CB	PAN	grams	600				
CF = CD - CE		CC	EXCAVATED MAT.	grams	4310				
CG = CF (100) / CC		CD	PLUS 3/4 MAT. + PAN	grams	859				
		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY		2.6				
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180				
		PB	MOLD	grams	2023				
		PC	WEIGHT OF SOIL	grams	2157				
		PD	WET DENSITY	lb/ft^3					
		PE	DRY DENSITY	lb/ft^3					

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5
MANUFACTURER'S STANDARDS		DATE						
DENSITY	2935	STATION NUMBER	ft.					
MOISTURE	664	OFFSET	ft.					
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.					
DENSITY	2902	LIFT THICKNESS	in.					
MOISTURE	658	DEPTH OF SOURCE	in.					

DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
		DB	DRY DENSITY -3/4	lb/ft^3	126				
MB = MA (100) / DB		MB	MOISTURE	%	10				
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CC = CA - CB		CB	PAN	grams	600				
CF = CD - CE		CC	EXCAVATED MAT.	grams	4310				
CG = CF (100) / CC		CD	PLUS 3/4 MAT. + PAN	grams	859				
		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY		2.6				

					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180				
PE (RERUN) = PD (100) / 100 + SG		PB	MOLD	grams	2023				
		PC	WEIGHT OF SOIL	grams	2157				
		PD	WET DENSITY	lb/ft^3	142				
		PE	DRY DENSITY	lb/ft^3					

GAUGE NUMBER	36688	TEST NUMBER		1	2	3	4	5	
MANUFACTURER'S STANDARDS		DATE							
DENSITY	2935	STATION NUMBER	ft.						
MOISTURE	664	OFFSET	ft.						
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.						
DENSITY	2902	LIFT THICKNESS	in.						
MOISTURE	658	DEPTH OF SOURCE	in.						
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	12				
		DB	DRY DENSITY -3/4	lb/ft^3	126				
MB = MA (100) / DB		MB	MOISTURE	%	10				
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
		CB	PAN	grams	600				
CC = CA - CB		CC	EXCAVATED MAT.	grams	4310				
CF = CD - CE		CD	PLUS 3/4 MAT. + PAN	grams	859				
CG = CF (100) / CC		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY		2.6				
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180				
		PB	MOLD	grams	2023				
		PC	WEIGHT OF SOIL	grams	2157				
		PD	WET DENSITY	lb/ft^3	142				
		PE	DRY DENSITY	lb/ft^3	129				


PERCENT MOISTURE
MB or RERUN SG
DRY DENSITY OF ONE POINT PROCTOR
PE or RERUN PE
PE = 129
MB = 10
DOES NOT PLOT
TOO WET

GAUGE NUMBER		TEST NUMBER		1	2	3	4	5
MANUFACTURER'S STANDARDS		DATE						
DENSITY		STATION NUMBER	ft.					
MOISTURE		OFFSET	ft.					
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.					
DENSITY		LIFT THICKNESS	in.					
MOISTURE		DEPTH OF SOURCE	in.					

DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	8				
MB = MA (100) / DB		DB	DRY DENSITY -3/4	lb/ft^3	126				
		MB	MOISTURE	%	6				
CC = CA - CB	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CF = CD - CE		CB	PAN	grams	600				
CG = CF (100) / CC		CC	EXCAVATED MAT.	grams	4310				
		CD	PLUS 3/4 MAT. + PAN	grams	859				
PC = PA - PB		CE	PAN	grams	600				
PD = PC (0.066)		CF	PLUS 3/4 MAT.	grams	259				
PE = PD (100) / 100 + MB		CG	PLUS 3/4 MAT.	%	6				
		CH	SPECIFIC GRAVITY		2.6				

					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131			
		PB	MOLD	grams	2023	2023			
		PC	WEIGHT OF SOIL	grams	2157	2108			
		PD	WET DENSITY	lb/ft^3	142	139			
		PE	DRY DENSITY	lb/ft^3	129				

GAUGE NUMBER		TEST NUMBER		1	2	3	4	5
MANUFACTURER'S STANDARDS		DATE						
DENSITY		STATION NUMBER	ft.					
MOISTURE		OFFSET	ft.					
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE	ft.					
DENSITY		LIFT THICKNESS	in.					
MOISTURE		DEPTH OF SOURCE	in.					
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	8				
		DB	DRY DENSITY -3/4	lb/ft^3	126				
MB = MA (100) / DB		MB	MOISTURE	%	6				
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CC = CA - CB		CB	PAN	grams	600				
CF = CD - CE		CC	EXCAVATED MAT.	grams	4310				
CG = CF (100) / CC		CD	PLUS 3/4 MAT. + PAN	grams	859				
		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
~~PE = PD (100) / 100 + MB~~		CH	SPECIFIC GRAVITY		2.6				
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131			
		PB	MOLD	grams	2023	2023			
		PC	WEIGHT OF SOIL	grams	2157	2108			
		PD	WET DENSITY	lb/ft^3	142	139			
		PE	DRY DENSITY	lb/ft^3	129				

RERUN PROCTOR

PE (RERUN) = $\frac{PD\ (100)}{100 + SG}$

SC = SA - SB

SE = SD - SB

SF = SC - SE

SG = $\frac{SF\ (100)}{SE}$

DE = $\frac{DB\ (100)}{DC}$

$\overline{X} = \frac{\Sigma\ DE}{5}$

$QL = \frac{\overline{X} - T}{R}$

					RERUN	RERUN	RERUN	RERUN	RERUN
ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131				
	PB	MOLD	grams	2023	2023				
	PC	WEIGHT OF SOIL	grams	2157	2108				
	PD	WET DENSITY	lb/ft^3	142	139				
	PE	DRY DENSITY	lb/ft^3	129					
STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams						
	SB	PAN	grams						
	SC	WET WEIGHT	grams						
	SD	DRY WEIGHT + PAN	grams						
	SE	DRY WEIGHT	grams						
	SF	MOISTURE	grams						
	SG	MOISTURE	%						
MOIST. EVAL.	OA	OPTIMUM MOISTURE	%						
	OB	PLUS / MINUS TOLER.							
	OC	PASS / FAIL							
DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3						
	DE	RELATIVE DENSITY	%						
LOT EVALUATION	$\overline{X}$	AVERAGE DE	%						
	T	TARGET	%						
	QL	QUALITY INDEX							
	DF	WITHIN TOLERANCE	%						
	DG	MIN. FOR 100% PAY	%						
	DH	PASS / FAIL	YES	NO					

NEED SG

INSPECTOR'S SIGNATURE	
PROJECT'S EVALUATION	
CHECKED BY:	
DATE:	

RERUN PROCTOR

$PE\ (RERUN) = \frac{PD\ (100)}{100 + SG}$

$SC = SA - SB$

$SE = SD - SB$

$SF = SC - SE$

$SG = \frac{SF\ (100)}{SE}$

$DE = \frac{DB\ (100)}{DC}$

$\overline{X} = \frac{\Sigma\ DE}{5}$

$QL = \frac{\overline{X} - T}{R}$

						RERUN	RERUN	RERUN	RERUN	RERUN
ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131					
	PB	MOLD	grams	2023	2023					
	PC	WEIGHT OF SOIL	grams	2157	2108					
	PD	WET DENSITY	lb/ft^3	142	139					
	PE	DRY DENSITY	lb/ft^3	129	129					
STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams	2027						
	SB	PAN	grams	1811						
	SC	WET WEIGHT	grams	216						
	SD	DRY WEIGHT + PAN	grams							
	SE	DRY WEIGHT	grams							
	SF	MOISTURE	grams							
	SG	MOISTURE	%							
MOIST. EVAL.	OA	OPTIMUM MOISTURE	%							
	OB	PLUS / MINUS TOLER.								
	OC	PASS / FAIL								
DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3							
	DE	RELATIVE DENSITY	%							
LOT EVALUATION	$\overline{X}$	AVERAGE DE	%							
	T	TARGET	%							
	QL	QUALITY INDEX								
	DF	WITHIN TOLERANCE	%							
	DG	MIN. FOR 100% PAY	%							
	DH	PASS / FAIL	YES	NO						

INSPECTOR'S SIGNATURE	
PROJECT'S EVALUATION	
CHECKED BY:	
DATE:	

RERUN PROCTOR

$PE\ (RERUN) = \frac{PD\ (100)}{100 + SG}$

$SC = SA - SB$

$SE = SD - SB$

$SF = SC - SE$

$SG = \frac{SF\ (100)}{SE}$

$DE = \frac{DB\ (100)}{DC}$

$\overline{X} = \frac{\Sigma\ DE}{5}$

$QL = \frac{\overline{X} - T}{R}$

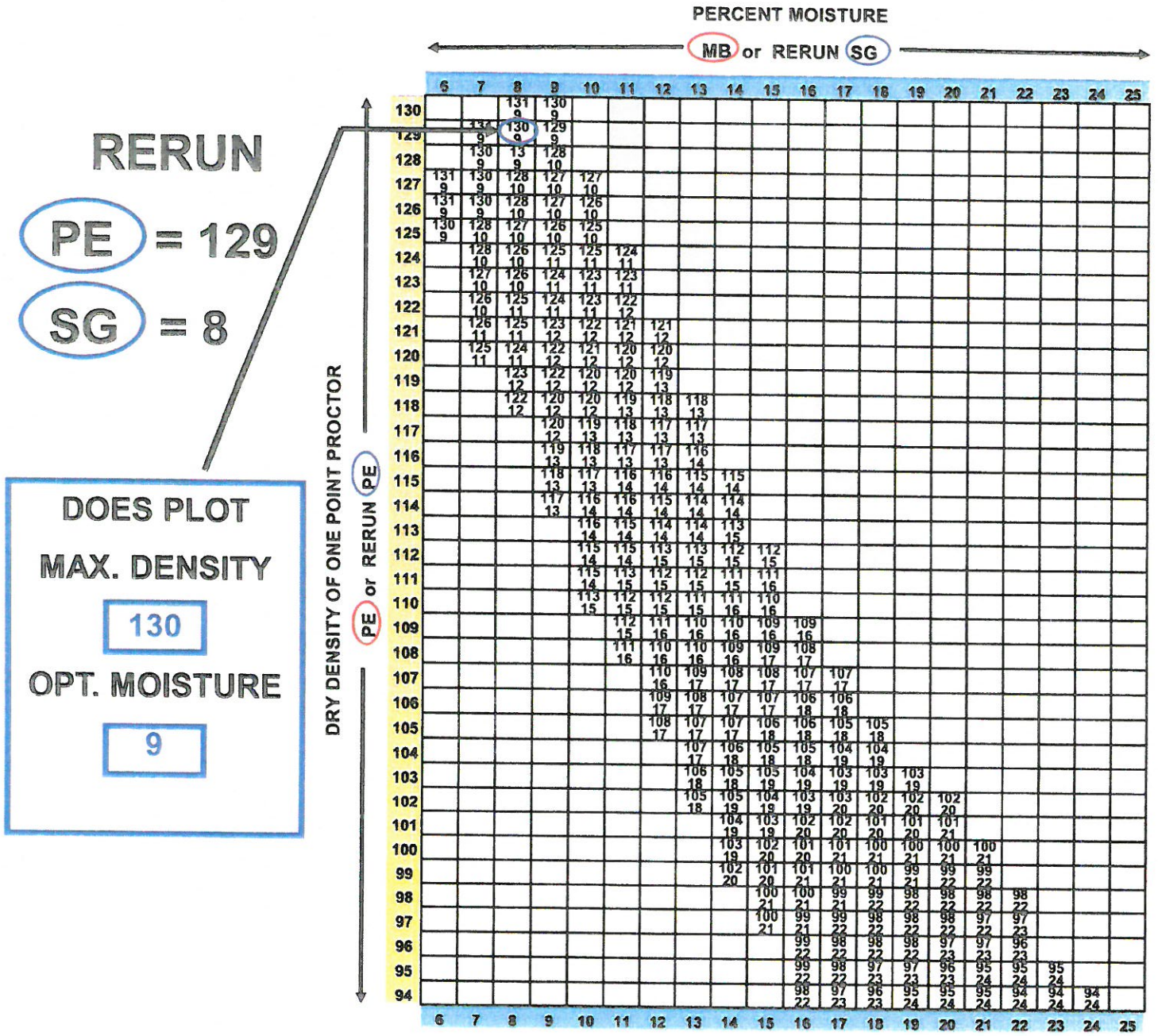
					RERUN	RERUN	RERUN	RERUN	RERUN
ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131				
	PB	MOLD	grams	2023	2023				
	PC	WEIGHT OF SOIL	grams	2157	2108				
	PD	WET DENSITY	lb/ft^3	142	139				
	PE	DRY DENSITY	lb/ft^3	129					
STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams	2027					
	SB	PAN	grams	1811					
	SC	WET WEIGHT	grams	216					
	SD	DRY WEIGHT + PAN	grams	2011					
	SE	DRY WEIGHT	grams	200					
	SF	MOISTURE	grams						
	SG	MOISTURE	%						
MOIST. EVAL.	OA	OPTIMUM MOISTURE	%						
	OB	PLUS / MINUS TOLER.							
	OC	PASS / FAIL							
DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3						
	DE	RELATIVE DENSITY	%						
LOT EVALUATION	$\overline{X}$	AVERAGE DE	%						
	T	TARGET	%						
	QL	QUALITY INDEX							
	DF	WITHIN TOLERANCE	%						
	DG	MIN. FOR 100% PAY	%						
	DH	PASS / FAIL	YES	NO					

INSPECTOR'S SIGNATURE	
PROJECT'S EVALUATION	
CHECKED BY:	
DATE:	

						RERUN	RERUN	RERUN	RERUN	RERUN				
RERUN PROCTOR PE (RERUN) = PD (100) 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131								
		PB	MOLD	grams	2023	2023								
		PC	WEIGHT OF SOIL	grams	2157	2108								
		PD	WET DENSITY	lb/ft^3	142	139								
		PE	DRY DENSITY	lb/ft^3	129									
SC = SA - SB	STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams	2027									
SE = SD - SB		SB	PAN	grams	1811									
SF = SC - SE		SC	WET WEIGHT	grams	216									
SG = SF (100) SE		SD	DRY WEIGHT + PAN	grams	2011									
		SE	DRY WEIGHT	grams	200									
DE = DB (100) DC		SF	MOISTURE	grams	16									
		SG	MOISTURE	%										
$\bar{X} = \frac{\Sigma DE}{5}$	MOIST. EVAL.	OA	OPTIMUM MOISTURE	%										
		OB	PLUS / MINUS TOLER.											
		OC	PASS / FAIL											
$QL = \frac{\bar{X} - T}{R}$	DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3										
		DE	RELATIVE DENSITY	%										
	LOT EVALUATION	$\bar{X}$	AVERAGE DE	%		INSPECTOR'S SIGNATURE								
		T	TARGET	%										
		QL	QUALITY INDEX			PROJECT'S EVALUATION								
		DF	WITHIN TOLERANCE	%		CHECKED BY:								
		DG	MIN. FOR 100% PAY	%		DATE:								
		DH	PASS / FAIL	YES	NO									

						RERUN	RERUN	RERUN	RERUN	RERUN			
RERUN PROCTOR PE (RERUN) = PD (100) 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131							
		PB	MOLD	grams	2023	2023							
		PC	WEIGHT OF SOIL	grams	2157	2108							
		PD	WET DENSITY	lb/ft^3	142	139							
		PE	DRY DENSITY	lb/ft^3	129								
SC = SA - SB	STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams	2027								
SE = SD - SB		SB	PAN	grams	1811								
SF = SC - SE		SC	WET WEIGHT	grams	216								
SG = SF (100) / SE		SD	DRY WEIGHT + PAN	grams	2011								
		SE	DRY WEIGHT	grams	200								
DE = DB (100) / DC		SF	MOISTURE	grams	16								
		SG	MOISTURE	%	8								
$\bar{X} = \frac{\Sigma DE}{5}$	MOIST. EVAL.	OA	OPTIMUM MOISTURE	%									
		OB	PLUS / MINUS TOLER.										
		OC	PASS / FAIL										
$QL = \frac{\bar{X} - T}{R}$	DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3									
		DE	RELATIVE DENSITY	%									
	LOT EVALUATION	$\bar{X}$	AVERAGE DE	%		INSPECTOR'S SIGNATURE							
		T	TARGET	%									
		QL	QUALITY INDEX			PROJECT'S EVALUATION							
		DF	WITHIN TOLERANCE	%		CHECKED BY:							
		DG	MIN. FOR 100% PAY	%		DATE:							
		DH	PASS / FAIL	YES	NO								

						RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4180	4131				
		PB	MOLD	grams	2023	2023				
		PC	WEIGHT OF SOIL	grams	2157	2108				
		PD	WET DENSITY	lb/ft^3	142	139				
		PE	DRY DENSITY	lb/ft^3	129	129				
SC = SA - SB SE = SD - SB SF = SC - SE SG = SF (100) / SE DE = DB (100) / DC	STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams	2027					
		SB	PAN	grams	1811					
		SC	WET WEIGHT	grams	216					
		SD	DRY WEIGHT + PAN	grams	2011					
		SE	DRY WEIGHT	grams	200					
		SF	MOISTURE	grams	16					
		SG	MOISTURE	%	8					
$\bar{X} = \frac{\Sigma DE}{5}$	MOIST. EVAL.	OA	OPTIMUM MOISTURE	%						
		OB	PLUS / MINUS TOLER.							
		OC	PASS / FAIL							
$QL = \frac{\bar{X} - T}{R}$	DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3						
		DE	RELATIVE DENSITY	%						
	LOT EVALUATION	$\bar{X}$	AVERAGE DE	%		INSPECTOR'S SIGNATURE				
		T	TARGET	%						
		QL	QUALITY INDEX			PROJECT'S EVALUATION				
		DF	WITHIN TOLERANCE	%		CHECKED BY:				
		DG	MIN. FOR 100% PAY	%		DATE:				
		DH	PASS / FAIL	YES	NO					


PERCENT MOISTURE
MB or RERUN SG
DRY DENSITY OF ONE POINT PROCTOR
PE or RERUN PE
RERUN
PE = 129
SG = 8
DOES PLOT
MAX. DENSITY
130
OPT. MOISTURE
9

						RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4080	4131				
		PB	MOLD	grams	2023	2023				
		PC	WEIGHT OF SOIL	grams	2057	2108				
		PD	WET DENSITY	lb/ft^3	136	139				
		PE	DRY DENSITY	lb/ft^3	128	129				
SC = SA - SB	STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams	2027					
SE = SD - SB		SB	PAN	grams	1811					
SF = SC - SE		SC	WET WEIGHT	grams	216					
SG = SF (100) / SE		SD	DRY WEIGHT + PAN	grams	2011					
		SE	DRY WEIGHT	grams	200					
DE = DB (100) / DC		SF	MOISTURE	grams	16					
		SG	MOISTURE	%	8					
$\bar{X} = \frac{\Sigma DE}{5}$	MOIST. EVAL.	OA	OPTIMUM MOISTURE	%	9					
		OB	PLUS / MINUS TOLER.		+3 / - 4					
		OC	PASS / FAIL							
$QL = \frac{\bar{X} - T}{R}$	DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3	130					
		DE	RELATIVE DENSITY	%						
	LOT EVALUATION	$\bar{X}$	AVERAGE DE	%						
		T	TARGET	%						
		QL	QUALITY INDEX							
		DF	WITHIN TOLERANCE	%						
		DG	MIN. FOR 100% PAY	%						
		DH	PASS / FAIL	YES	NO					

INSPECTOR'S SIGNATURE	
PROJECT'S EVALUATION	
CHECKED BY:	
DATE:	

Specification

% MOISTURE (MB)

Must be within +3 - 4 of OPTIMUM MOISTURE

OPTIMUM MOISTURE = 9%

9 + 3 = 12

9 – 4 = 5

Range = 12% to 5%

GAUGE NUMBER		TEST NUMBER			1	2	3	4	5
MANUFACTURER'S STANDARDS		DATE							
DENSITY		STATION NUMBER		ft.					
MOISTURE		OFFSET		ft.					
GAUGE STANDARD COUNTS		DEPTH BELOW GRADE		ft.					
DENSITY		LIFT THICKNESS		in.					
MOISTURE		DEPTH OF SOURCE		in.					
DB FROM TABLES	Field Density Moisture	DA	TOTAL DRY DENSITY	lb/ft^3	127				
		MA	MOISTURE	lb/ft^3	8				
		DB	DRY DENSITY -3/4	lb/ft^3	126				
MB = MA (100) / DB		MB	MOISTURE	%	10				
	PLUS 3/4 MATERIAL DETERMINATION	CA	EXC. MATERIAL + PAN	grams	4910				
CC = CA - CB		CB	PAN	grams	600				
CF = CD - CE		CC	EXCAVATED MAT.	grams	4310				
CG = CF (100) / CC		CD	PLUS 3/4 MAT. + PAN	grams	859				
		CE	PAN	grams	600				
PC = PA - PB		CF	PLUS 3/4 MAT.	grams	259				
PD = PC (0.066)		CG	PLUS 3/4 MAT.	%	6				
PE = PD (100) / 100 + MB		CH	SPECIFIC GRAVITY		2.6				
					RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4080				
		PB	MOLD	grams	2023				
		PC	WEIGHT OF SOIL	grams	2057				
		PD	WET DENSITY	lb/ft^3	136				
		PE	DRY DENSITY	lb/ft^3	128				

% MOISTURE (MB)

+3 - 4 of Optimum 9

RANGE

12% to 5%

						RERUN	RERUN	RERUN	RERUN	RERUN
RERUN PROCTOR PE (RERUN) = PD (100) / 100 + SG	ONE POINT PROCTOR	PA	WEIGHT SOIL & MOLD	grams	4080	4131				
		PB	MOLD	grams	2023	2023				
		PC	WEIGHT OF SOIL	grams	2057	2108				
		PD	WET DENSITY	lb/ft^3	136	139				
		PE	DRY DENSITY	lb/ft^3	128	129				
SC = SA - SB SE = SD - SB SF = SC - SE SG = SF (100) / SE DE = DB (100) / DC	STOVE DRIED MOISTURE	SA	WET WEIGHT + PAN	grams	2027					
		SB	PAN	grams	1811					
		SC	WET WEIGHT	grams	216					
		SD	DRY WEIGHT + PAN	grams	2011					
		SE	DRY WEIGHT	grams	200					
		SF	MOISTURE	grams	16					
		SG	MOISTURE	%	8					
$\bar{X} = \frac{\Sigma DE}{5}$	MOIST. EVAL.	OA	OPTIMUM MOISTURE	%	9					
		OB	PLUS / MINUS TOLER.		+3 / -4					
		OC	PASS / FAIL		PASS					
$QL = \frac{\bar{X} - T}{R}$	DEN EVAL	DC	MAXIMUM DENSITY	lb/ft^3	130					
		DE	RELATIVE DENSITY	%	97					
	LOT EVALUATION	$\bar{X}$	AVERAGE DE	%		INSPECTOR'S SIGNATURE				
		T	TARGET	%						
		QL	QUALITY INDEX			PROJECT'S EVALUATION				
		DF	WITHIN TOLERANCE	%		CHECKED BY:				
		DG	MIN. FOR 100% PAY	%		DATE:				
		DH	PASS / FAIL	YES	NO					

WEST VIRGINIA DIVISION OF HIGHWAYS
MATERIALS CONTROL, SOILS & TESTING DIVISION

LAB NUMBER _____
AUTHORIZATION NUMBER _____
PROJECT NUMBER _____
DISTRICT _____
LOT NUMBER _____
ITEM NUMBER _____

ATTACHMENT 1
FORM T-316
MP 207.07.20
REV. 08-08

GAUGE NUMBER		TEST NUMBER			1	2	3	4	5
MANUFACTURER'S STANDARDS			DATE						
DENSITY			STATION NUMBER	ft.					
MOISTURE			OFFSET	ft.					
GAUGE STANDARD COUNTS			DEPTH BELOW GRADE	ft.					
DENSITY			LIFT THICKNESS	in.					
MOISTURE			DEPTH OF SOURCE	in.					
DB FROM TABLES	Field Density Moisture	**DA**	TOTAL DRY DENSITY	lb/ft^3					
		MA	MOISTURE	lb/ft^3					
		DB	DRY DENSITY -3/4	lb/ft^3					
MB = MA·(100) / DB		**MB**	MOISTURE	%					
	PLUS 3/4 MATERIAL DETERMINATION	**CA**	EXC. MATERIAL + PAN	grams					
CC = CA - CB		**CB**	PAN	grams					
CF = CD - CE		**CC**	EXCAVATED MAT.	grams					
CG = CF (100) / CC		**CD**	PLUS 3/4 MAT. + PAN	grams					
		CE	PAN	grams					
PC = PA - PB		**CF**	PLUS 3/4 MAT.	grams					
PD = PC (0.066)		**CG**	PLUS 3/4 MAT.	%					
PE = PD (100) / 100 + MB		**CH**	SPECIFIC GRAVITY						
					RERUN	**RERUN**	**RERUN**	**RERUN**	**RERUN**
RERUN PROCTOR **PE (RERUN)** = PD (100) / 100 + SG	ONE POINT PROCTOR	**PA**	WEIGHT SOIL & MOLD	grams					
		PB	MOLD	grams					
		PC	WEIGHT OF SOIL	grams					
		PD	WET DENSITY	lb/ft^3					
		PE	DRY DENSITY	lb/ft^3					
SC = SA - SB	STOVE DRIED MOISTURE	**SA**	WET WEIGHT + PAN	grams					
SE = SD - SB		**SB**	PAN	grams					
SF = SC - SE		**SC**	WET WEIGHT	grams					
SG = SF (100) / SE		**SD**	DRY WEIGHT + PAN	grams					
		SE	DRY WEIGHT	grams					
DE = DB (100) / DC		**SF**	MOISTURE	grams					
		SG	MOISTURE	%					
$\overline{X} = \frac{\Sigma DE}{5}$	MOIST. EVAL.	**OA**	OPTIMUM MOISTURE	%					
		OB	PLUS / MINUS TOLER.						
		OC	PASS / FAIL						
$QL = \frac{\overline{X} - T}{R}$	DEN EVAL	**DC**	MAXIMUM DENSITY	lb/ft^3					
		DE	RELATIVE DENSITY	%					
	LOT EVALUATION	$\overline{X}$	AVERAGE **DE**	%		INSPECTOR'S NAME:			
		T	TARGET	%		INSPECTOR'S SIGNATURE:			
		QL	QUALITY INDEX						
		DF	WITHIN TOLERANCE	%		PROJECT'S EVALUATION			
		DG	MIN. FOR 100% PAY	%		CHECKED BY:			
		DH	PASS / FAIL	YES	NO	DATE:			

TABLE FOR ESTIMATING PERCENT OF LOT WITHIN TOLERANCE

Quality Index (QL) Positive Values	Percent Within Tolerance
.66	99
.65	98
.62	97
.60	96
.58	95
.57	94
.55	93
.53	92
.51	91
.50	90
.48	89
.46	88
.45	87
.44	86
.42	85
.41	84
.40	83
.38	82
.37	81
.36	80
.34	79
.33	78
.32	77
.30	76
.29	75
.28	74
.27	73
.25	72
.24	71
.23	70
.22	69
.21	68
.19	67
.18	66
.17	65
.16	64
.15	63
.14	62
.13	61
.11	60
.10	59
.09	58
.08	57
.07	56
.06	55
.05	54
.04	53
.02	52
.01	51
.00	50

Quality Index (QL) Negative Values	Percent Within Tolerance
.00	50
.01	49
.02	48
.04	47
.05	46
.06	45
.07	44
.08	43
.09	42
.10	41
.11	40
.13	39
.14	38
.15	37
.16	36
.17	35
.18	34
.19	33
.21	32
.22	31
.23	30
.24	29
.25	28
.27	27
.28	26
.29	25
.30	24
.32	23
.33	22
.34	21
.36	20
.37	19
.38	18
.40	17
.41	16
.42	15
.44	14
.45	13
.46	12
.48	11
.50	10
.51	9
.53	8
.55	7
.57	6
.58	5
.60	4
.62	3
.63	2
.66	1

MAXIMUM DENSITY-OPTIMUM MOISTURE TABLE

DRY DENSITY OF ONE POINT PROCTOR

	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
130			131 9	130 9																
129		131 9	130 9	129 9																
128		130 9	130 9	128 10																
127	131 9	130 9	128 10	127 10	127 10															
126	131 9	130 9	128 10	127 10	126 10															
125	130 9	128 10	127 10	126 10	125 10															
124		128 10	126 10	125 11	125 11	124 11														
123		127 10	126 10	124 11	123 11	123 11														
122		126 10	125 11	124 11	123 11	122 12														
121		126 11	125 11	123 12	122 12	121 12	121 12													
120		125 11	124 11	122 12	121 12	120 12	120 12													
119			123 12	122 12	120 12	120 12	119 13													
118			122 12	120 12	120 12	119 13	118 13	118 13												
117				120 12	119 13	118 13	117 13	117 13												
116				119 13	118 13	117 13	117 13	116 14												
115				118 13	117 13	116 14	116 14	115 14	115 14											
114				117 13	116 14	116 14	115 14	114 14	114 14											
113					116 14	115 14	114 14	114 14	113 15											
112					115 14	115 14	113 15	113 15	112 15	112 15										
111					115 14	113 15	112 15	112 15	111 15	111 16										
110					113 15	112 15	112 15	111 15	111 16	110 16										
109						112 15	111 16	110 16	110 16	109 16	109 16									
108						111 16	110 16	110 16	109 16	109 17	108 17									
107							110 16	109 17	108 17	108 17	107 17	107 17								
106							109 17	108 17	107 17	107 17	106 18	106 18								
105							108 17	107 17	107 17	106 18	106 18	105 18	105 18							
104								107 17	106 18	105 18	105 18	104 19	104 19							
103								106 18	105 18	105 19	104 19	103 19	103 19	103 19						
102								105 18	105 19	104 19	103 19	103 20	102 20	102 20	102 20					
101									104 19	103 19	102 20	102 20	101 20	101 20	101 21					
100									103 19	102 20	101 20	101 21	100 21	100 21	100 21	100 21				
99									102 20	101 20	101 21	100 21	100 21	99 21	99 22	99 22				
98										100 21	100 21	99 21	99 22	98 22	98 22	98 22	98 22			
97										100 21	99 21	99 22	98 22	98 22	98 22	97 22	97 23			
96											99 22	98 22	98 22	98 22	97 23	97 23	96 23			
95											99 22	98 22	97 23	97 23	96 23	95 24	95 24	95 24		
94											98 22	97 23	96 23	95 24	95 24	95 24	94 24	94 24	94 24	
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

PERCENT MOISTURE

MAXIMUM DENSITY-OPTIMUM MOISTURE TABLE

DRY DENSITY OF ONE POINT PROCTOR

	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1790	1850 14	1830 14	1810 15	1800 15	1790 15	1790 15									
1780	1840 14	1820 15	1810 15	1790 15	1790 15	1780 15									
1770	1820 14	1810 15	1800 15	1780 15	1780 16	1770 16									
1760	1810 15	1800 15	1790 15	1780 16	1770 16	1760 16									
1750		1790 15	1780 15	1770 16	1760 16	1750 16	1750 16								
1740		1790 15	1770 16	1760 16	1750 16	1750 16	1740 17								
1730		1780 15	1770 16	1760 16	1750 16	1740 17	1730 17								
1720			1760 16	1750 16	1740 17	1730 17	1720 17	1720 17							
1710			1750 16	1740 17	1730 17	1720 17	1720 17	1710 17							
1700			1750 16	1730 17	1720 17	1710 17	1710 17	1700 18							
1690			1740 17	1720 17	1720 17	1710 18	1700 18	1690 18	1680 18						
1680			1730 17	1720 17	1710 17	1700 18	1690 18	1680 18	1680 18						
1670			1720 17	1710 17	1700 18	1690 18	1680 18	1680 18	1670 19						
1660				1710 18	1700 18	1680 18	1670 19	1670 19	1660 19	1660 19					
1650				1700 18	1690 18	1680 18	1670 19	1660 19	1650 19	1650 19					
1640				1690 18	1680 18	1670 19	1660 19	1650 19	1640 19	1640 19					
1630				1680 18	1670 19	1660 19	1650 19	1640 20	1630 20	1630 20	1630 20				
1620					1660 19	1650 19	1640 20	1630 20	1630 20	1620 20	1620 20				
1610					1650 19	1640 20	1630 20	1620 20	1620 21	1610 21	1610 21				
1600					1650 20	1630 20	1620 20	1610 21	1610 21	1600 21	1600 21	1600 21			
1590					1640 20	1630 20	1620 21	1610 21	1600 21	1600 21	1590 21	1590 21			
1580					1630 20	1620 20	1610 21	1600 21	1590 21	1580 22	1580 22	1580 22			
1570						1610 21	1600 21	1590 21	1590 22	1580 22	1580 22	1570 22	1570 22		
1560						1600 21	1590 21	1590 22	1580 22	1570 22	1570 22	1570 22	1560 22		
1550						1600 21	1590 22	1580 22	1570 22	1570 22	1560 23	1560 23	1550 23		
1540						1590 21	1580 22	1580 22	1570 22	1560 22	1550 23	1550 23	1540 23	1540 23	
1530							1580 22	1570 22	1570 22	1550 23	1540 23	1530 23	1530 23	1530 23	
1520							1570 22	1570 22	1560 23	1540 23	1530 23	1530 24	1520 24	1520 24	
1510							1570 22	1560 22	1550 23	1530 23	1520 24	1520 24	1510 24	1510 24	1510 24
1500							1570 22	1560 23	1530 23	1520 24	1510 24	1510 24	1500 24	1500 25	1500 25
	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

PERCENT MOISTURE

MAXIMUM DENSITY-OPTIMUM MOISTURE TABLE

DRY DENSITY OF ONE POINT PROCTOR

	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2080			2090 9	2080 9											
2070		2100 9	2080 9	2070 9											
2060		2090 9	2080 9	2060 10											
2050		2090 9	2070 9	2050 10											
2040		2090 9	2060 10	2050 10	2040 10										
2030	2100 9	2080 9	2050 10	2040 10	2030 10										
2020	2100 9	2080 9	2050 10	2030 10	2020 10										
2010	2090 9	2070 9	2040 10	2030 10	2010 10										
2000	2090 9	2060 10	2030 10	2020 10	2000 11										
1990		2050 10	2030 10	2010 11	2000 11	1990 11									
1980		2040 10	2020 10	2000 11	1990 11	1980 11									
1970		2040 10	2020 10	2000 11	1980 11	1970 11									
1960		2030 10	2010 11	1990 11	1970 11	1960 12									
1950		2020 10	2000 11	1980 11	1960 12	1950 12									
1940		2020 10	2000 11	1970 11	1950 12	1940 12	1940 12								
1930		2010 11	1990 11	1980 12	1950 12	1940 12	1930 12								
1920		2010 11	1980 11	1960 12	1940 12	1930 12	1920 12								
1910			1970 11	1950 12	1930 12	1920 12	1910 13								
1900			1960 12	1940 12	1920 12	1910 13	1900 13								
1890			1950 12	1930 12	1910 12	1900 13	1890 13								
1880				1920 12	1910 13	1890 13	1890 13	1880 13							
1870				1910 13	1900 13	1880 13	1880 13	1870 13							
1860				1900 13	1890 13	1880 13	1870 13	1860 14							
1850				1900 13	1880 13	1870 13	1860 14	1850 14							
1840				1890 13	1870 13	1860 14	1850 14	1840 14	1840 14						
1830				1880 13	1870 13	1860 14	1850 14	1840 14	1830 14						
1820				1870 13	1860 14	1850 14	1840 14	1830 14	1820 14						
1810					1860 14	1850 14	1830 14	1820 14	1810 15						
1800					1850 14	1840 14	1820 14	1810 15	1800 15						
	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

PERCENT MOISTURE

TABLES FOR CONVERTING

TOTAL DRY DENSITY TO DENSITY

OF THE -3/4 in. (-19 mm) MATERIAL

INSTRUCTIONS FOR USING THE TABLES

To use the tables, locate in the index the page number corresponding to the specific gravity (CH), the total dry density (DA), and the percent of +3/4 in. (+19 mm) material (CG). Turn to the selected page and locate the total dry density in the left column and read across the page to the column corresponding to the percent of +3/4 in. (+19 mm) material. The percents of +3/4 in. (+19 mm) material are listed across the top of the page. The value at the intersection is the dry density of the -3/4 in. (-19 mm) material (DB).

EXAMPLE:

Given: Specific Gravity = 2.5
Percent of +3/4 in. (+19 mm) material = 29
Total Dry Density = 1 970 kg/m^3

Turn to the index with the values and select Page 20. Next, turn to Page 20 and notice that a specific gravity of 2.5 is listed at the top of the page. Read down the left column and locate 1 970 kg/m^3. Then read across the page to the column corresponding to 29%. The value of 1 880 kg/m^3 at the intersection is the dry density of the -3/4 in. (-19 mm) material.

INDEX

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
80	79	79	78	78	77	77	76	75	75	74
81	80	80	79	79	78	78	77	77	76	75
82	81	81	80	80	79	79	78	78	77	76
83	83	82	81	81	80	80	79	79	78	78
84	84	83	83	82	81	81	80	80	79	79
85	85	84	84	83	83	82	81	81	80	80
86	86	85	85	84	84	83	83	82	81	81
87	87	86	86	85	85	84	84	83	83	82
88	88	87	87	86	86	85	85	84	84	83
89	89	88	88	87	87	86	86	85	85	84
90	90	89	89	88	88	87	87	86	86	85
91	91	90	90	89	89	88	88	87	87	86
92	92	91	91	90	90	89	89	89	88	88
93	93	92	92	91	91	91	90	90	89	89
94	94	93	93	92	92	92	91	91	90	90
95	95	94	94	93	93	93	92	92	91	91
96	96	95	95	95	94	94	93	93	92	92
97	97	96	96	96	95	95	94	94	94	93
98	98	97	97	97	96	96	95	95	95	94
99	99	98	98	98	97	97	97	96	96	95
100	100	99	99	99	98	98	98	97	97	96
101	101	100	100	100	99	99	99	98	98	98
102	102	101	101	101	100	100	100	99	99	99
103	103	102	102	102	101	101	101	100	100	100
104	104	103	103	103	103	102	102	102	101	101
105	105	104	104	104	104	103	103	103	102	102
106	106	105	105	105	105	104	104	104	103	103
107	107	106	106	106	106	105	105	105	105	104
108	108	108	107	107	107	106	106	106	106	105
109	109	109	108	108	108	108	107	107	107	106
110	110	110	109	109	109	109	108	108	108	108
111	111	111	110	110	110	110	109	109	109	109
112	112	112	111	111	111	111	111	110	110	110
113	113	113	112	112	112	112	112	111	111	111
114	114	114	113	113	113	113	113	112	112	112
115	115	115	114	114	114	114	114	114	113	113
116	116	116	116	115	115	115	115	115	114	114
117	117	117	117	116	116	116	116	116	116	115
118	118	118	118	117	117	117	117	117	117	116
119	119	119	119	118	118	118	118	118	118	118
120	120	120	120	120	119	119	119	119	119	119

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
121	121	121	121	121	120	120	120	120	120	120
122	122	122	122	122	121	121	121	121	121	121
123	123	123	123	123	123	122	122	122	122	122
124	124	124	124	124	124	124	123	123	123	123
125	125	125	125	125	125	125	124	124	124	124
126	126	126	126	126	126	126	126	125	125	125
127	127	127	127	127	127	127	127	127	127	126
128	128	128	128	128	128	128	128	128	128	128
129	129	129	129	129	129	129	129	129	129	129
130	130	130	130	130	130	130	130	130	130	130
131	131	131	131	131	131	131	131	131	131	131
132	132	132	132	132	132	132	132	132	132	132
133	133	133	133	133	133	133	133	133	133	133
134	134	134	134	134	134	134	134	134	134	134
135	135	135	135	135	135	135	135	135	135	135
136	136	136	136	136	136	136	136	136	136	136
137	137	137	137	137	137	137	137	137	138	138
138	138	138	138	138	138	138	138	139	139	139
139	139	139	139	139	139	139	140	140	140	140
140	140	140	140	140	140	141	141	141	141	141
141	141	141	141	141	141	142	142	142	142	142
142	142	142	142	142	143	143	143	143	143	143
143	143	143	143	143	144	144	144	144	144	144
144	144	144	144	145	145	145	145	145	145	145
145	145	145	145	146	146	146	146	146	146	146
146	146	146	146	147	147	147	147	147	147	148
147	147	147	147	148	148	148	148	148	149	149
148	148	148	149	149	149	149	149	149	150	150
149	149	149	150	150	150	150	150	150	151	151
150	150	150	151	151	151	151	151	152	152	152
151	151	151	152	152	152	152	152	153	153	153
152	152	152	153	153	153	153	154	154	154	154
153	153	153	154	154	154	154	155	155	155	155
154	154	154	155	155	155	155	156	156	156	156
155	155	155	156	156	156	156	157	157	157	158
156	156	156	157	157	157	158	158	158	158	159
157	157	158	158	158	158	159	159	159	159	160
158	158	159	159	159	159	160	160	160	161	161
159	159	160	160	160	160	161	161	161	162	162
160	160	161	161	161	161	162	162	162	163	163

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
80	74	73	72	72	71	70	69	69	68	67
81	75	74	73	73	72	71	71	70	69	68
82	76	75	75	74	73	73	72	71	70	70
83	77	76	76	75	74	74	73	72	72	71
84	78	77	77	76	76	75	74	74	73	72
85	79	79	78	77	77	76	75	75	74	73
86	80	80	79	79	78	77	77	76	75	75
87	81	81	80	80	79	78	78	77	76	76
88	83	82	81	81	80	80	79	78	78	77
89	84	83	83	82	81	81	80	80	79	78
90	85	84	84	83	83	82	81	81	80	80
91	86	85	85	84	84	83	83	82	81	81
92	87	87	86	86	85	84	84	83	83	82
93	88	88	87	87	86	86	85	84	84	83
94	89	89	88	88	87	87	86	86	85	85
95	90	90	90	89	89	88	87	87	86	86
96	92	91	91	90	90	89	89	88	88	87
97	93	92	92	91	91	90	90	89	89	88
98	94	93	93	92	92	92	91	91	90	90
99	95	95	94	94	93	93	92	92	91	91
100	96	96	95	95	94	94	93	93	93	92
101	97	97	96	96	96	95	95	94	94	93
102	98	98	98	97	97	96	96	95	95	95
103	99	99	99	98	98	98	97	97	96	96
104	101	100	100	99	99	99	98	98	97	97
105	102	101	101	101	100	100	100	99	99	98
106	103	102	102	102	101	101	101	100	100	100
107	104	104	103	103	103	102	102	102	101	101
108	105	105	104	104	104	103	103	103	102	102
109	106	106	106	105	105	105	104	104	104	103
110	107	107	107	106	106	106	106	105	105	105
111	108	108	108	108	107	107	107	106	106	106
112	110	109	109	109	109	108	108	108	107	107
113	111	110	110	110	110	109	109	109	109	108
114	112	112	111	111	111	111	110	110	110	110
115	113	113	112	112	112	112	112	111	111	111
116	114	114	114	113	113	113	113	113	112	112
117	115	115	115	115	114	114	114	114	114	113
118	116	116	116	116	116	115	115	115	115	115
119	117	117	117	117	117	117	116	116	116	116
120	119	118	118	118	118	118	118	117	117	117

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
121	120	120	119	119	119	119	119	119	118	118
122	121	121	121	120	120	120	120	120	120	120
123	122	122	122	122	121	121	121	121	121	121
124	123	123	123	123	123	123	122	122	122	122
125	124	124	124	124	124	124	124	124	123	123
126	125	125	125	125	125	125	125	125	125	125
127	126	126	126	126	126	126	126	126	126	126
128	128	127	127	127	127	127	127	127	127	127
129	129	129	129	129	129	128	128	128	128	128
130	130	130	130	130	130	130	130	130	130	130
131	131	131	131	131	131	131	131	131	131	131
132	132	132	132	132	132	132	132	132	132	132
133	133	133	133	133	133	133	133	133	133	133
134	134	134	134	134	134	134	134	134	135	135
135	135	135	135	136	136	136	136	136	136	136
136	137	137	137	137	137	137	137	137	137	137
137	138	138	138	138	138	138	138	138	138	138
138	139	139	139	139	139	139	139	139	139	140
139	140	140	140	140	140	140	140	141	141	141
140	141	141	141	141	141	142	142	142	142	142
141	142	142	142	142	143	143	143	143	143	143
142	143	143	144	144	144	144	144	144	144	145
143	144	145	145	145	145	145	145	145	146	146
144	146	146	146	146	146	146	147	147	147	147
145	147	147	147	147	147	148	148	148	148	148
146	148	148	148	148	149	149	149	149	149	150
147	149	149	149	149	150	150	150	150	151	151
148	150	150	150	151	151	151	151	152	152	152
149	151	151	152	152	152	152	153	153	153	153
150	152	152	153	153	153	153	154	154	154	155
151	153	154	154	154	154	155	155	155	156	156
152	154	155	155	155	156	156	156	156	157	157
153	156	156	156	156	157	157	157	158	158	158
154	157	157	157	158	158	158	159	159	159	160
155	158	158	158	159	159	159	160	160	160	161
156	159	159	160	160	160	161	161	161	162	162
157	160	160	161	161	161	162	162	163	163	163
158	161	162	162	162	163	163	163	164	164	165
159	162	163	163	163	164	164	165	165	165	166
160	163	164	164	165	165	165	166	166	167	167

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	21	22	23	24	25	26	27	28	29	30
80	66	65	65	64	63	62	61	60	59	58
81	67	67	66	65	64	63	62	61	60	59
82	69	68	67	66	65	65	64	63	62	61
83	70	69	68	68	67	66	65	64	63	62
84	71	71	70	69	68	67	66	65	64	64
85	73	72	71	70	69	69	68	67	66	65
86	74	73	72	72	71	70	69	68	67	66
87	75	74	74	73	72	71	70	70	69	68
88	76	76	75	74	73	73	72	71	70	69
89	78	77	76	75	75	74	73	72	72	71
90	79	78	78	77	76	75	75	74	73	72
91	80	79	79	78	77	77	76	75	74	74
92	81	81	80	79	79	78	77	77	76	75
93	83	82	81	81	80	79	79	78	77	76
94	84	83	83	82	81	81	80	79	79	78
95	85	85	84	83	83	82	81	81	80	79
96	86	86	85	85	84	83	83	82	81	81
97	88	87	87	86	85	85	84	83	83	82
98	89	88	88	87	87	86	86	85	84	84
99	90	90	89	89	88	87	87	86	86	85
100	92	91	91	90	89	89	88	88	87	86
101	93	92	92	91	91	90	90	89	88	88
102	94	94	93	93	92	92	91	90	90	89
103	95	95	94	94	93	93	92	92	91	91
104	97	96	96	95	95	94	94	93	93	92
105	98	97	97	97	96	96	95	95	94	94
106	99	99	98	98	97	97	96	96	95	95
107	100	100	100	99	99	98	98	97	97	96
108	102	101	101	100	100	100	99	99	98	98
109	103	103	102	102	101	101	101	100	100	99
110	104	104	103	103	103	102	102	102	101	101
111	105	105	105	104	104	104	103	103	103	102
112	107	106	106	106	105	105	105	104	104	104
113	108	108	107	107	107	106	106	106	105	105
114	109	109	109	108	108	108	107	107	107	106
115	111	110	110	110	109	109	109	108	108	108
116	112	112	111	111	111	110	110	110	110	109
117	113	113	113	112	112	112	112	111	111	111
118	114	114	114	114	113	113	113	113	112	112
119	116	115	115	115	115	115	114	114	114	114
120	117	117	116	116	116	116	116	115	115	115

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	21	22	23	24	25	26	27	28	29	30
121	118	118	118	118	117	117	117	117	117	116
122	119	119	119	119	119	119	118	118	118	118
123	121	121	120	120	120	120	120	120	119	119
124	122	122	122	122	121	121	121	121	121	121
125	123	123	123	123	123	123	122	122	122	122
126	124	124	124	124	124	124	124	124	124	124
127	126	126	126	125	125	125	125	125	125	125
128	127	127	127	127	127	127	127	127	126	126
129	128	128	128	128	128	128	128	128	128	128
130	130	129	129	129	129	129	129	129	129	129
131	131	131	131	131	131	131	131	131	131	131
132	132	132	132	132	132	132	132	132	132	132
133	133	133	133	133	133	133	133	133	133	134
134	135	135	135	135	135	135	135	135	135	135
135	136	136	136	136	136	136	136	136	136	136
136	137	137	137	137	137	137	138	138	138	138
137	138	138	139	139	139	139	139	139	139	139
138	140	140	140	140	140	140	140	140	141	141
139	141	141	141	141	141	142	142	142	142	142
140	142	142	142	143	143	143	143	143	143	144
141	143	144	144	144	144	144	144	145	145	145
142	145	145	145	145	145	146	146	146	146	146
143	146	146	146	147	147	147	147	147	148	148
144	147	147	148	148	148	148	149	149	149	149
145	149	149	149	149	149	150	150	150	150	151
146	150	150	150	150	151	151	151	152	152	152
147	151	151	152	152	152	152	153	153	153	154
148	152	153	153	153	153	154	154	154	155	155
149	154	154	154	154	155	155	155	156	156	156
150	155	155	155	156	156	156	157	157	157	158
151	156	156	157	157	157	158	158	158	159	159
152	157	158	158	158	159	159	159	160	160	161
153	159	159	159	160	160	160	161	161	162	162
154	160	160	161	161	161	162	162	163	163	164
155	161	162	162	162	163	163	164	164	164	165
156	162	163	163	164	164	165	165	165	166	166
157	164	164	165	165	165	166	166	167	167	168
158	165	165	166	166	167	167	168	168	169	169
159	166	167	167	168	168	169	169	170	170	171
160	167	168	168	169	169	170	170	171	172	172

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
80	57	56	54	53	52	51	50	48	47	45
81	58	57	56	55	54	52	51	50	49	47
82	60	59	57	56	55	54	53	51	50	49
83	61	60	59	58	57	56	54	53	52	50
84	63	62	60	59	58	57	56	55	53	52
85	64	63	62	61	60	59	58	56	55	54
86	65	64	63	62	61	60	59	58	57	55
87	67	66	65	64	63	62	61	60	58	57
88	68	67	66	65	64	63	62	61	60	59
89	70	69	68	67	66	65	64	63	62	60
90	71	70	69	68	67	66	65	64	63	62
91	73	72	71	70	69	68	67	66	65	64
92	74	73	72	72	71	70	69	68	67	65
93	76	75	74	73	72	71	70	69	68	67
94	77	76	75	75	74	73	72	71	70	69
95	78	78	77	76	75	74	73	72	71	70
96	80	79	78	78	77	76	75	74	73	72
97	81	81	80	79	78	77	77	76	75	74
98	83	82	81	81	80	79	78	77	76	75
99	84	84	83	82	81	81	80	79	78	77
100	86	85	84	84	83	82	81	81	80	79
101	87	87	86	85	84	84	83	82	81	80
102	89	88	87	87	86	85	85	84	83	82
103	90	89	89	88	87	87	86	85	85	84
104	92	91	90	90	89	88	88	87	86	85
105	93	92	92	91	91	90	89	89	88	87
106	94	94	93	93	92	91	91	90	90	89
107	96	95	95	94	94	93	92	92	91	90
108	97	97	96	96	95	95	94	93	93	92
109	99	98	98	97	97	96	96	95	94	94
110	100	100	99	99	98	98	97	97	96	95
111	102	101	101	100	100	99	99	98	98	97
112	103	103	102	102	101	101	100	100	99	99
113	105	104	104	103	103	102	102	101	101	100
114	106	106	105	105	104	104	104	103	103	102
115	107	107	107	106	106	106	105	105	104	104
116	109	109	108	108	107	107	107	106	106	105
117	110	110	110	109	109	109	108	108	108	107
118	112	112	111	111	111	110	110	110	109	109
119	113	113	113	112	112	112	111	111	111	110
120	115	114	114	114	114	113	113	113	112	112

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.4**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
121	116	116	116	115	115	115	115	114	114	114
122	118	117	117	117	117	116	116	116	116	115
123	119	119	119	118	118	118	118	118	117	117
124	121	120	120	120	120	120	119	119	119	119
125	122	122	122	122	121	121	121	121	121	120
126	123	123	123	123	123	123	123	122	122	122
127	125	125	125	125	124	124	124	124	124	124
128	126	126	126	126	126	126	126	126	126	125
129	128	128	128	128	127	127	127	127	127	127
130	129	129	129	129	129	129	129	129	129	129
131	131	131	131	131	131	131	131	131	130	130
132	132	132	132	132	132	132	132	132	132	132
133	134	134	134	134	134	134	134	134	134	134
134	135	135	135	135	135	135	135	135	135	135
135	136	137	137	137	137	137	137	137	137	137
136	138	138	138	138	138	138	138	139	139	139
137	139	139	140	140	140	140	140	140	140	140
138	141	141	141	141	141	141	142	142	142	142
139	142	142	143	143	143	143	143	143	144	144
140	144	144	144	144	144	145	145	145	145	145
141	145	145	146	146	146	146	146	147	147	147
142	147	147	147	147	147	148	148	148	149	149
143	148	148	149	149	149	149	150	150	150	150
144	149	150	150	150	151	151	151	151	152	152
145	151	151	152	152	152	152	153	153	153	154
146	152	153	153	153	154	154	154	155	155	155
147	154	154	154	155	155	156	156	156	157	157
148	155	156	156	156	157	157	158	158	158	159
149	157	157	157	158	158	159	159	160	160	160
150	158	159	159	159	160	160	161	161	162	162
151	160	160	160	161	161	162	162	163	163	164
152	161	162	162	162	163	163	164	164	165	165
153	163	163	163	164	164	165	165	166	167	167
154	164	164	165	165	166	166	167	168	168	169
155	165	166	166	167	167	168	169	169	170	170
156	167	167	168	168	169	170	170	171	171	172
157	168	169	169	170	171	171	172	172	173	174
158	170	170	171	172	172	173	173	174	175	175
159	171	172	172	173	174	174	175	176	176	177
160	173	173	174	175	175	176	177	177	178	179

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
80	79	79	78	78	77	76	76	75	74	74
81	80	80	79	79	78	77	77	76	75	75
82	81	81	80	80	79	78	78	77	77	76
83	82	82	81	81	80	80	79	78	78	77
84	83	83	82	82	81	81	80	79	79	78
85	84	84	83	83	82	82	81	80	80	79
86	85	85	84	84	83	83	82	82	81	80
87	86	86	85	85	84	84	83	83	82	81
88	88	87	86	86	85	85	84	84	83	83
89	89	88	88	87	86	86	85	85	84	84
90	90	89	89	88	88	87	86	86	85	85
91	91	90	90	89	89	88	88	87	86	86
92	92	91	91	90	90	89	89	88	88	87
93	93	92	92	91	91	90	90	89	89	88
94	94	93	93	92	92	91	91	90	90	89
95	95	94	94	93	93	92	92	91	91	90
96	96	95	95	94	94	93	93	92	92	91
97	97	96	96	95	95	94	94	93	93	93
98	98	97	97	96	96	95	95	95	94	94
99	99	98	98	97	97	97	96	96	95	95
100	100	99	99	98	98	98	97	97	96	96
101	101	100	100	99	99	99	98	98	97	97
102	102	101	101	101	100	100	99	99	99	98
103	103	102	102	102	101	101	100	100	100	99
104	104	103	103	103	102	102	101	101	101	100
105	105	104	104	104	103	103	103	102	102	101
106	106	105	105	105	104	104	104	103	103	103
107	107	106	106	106	105	105	105	104	104	104
108	108	107	107	107	106	106	106	105	105	105
109	109	108	108	108	108	107	107	107	106	106
110	110	109	109	109	109	108	108	108	107	107
111	111	110	110	110	110	109	109	109	108	108
112	112	111	111	111	111	110	110	110	109	109
113	113	113	112	112	112	111	111	111	111	110
114	114	114	113	113	113	113	112	112	112	111
115	115	115	114	114	114	114	113	113	113	113
116	116	116	115	115	115	115	114	114	114	114
117	117	117	116	116	116	116	115	115	115	115
118	118	118	117	117	117	117	117	116	116	116
119	119	119	118	118	118	118	118	117	117	117
120	120	120	119	119	119	119	119	118	118	118

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
121	121	121	120	120	120	120	120	120	119	119
122	122	122	122	121	121	121	121	121	120	120
123	123	123	123	122	122	122	122	122	122	121
124	124	124	124	123	123	123	123	123	123	123
125	125	125	125	124	124	124	124	124	124	124
126	126	126	126	126	125	125	125	125	125	125
127	127	127	127	127	126	126	126	126	126	126
128	128	128	128	128	128	127	127	127	127	127
129	129	129	129	129	129	128	128	128	128	128
130	130	130	130	130	130	130	129	129	129	129
131	131	131	131	131	131	131	131	130	130	130
132	132	132	132	132	132	132	132	132	131	131
133	133	133	133	133	133	133	133	133	133	133
134	134	134	134	134	134	134	134	134	134	134
135	135	135	135	135	135	135	135	135	135	135
136	136	136	136	136	136	136	136	136	136	136
137	137	137	137	137	137	137	137	137	137	137
138	138	138	138	138	138	138	138	138	138	138
139	139	139	139	139	139	139	139	139	139	139
140	140	140	140	140	140	140	140	140	140	140
141	141	141	141	141	141	141	141	141	141	141
142	142	142	142	142	142	142	142	142	142	143
143	143	143	143	143	143	143	143	143	144	144
144	144	144	144	144	144	144	145	145	145	145
145	145	145	145	145	145	145	146	146	146	146
146	146	146	146	146	146	147	147	147	147	147
147	147	147	147	147	148	148	148	148	148	148
148	148	148	148	148	149	149	149	149	149	149
149	149	149	149	149	150	150	150	150	150	150
150	150	150	150	151	151	151	151	151	151	151
151	151	151	151	152	152	152	152	152	152	153
152	152	152	152	153	153	153	153	153	153	154
153	153	153	153	154	154	154	154	154	155	155
154	154	154	155	155	155	155	155	155	156	156
155	155	155	156	156	156	156	156	157	157	157
156	156	156	157	157	157	157	157	158	158	158
157	157	157	158	158	158	158	158	159	159	159
158	158	158	159	159	159	159	160	160	160	160
159	159	159	160	160	160	160	161	161	161	161
160	160	160	161	161	161	161	162	162	162	163

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
80	73	72	71	71	70	69	68	67	67	66
81	74	73	73	72	71	70	69	69	68	67
82	75	74	74	73	72	71	71	70	69	68
83	76	76	75	74	73	73	72	71	70	69
84	77	77	76	75	75	74	73	72	72	71
85	79	78	77	76	76	75	74	74	73	72
86	80	79	78	78	77	76	75	75	74	73
87	81	80	79	79	78	77	77	76	75	74
88	82	81	81	80	79	79	78	77	76	76
89	83	82	82	81	80	80	79	78	78	77
90	84	84	83	82	82	81	80	80	79	78
91	85	85	84	83	83	82	82	81	80	79
92	86	86	85	85	84	83	83	82	81	81
93	88	87	86	86	85	85	84	83	83	82
94	89	88	88	87	86	86	85	84	84	83
95	90	89	89	88	88	87	86	86	85	84
96	91	90	90	89	89	88	88	87	86	86
97	92	92	91	90	90	89	89	88	88	87
98	93	93	92	92	91	91	90	89	89	88
99	94	94	93	93	92	92	91	91	90	89
100	95	95	94	94	93	93	92	92	91	91
101	97	96	96	95	95	94	94	93	92	92
102	98	97	97	96	96	95	95	94	94	93
103	99	98	98	97	97	96	96	95	95	94
104	100	99	99	99	98	98	97	97	96	96
105	101	101	100	100	99	99	98	98	97	97
106	102	102	101	101	100	100	100	99	99	98
107	103	103	102	102	102	101	101	100	100	99
108	104	104	104	103	103	102	102	102	101	101
109	106	105	105	104	104	104	103	103	102	102
110	107	106	106	106	105	105	104	104	104	103
111	108	107	107	107	106	106	106	105	105	104
112	109	109	108	108	108	107	107	106	106	106
113	110	110	109	109	109	108	108	108	107	107
114	111	111	111	110	110	110	109	109	109	108
115	112	112	112	111	111	111	110	110	110	109
116	113	113	113	113	112	112	112	111	111	111
117	114	114	114	114	113	113	113	113	112	112
118	116	115	115	115	115	114	114	114	113	113
119	117	117	116	116	116	116	115	115	115	114
120	118	118	117	117	117	117	116	116	116	116

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
121	119	119	119	118	118	118	118	117	117	117
122	120	120	120	120	119	119	119	119	118	118
123	121	121	121	121	120	120	120	120	120	119
124	122	122	122	122	122	121	121	121	121	121
125	123	123	123	123	123	123	122	122	122	122
126	125	124	124	124	124	124	124	124	123	123
127	126	126	125	125	125	125	125	125	125	124
128	127	127	127	126	126	126	126	126	126	126
129	128	128	128	128	128	127	127	127	127	127
130	129	129	129	129	129	129	129	128	128	128
131	130	130	130	130	130	130	130	130	130	129
132	131	131	131	131	131	131	131	131	131	131
133	132	132	132	132	132	132	132	132	132	132
134	134	134	134	133	133	133	133	133	133	133
135	135	135	135	135	135	135	135	134	134	134
136	136	136	136	136	136	136	136	136	136	136
137	137	137	137	137	137	137	137	137	137	137
138	138	138	138	138	138	138	138	138	138	138
139	139	139	139	139	139	139	139	139	139	139
140	140	140	140	140	140	141	141	141	141	141
141	141	142	142	142	142	142	142	142	142	142
142	143	143	143	143	143	143	143	143	143	143
143	144	144	144	144	144	144	144	144	144	144
144	145	145	145	145	145	145	145	145	146	146
145	146	146	146	146	146	146	147	147	147	147
146	147	147	147	147	148	148	148	148	148	148
147	148	148	148	149	149	149	149	149	149	149
148	149	149	150	150	150	150	150	150	151	151
149	150	151	151	151	151	151	151	152	152	152
150	152	152	152	152	152	152	153	153	153	153
151	153	153	153	153	153	154	154	154	154	154
152	154	154	154	154	155	155	155	155	155	156
153	155	155	155	156	156	156	156	156	157	157
154	156	156	156	157	157	157	157	158	158	158
155	157	157	158	158	158	158	159	159	159	159
156	158	159	159	159	159	160	160	160	160	161
157	159	160	160	160	160	161	161	161	162	162
158	161	161	161	161	162	162	162	163	163	163
159	162	162	162	163	163	163	163	164	164	164
160	163	163	163	164	164	164	165	165	165	166

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	21	22	23	24	25	26	27	28	29	30
80	65	64	63	62	61	60	59	58	57	55
81	66	65	64	63	62	61	60	59	58	57
82	67	66	65	65	64	63	62	61	59	58
83	69	68	67	66	65	64	63	62	61	60
84	70	69	68	67	66	65	64	63	62	61
85	71	70	69	68	68	67	66	65	64	63
86	72	72	71	70	69	68	67	66	65	64
87	74	73	72	71	70	69	68	67	66	65
88	75	74	73	72	72	71	70	69	68	67
89	76	75	75	74	73	72	71	70	69	68
90	77	77	76	75	74	73	73	72	71	70
91	79	78	77	76	76	75	74	73	72	71
92	80	79	78	78	77	76	75	74	74	73
93	81	81	80	79	78	77	77	76	75	74
94	82	82	81	80	80	79	78	77	76	75
95	84	83	82	82	81	80	79	79	78	77
96	85	84	84	83	82	81	81	80	79	78
97	86	86	85	84	84	83	82	81	81	80
98	88	87	86	86	85	84	83	83	82	81
99	89	88	88	87	86	86	85	84	83	83
100	90	89	89	88	88	87	86	86	85	84
101	91	91	90	90	89	88	88	87	86	85
102	93	92	91	91	90	90	89	88	88	87
103	94	93	93	92	92	91	90	90	89	88
104	95	95	94	93	93	92	92	91	90	90
105	96	96	95	95	94	94	93	92	92	91
106	98	97	97	96	96	95	94	94	93	93
107	99	98	98	97	97	96	96	95	95	94
108	100	100	99	99	98	98	97	97	96	95
109	101	101	101	100	100	99	99	98	97	97
110	103	102	102	101	101	100	100	99	99	98
111	104	104	103	103	102	102	101	101	100	100
112	105	105	104	104	104	103	103	102	102	101
113	107	106	106	105	105	104	104	104	103	103
114	108	107	107	107	106	106	105	105	104	104
115	109	109	108	108	108	107	107	106	106	105
116	110	110	110	109	109	109	108	108	107	107
117	112	111	111	111	110	110	109	109	109	108
118	113	113	112	112	112	111	111	111	110	110
119	114	114	114	113	113	113	112	112	112	111
120	115	115	115	115	114	114	114	113	113	113

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	21	22	23	24	25	26	27	28	29	30
121	117	116	116	116	116	115	115	115	114	114
122	118	118	117	117	117	117	116	116	116	115
123	119	119	119	118	118	118	118	117	117	117
124	120	120	120	120	120	119	119	119	119	118
125	122	122	121	121	121	121	120	120	120	120
126	123	123	123	122	122	122	122	122	121	121
127	124	124	124	124	124	123	123	123	123	123
128	126	125	125	125	125	125	125	124	124	124
129	127	127	127	126	126	126	126	126	126	125
130	128	128	128	128	128	127	127	127	127	127
131	129	129	129	129	129	129	129	129	128	128
132	131	131	130	130	130	130	130	130	130	130
133	132	132	132	132	132	131	131	131	131	131
134	133	133	133	133	133	133	133	133	133	133
135	134	134	134	134	134	134	134	134	134	134
136	136	136	136	136	136	136	136	136	135	135
137	137	137	137	137	137	137	137	137	137	137
138	138	138	138	138	138	138	138	138	138	138
139	139	139	140	140	140	140	140	140	140	140
140	141	141	141	141	141	141	141	141	141	141
141	142	142	142	142	142	142	142	142	143	143
142	143	143	143	143	144	144	144	144	144	144
143	145	145	145	145	145	145	145	145	145	145
144	146	146	146	146	146	146	146	147	147	147
145	147	147	147	147	148	148	148	148	148	148
146	148	148	149	149	149	149	149	149	150	150
147	150	150	150	150	150	150	151	151	151	151
148	151	151	151	151	152	152	152	152	152	153
149	152	152	153	153	153	153	153	154	154	154
150	153	154	154	154	154	154	155	155	155	155
151	155	155	155	155	156	156	156	156	157	157
152	156	156	156	157	157	157	157	158	158	158
153	157	157	158	158	158	159	159	159	159	160
154	158	159	159	159	160	160	160	161	161	161
155	160	160	160	161	161	161	162	162	162	163
156	161	161	162	162	162	163	163	163	164	164
157	162	163	163	163	164	164	164	165	165	165
158	164	164	164	165	165	165	166	166	166	167
159	165	165	165	166	166	167	167	167	168	168
160	166	166	167	167	168	168	168	169	169	170

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
80	54	53	52	50	49	48	46	45	43	42
81	56	55	53	52	51	49	48	47	45	43
82	57	56	55	54	52	51	50	48	47	45
83	59	57	56	55	54	52	51	50	48	47
84	60	59	58	57	55	54	53	51	50	48
85	62	60	59	58	57	56	54	53	52	50
86	63	62	61	60	58	57	56	55	53	52
87	64	63	62	61	60	59	57	56	55	53
88	66	65	64	63	61	60	59	58	56	55
89	67	66	65	64	63	62	61	59	58	57
90	69	68	67	66	65	63	62	61	60	58
91	70	69	68	67	66	65	64	63	61	60
92	72	71	70	69	68	67	65	64	63	62
93	73	72	71	70	69	68	67	66	65	63
94	75	74	73	72	71	70	69	67	66	65
95	76	75	74	73	72	71	70	69	68	67
96	77	77	76	75	74	73	72	71	70	68
97	79	78	77	76	75	74	73	72	71	70
98	80	80	79	78	77	76	75	74	73	72
99	82	81	80	79	78	77	77	76	75	73
100	83	82	82	81	80	79	78	77	76	75
101	85	84	83	82	81	81	80	79	78	77
102	86	85	85	84	83	82	81	80	79	78
103	88	87	86	85	85	84	83	82	81	80
104	89	88	88	87	86	85	84	84	83	82
105	90	90	89	88	88	87	86	85	84	83
106	92	91	91	90	89	88	88	87	86	85
107	93	93	92	91	91	90	89	88	88	87
108	95	94	94	93	92	92	91	90	89	88
109	96	96	95	94	94	93	92	92	91	90
110	98	97	97	96	95	95	94	93	93	92
111	99	99	98	97	97	96	96	95	94	93
112	101	100	100	99	98	98	97	97	96	95
113	102	102	101	100	100	99	99	98	97	97
114	104	103	103	102	101	101	100	100	99	98
115	105	105	104	104	103	102	102	101	101	100
116	106	106	106	105	105	104	104	103	102	102
117	108	107	107	107	106	106	105	105	104	103
118	109	109	109	108	108	107	107	106	106	105
119	111	110	110	110	109	109	108	108	107	107
120	112	112	111	111	111	110	110	109	109	108

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.5**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
121	114	113	113	113	112	112	111	111	111	110
122	115	115	114	114	114	113	113	113	112	112
123	117	116	116	116	115	115	115	114	114	113
124	118	118	117	117	117	117	116	116	116	115
125	119	119	119	119	118	118	118	117	117	117
126	121	121	120	120	120	120	119	119	119	118
127	122	122	122	122	121	121	121	121	120	120
128	124	124	123	123	123	123	123	122	122	122
129	125	125	125	125	125	124	124	124	124	123
130	127	127	126	126	126	126	126	126	125	125
131	128	128	128	128	128	127	127	127	127	127
132	130	130	129	129	129	129	129	129	129	128
133	131	131	131	131	131	131	130	130	130	130
134	133	132	132	132	132	132	132	132	132	132
135	134	134	134	134	134	134	134	134	134	133
136	135	135	135	135	135	135	135	135	135	135
137	137	137	137	137	137	137	137	137	137	137
138	138	138	138	138	138	138	138	138	138	138
139	140	140	140	140	140	140	140	140	140	140
140	141	141	141	141	141	142	142	142	142	142
141	143	143	143	143	143	143	143	143	143	143
142	144	144	144	144	145	145	145	145	145	145
143	146	146	146	146	146	146	146	147	147	147
144	147	147	147	147	148	148	148	148	148	148
145	148	149	149	149	149	149	150	150	150	150
146	150	150	150	150	151	151	151	151	152	152
147	151	152	152	152	152	152	153	153	153	153
148	153	153	153	154	154	154	154	155	155	155
149	154	155	155	155	155	156	156	156	156	157
150	156	156	156	157	157	157	157	158	158	158
151	157	157	158	158	158	159	159	159	160	160
152	159	159	159	160	160	160	161	161	161	162
153	160	160	161	161	161	162	162	163	163	163
154	162	162	162	163	163	163	164	164	165	165
155	163	163	164	164	165	165	165	166	166	167
156	164	165	165	166	166	167	167	167	168	168
157	166	166	167	167	168	168	169	169	170	170
158	167	168	168	169	169	170	170	171	171	172
159	169	169	170	170	171	171	172	172	173	173
160	170	171	171	172	172	173	173	174	175	175

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
80	79	79	78	77	77	76	75	75	74	73
81	80	80	79	78	78	77	76	76	75	74
82	81	81	80	79	79	78	77	77	76	75
83	82	82	81	81	80	79	79	78	77	76
84	83	83	82	82	81	80	80	79	78	77
85	84	84	83	83	82	81	81	80	79	79
86	85	85	84	84	83	82	82	81	80	80
87	86	86	85	85	84	83	83	82	81	81
88	87	87	86	86	85	85	84	83	83	82
89	88	88	87	87	86	86	85	84	84	83
90	89	89	88	88	87	87	86	85	85	84
91	90	90	89	89	88	88	87	86	86	85
92	91	91	90	90	89	89	88	88	87	86
93	92	92	91	91	90	90	89	89	88	87
94	94	93	92	92	91	91	90	90	89	89
95	95	94	94	93	92	92	91	91	90	90
96	96	95	95	94	94	93	92	92	91	91
97	97	96	96	95	95	94	94	93	92	92
98	98	97	97	96	96	95	95	94	94	93
99	99	98	98	97	97	96	96	95	95	94
100	100	99	99	98	98	97	97	96	96	95
101	101	100	100	99	99	98	98	97	97	96
102	102	101	101	100	100	99	99	98	98	97
103	103	102	102	101	101	100	100	100	99	99
104	104	103	103	102	102	102	101	101	100	100
105	105	104	104	103	103	103	102	102	101	101
106	106	105	105	104	104	104	103	103	102	102
107	107	106	106	106	105	105	104	104	103	103
108	108	107	107	107	106	106	105	105	105	104
109	109	108	108	108	107	107	106	106	106	105
110	110	109	109	109	108	108	108	107	107	106
111	111	110	110	110	109	109	109	108	108	107
112	112	111	111	111	110	110	110	109	109	109
113	113	112	112	112	111	111	111	110	110	110
114	114	113	113	113	112	112	112	111	111	111
115	115	114	114	114	114	113	113	113	112	112
116	116	115	115	115	115	114	114	114	113	113
117	117	116	116	116	116	115	115	115	114	114
118	118	117	117	117	117	116	116	116	116	115
119	119	119	118	118	118	117	117	117	117	116
120	120	120	119	119	119	119	118	118	118	117

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
121	121	121	120	120	120	120	119	119	119	119
122	122	122	121	121	121	121	120	120	120	120
123	123	123	122	122	122	122	122	121	121	121
124	124	124	123	123	123	123	123	122	122	122
125	125	125	124	124	124	124	124	123	123	123
126	126	126	125	125	125	125	125	125	124	124
127	127	127	127	126	126	126	126	126	125	125
128	128	128	128	127	127	127	127	127	127	126
129	129	129	129	128	128	128	128	128	128	127
130	130	130	130	129	129	129	129	129	129	129
131	131	131	131	131	130	130	130	130	130	130
132	132	132	132	132	131	131	131	131	131	131
133	133	133	133	133	132	132	132	132	132	132
134	134	134	134	134	134	133	133	133	133	133
135	135	135	135	135	135	135	134	134	134	134
136	136	136	136	136	136	136	135	135	135	135
137	137	137	137	137	137	137	137	136	136	136
138	138	138	138	138	138	138	138	138	138	137
139	139	139	139	139	139	139	139	139	139	139
140	140	140	140	140	140	140	140	140	140	140
141	141	141	141	141	141	141	141	141	141	141
142	142	142	142	142	142	142	142	142	142	142
143	143	143	143	143	143	143	143	143	143	143
144	144	144	144	144	144	144	144	144	144	144
145	145	145	145	145	145	145	145	145	145	145
146	146	146	146	146	146	146	146	146	146	146
147	147	147	147	147	147	147	147	147	147	147
148	148	148	148	148	148	148	148	148	149	149
149	149	149	149	149	149	149	149	150	150	150
150	150	150	150	150	150	150	151	151	151	151
151	151	151	151	151	151	152	152	152	152	152
152	152	152	152	152	152	153	153	153	153	153
153	153	153	153	153	154	154	154	154	154	154
154	154	154	154	154	155	155	155	155	155	155
155	155	155	155	156	156	156	156	156	156	156
156	156	156	156	157	157	157	157	157	157	157
157	157	157	157	158	158	158	158	158	158	159
158	158	158	158	159	159	159	159	159	160	160
159	159	159	160	160	160	160	160	160	161	161
160	160	160	161	161	161	161	161	161	162	162

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
80	72	71	71	70	69	68	67	66	65	64
81	73	73	72	71	70	69	68	67	67	66
82	74	74	73	72	71	70	70	69	68	67
83	76	75	74	73	72	72	71	70	69	68
84	77	76	75	74	74	73	72	71	70	69
85	78	77	76	76	75	74	73	72	71	71
86	79	78	78	77	76	75	74	74	73	72
87	80	79	79	78	77	76	76	75	74	73
88	81	81	80	79	78	78	77	76	75	74
89	82	82	81	80	80	79	78	77	76	76
90	83	83	82	81	81	80	79	78	78	77
91	85	84	83	83	82	81	80	80	79	78
92	86	85	84	84	83	82	82	81	80	79
93	87	86	86	85	84	84	83	82	81	81
94	88	87	87	86	85	85	84	83	83	82
95	89	88	88	87	87	86	85	85	84	83
96	90	90	89	88	88	87	86	86	85	84
97	91	91	90	90	89	88	88	87	86	86
98	92	92	91	91	90	89	89	88	87	87
99	94	93	92	92	91	91	90	89	89	88
100	95	94	94	93	92	92	91	91	90	89
101	96	95	95	94	94	93	92	92	91	91
102	97	96	96	95	95	94	94	93	92	92
103	98	98	97	97	96	95	95	94	94	93
104	99	99	98	98	97	97	96	95	95	94
105	100	100	99	99	98	98	97	97	96	96
106	101	101	101	100	100	99	98	98	97	97
107	103	102	102	101	101	100	100	99	99	98
108	104	103	103	102	102	101	101	100	100	99
109	105	104	104	104	103	103	102	102	101	101
110	106	106	105	105	104	104	103	103	102	102
111	107	107	106	106	105	105	104	104	104	103
112	108	108	107	107	107	106	106	105	105	104
113	109	109	109	108	108	107	107	106	106	106
114	110	110	110	109	109	109	108	108	107	107
115	112	111	111	110	110	110	109	109	108	108
116	113	112	112	112	111	111	111	110	110	109
117	114	113	113	113	112	112	112	111	111	111
118	115	115	114	114	114	113	113	113	112	112
119	116	116	115	115	115	114	114	114	113	113
120	117	117	117	116	116	116	115	115	115	114

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
121	118	118	118	117	117	117	117	116	116	116
122	119	119	119	119	118	118	118	117	117	117
123	121	120	120	120	120	119	119	119	118	118
124	122	121	121	121	121	120	120	120	120	119
125	123	123	122	122	122	122	121	121	121	121
126	124	124	123	123	123	123	123	122	122	122
127	125	125	125	124	124	124	124	124	123	123
128	126	126	126	126	125	125	125	125	125	124
129	127	127	127	127	127	126	126	126	126	126
130	128	128	128	128	128	128	127	127	127	127
131	130	129	129	129	129	129	129	128	128	128
132	131	131	130	130	130	130	130	130	129	129
133	132	132	132	131	131	131	131	131	131	131
134	133	133	133	133	132	132	132	132	132	132
135	134	134	134	134	134	134	133	133	133	133
136	135	135	135	135	135	135	135	135	134	134
137	136	136	136	136	136	136	136	136	136	136
138	137	137	137	137	137	137	137	137	137	137
139	139	138	138	138	138	138	138	138	138	138
140	140	140	140	140	140	139	139	139	139	139
141	141	141	141	141	141	141	141	141	141	141
142	142	142	142	142	142	142	142	142	142	142
143	143	143	143	143	143	143	143	143	143	143
144	144	144	144	144	144	144	144	144	144	144
145	145	145	145	145	145	145	145	145	146	146
146	146	146	146	147	147	147	147	147	147	147
147	148	148	148	148	148	148	148	148	148	148
148	149	149	149	149	149	149	149	149	149	149
149	150	150	150	150	150	150	150	150	150	151
150	151	151	151	151	151	151	151	152	152	152
151	152	152	152	152	152	153	153	153	153	153
152	153	153	153	154	154	154	154	154	154	154
153	154	154	155	155	155	155	155	155	155	156
154	155	156	156	156	156	156	156	156	157	157
155	157	157	157	157	157	157	158	158	158	158
156	158	158	158	158	158	159	159	159	159	159
157	159	159	159	159	160	160	160	160	160	161
158	160	160	160	160	161	161	161	161	162	162
159	161	161	161	162	162	162	162	163	163	163
160	162	162	163	163	163	163	164	164	164	164

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

PERCENT of + 3/4 MATERIAL

DD	21	22	23	24	25	26	27	28	29	30
80	63	62	61	60	59	58	57	56	54	53
81	65	64	63	61	60	59	58	57	56	55
82	66	65	64	63	62	61	60	58	57	56
83	67	66	65	64	63	62	61	60	59	57
84	68	67	66	65	64	63	62	61	60	59
85	70	69	68	67	66	65	64	63	61	60
86	71	70	69	68	67	66	65	64	63	62
87	72	71	70	69	68	67	66	65	64	63
88	73	73	72	71	70	69	68	67	66	65
89	75	74	73	72	71	70	69	68	67	66
90	76	75	74	73	72	71	70	69	68	67
91	77	76	76	75	74	73	72	71	70	69
92	79	78	77	76	75	74	73	72	71	70
93	80	79	78	77	76	76	75	74	73	72
94	81	80	79	79	78	77	76	75	74	73
95	82	82	81	80	79	78	77	76	75	75
96	84	83	82	81	80	80	79	78	77	76
97	85	84	83	83	82	81	80	79	78	77
98	86	85	85	84	83	82	81	81	80	79
99	87	87	86	85	84	84	83	82	81	80
100	89	88	87	86	86	85	84	83	83	82
101	90	89	89	88	87	86	86	85	84	83
102	91	91	90	89	88	88	87	86	85	85
103	92	92	91	90	90	89	88	88	87	86
104	94	93	92	92	91	90	90	89	88	87
105	95	94	94	93	92	92	91	90	90	89
106	96	96	95	94	94	93	92	92	91	90
107	97	97	96	96	95	94	94	93	92	92
108	99	98	98	97	96	96	95	94	94	93
109	100	99	99	98	98	97	97	96	95	95
110	101	101	100	100	99	98	98	97	97	96
111	103	102	102	101	100	100	99	99	98	97
112	104	103	103	102	102	101	101	100	99	99
113	105	105	104	104	103	103	102	101	101	100
114	106	106	105	105	104	104	103	103	102	102
115	108	107	107	106	106	105	105	104	104	103
116	109	108	108	108	107	107	106	106	105	105
117	110	110	109	109	108	108	107	107	106	106
118	111	111	111	110	110	109	109	108	108	107
119	113	112	112	111	111	111	110	110	109	109
120	114	114	113	113	112	112	112	111	111	110

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

	← PERCENT of + 3/4 MATERIAL →									
DD	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**
121	115	115	114	114	114	113	113	113	112	112
122	116	116	116	115	115	115	114	114	114	113
123	118	117	117	117	116	116	116	115	115	115
124	119	119	118	118	118	117	117	117	116	116
125	120	120	120	119	119	119	118	118	118	117
126	122	121	121	121	120	120	120	119	119	119
127	123	123	122	122	122	121	121	121	121	120
128	124	124	124	123	123	123	123	122	122	122
129	125	125	125	125	124	124	124	124	123	123
130	127	126	126	126	126	126	125	125	125	125
131	128	128	127	127	127	127	127	126	126	126
132	129	129	129	129	128	128	128	128	128	127
133	130	130	130	130	130	130	129	129	129	129
134	132	132	131	131	131	131	131	131	130	130
135	133	133	133	133	132	132	132	132	132	132
136	134	134	134	134	134	134	133	133	133	133
137	135	135	135	135	135	135	135	135	135	135
138	137	137	137	136	136	136	136	136	136	136
139	138	138	138	138	138	138	138	138	137	137
140	139	139	139	139	139	139	139	139	139	139
141	141	141	140	140	140	140	140	140	140	140
142	142	142	142	142	142	142	142	142	142	142
143	143	143	143	143	143	143	143	143	143	143
144	144	144	144	144	144	144	144	144	145	145
145	146	146	146	146	146	146	146	146	146	146
146	147	147	147	147	147	147	147	147	147	147
147	148	148	148	148	148	148	149	149	149	149
148	149	149	150	150	150	150	150	150	150	150
149	151	151	151	151	151	151	151	151	152	152
150	152	152	152	152	152	153	153	153	153	153
151	153	153	153	154	154	154	154	154	154	155
152	154	155	155	155	155	155	155	156	156	156
153	156	156	156	156	156	157	157	157	157	157
154	157	157	157	158	158	158	158	158	159	159
155	158	158	159	159	159	159	160	160	160	160
156	160	160	160	160	160	161	161	161	161	162
157	161	161	161	161	162	162	162	163	163	163
158	162	162	163	163	163	163	164	164	164	165
159	163	164	164	164	164	165	165	165	166	166
160	165	165	165	165	166	166	166	167	167	167

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
80	52	50	49	48	46	45	43	42	40	38
81	53	52	51	49	48	46	45	43	42	40
82	55	53	52	51	49	48	46	45	43	41
83	56	55	54	52	51	49	48	46	45	43
84	58	56	55	54	52	51	49	48	46	45
85	59	58	57	55	54	53	51	50	48	46
86	60	59	58	57	55	54	53	51	50	48
87	62	61	60	58	57	56	54	53	51	50
88	63	62	61	60	59	57	56	54	53	51
89	65	64	63	61	60	59	57	56	55	53
90	66	65	64	63	62	60	59	58	56	55
91	68	67	66	64	63	62	61	59	58	56
92	69	68	67	66	65	63	62	61	60	58
93	71	70	68	67	66	65	64	62	61	60
94	72	71	70	69	68	67	65	64	63	61
95	74	73	71	70	69	68	67	66	64	63
96	75	74	73	72	71	70	69	67	66	65
97	76	75	74	73	72	71	70	69	68	66
98	78	77	76	75	74	73	72	71	69	68
99	79	78	77	76	75	74	73	72	71	70
100	81	80	79	78	77	76	75	74	73	71
101	82	81	80	79	79	78	76	75	74	73
102	84	83	82	81	80	79	78	77	76	75
103	85	84	83	83	82	81	80	79	78	76
104	87	86	85	84	83	82	81	80	79	78
105	88	87	86	86	85	84	83	82	81	80
106	89	89	88	87	86	85	84	83	82	81
107	91	90	89	89	88	87	86	85	84	83
108	92	92	91	90	89	88	88	87	86	85
109	94	93	92	92	91	90	89	88	87	86
110	95	95	94	93	92	92	91	90	89	88
111	97	96	95	95	94	93	92	92	91	90
112	98	98	97	96	95	95	94	93	92	91
113	100	99	98	98	97	96	96	95	94	93
114	101	100	100	99	99	98	97	96	96	95
115	103	102	101	101	100	99	99	98	97	96
116	104	103	103	102	102	101	100	100	99	98
117	105	105	104	104	103	103	102	101	101	100
118	107	106	106	105	105	104	103	103	102	101
119	108	108	107	107	106	106	105	104	104	103
120	110	109	109	108	108	107	107	106	105	105

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.6**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
121	111	111	110	110	109	109	108	108	107	106
122	113	112	112	111	111	110	110	109	109	108
123	114	114	113	113	112	112	111	111	110	110
124	116	115	115	114	114	113	113	112	112	111
125	117	117	116	116	115	115	115	114	114	113
126	118	118	118	117	117	117	116	116	115	115
127	120	120	119	119	119	118	118	117	117	116
128	121	121	121	120	120	120	119	119	119	118
129	123	123	122	122	122	121	121	121	120	120
130	124	124	124	123	123	123	122	122	122	121
131	126	125	125	125	125	124	124	124	123	123
132	127	127	127	126	126	126	126	125	125	125
133	129	128	128	128	128	128	127	127	127	126
134	130	130	130	129	129	129	129	129	128	128
135	132	131	131	131	131	131	130	130	130	130
136	133	133	133	133	132	132	132	132	132	131
137	134	134	134	134	134	134	134	133	133	133
138	136	136	136	136	135	135	135	135	135	135
139	137	137	137	137	137	137	137	137	137	136
140	139	139	139	139	139	138	138	138	138	138
141	140	140	140	140	140	140	140	140	140	140
142	142	142	142	142	142	142	142	142	142	141
143	143	143	143	143	143	143	143	143	143	143
144	145	145	145	145	145	145	145	145	145	145
145	146	146	146	146	146	146	146	146	146	146
146	147	148	148	148	148	148	148	148	148	148
147	149	149	149	149	149	149	149	150	150	150
148	150	150	151	151	151	151	151	151	151	151
149	152	152	152	152	152	153	153	153	153	153
150	153	153	154	154	154	154	154	154	155	155
151	155	155	155	155	155	156	156	156	156	156
152	156	156	157	157	157	157	157	158	158	158
153	158	158	158	158	159	159	159	159	160	160
154	159	159	160	160	160	160	161	161	161	161
155	160	161	161	161	162	162	162	162	163	163
156	162	162	163	163	163	163	164	164	164	165
157	163	164	164	164	165	165	165	166	166	166
158	165	165	166	166	166	167	167	167	168	168
159	166	167	167	167	168	168	169	169	169	170
160	168	168	168	169	169	170	170	171	171	171

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
80	79	79	78	77	76	76	75	74	73	72
81	80	80	79	78	77	77	76	75	74	74
82	81	81	80	79	79	78	77	76	75	75
83	82	82	81	80	80	79	78	77	77	76
84	83	83	82	81	81	80	79	78	78	77
85	84	84	83	82	82	81	80	79	79	78
86	85	85	84	83	83	82	81	81	80	79
87	86	86	85	84	84	83	82	82	81	80
88	87	87	86	85	85	84	83	83	82	81
89	88	88	87	87	86	85	85	84	83	82
90	89	89	88	88	87	86	86	85	84	84
91	90	90	89	89	88	87	87	86	85	85
92	91	91	90	90	89	88	88	87	86	86
93	92	92	91	91	90	89	89	88	88	87
94	93	93	92	92	91	91	90	89	89	88
95	94	94	93	93	92	92	91	90	90	89
96	95	95	94	94	93	93	92	91	91	90
97	96	96	95	95	94	94	93	93	92	91
98	97	97	96	96	95	95	94	94	93	92
99	99	98	97	97	96	96	95	95	94	94
100	100	99	99	98	97	97	96	96	95	95
101	101	100	100	99	99	98	97	97	96	96
102	102	101	101	100	100	99	99	98	97	97
103	103	102	102	101	101	100	100	99	99	98
104	104	103	103	102	102	101	101	100	100	99
105	105	104	104	103	103	102	102	101	101	100
106	106	105	105	104	104	103	103	102	102	101
107	107	106	106	105	105	104	104	103	103	102
108	108	107	107	106	106	105	105	104	104	104
109	109	108	108	107	107	106	106	106	105	105
110	110	109	109	108	108	108	107	107	106	106
111	111	110	110	109	109	109	108	108	107	107
112	112	111	111	110	110	110	109	109	108	108
113	113	112	112	112	111	111	110	110	110	109
114	114	113	113	113	112	112	111	111	111	110
115	115	114	114	114	113	113	112	112	112	111
116	116	115	115	115	114	114	114	113	113	112
117	117	116	116	116	115	115	115	114	114	114
118	118	117	117	117	116	116	116	115	115	115
119	119	118	118	118	117	117	117	116	116	116
120	120	119	119	119	119	118	118	118	117	117

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	1	2	3	4	5	6	7	8	9	10
121	121	120	120	120	120	119	119	119	118	118
122	122	121	121	121	121	120	120	120	119	119
123	123	122	122	122	122	121	121	121	121	120
124	124	124	123	123	123	122	122	122	122	121
125	125	125	124	124	124	124	123	123	123	122
126	126	126	125	125	125	125	124	124	124	124
127	127	127	126	126	126	126	125	125	125	125
128	128	128	127	127	127	127	126	126	126	126
129	129	129	128	128	128	128	128	127	127	127
130	130	130	129	129	129	129	129	128	128	128
131	131	131	130	130	130	130	130	129	129	129
132	132	132	131	131	131	131	131	131	130	130
133	133	133	133	132	132	132	132	132	131	131
134	134	134	134	133	133	133	133	133	133	132
135	135	135	135	134	134	134	134	134	134	134
136	136	136	136	135	135	135	135	135	135	135
137	137	137	137	137	136	136	136	136	136	136
138	138	138	138	138	137	137	137	137	137	137
139	139	139	139	139	139	138	138	138	138	138
140	140	140	140	140	140	139	139	139	139	139
141	141	141	141	141	141	141	140	140	140	140
142	142	142	142	142	142	142	142	141	141	141
143	143	143	143	143	143	143	143	143	142	142
144	144	144	144	144	144	144	144	144	144	144
145	145	145	145	145	145	145	145	145	145	145
146	146	146	146	146	146	146	146	146	146	146
147	147	147	147	147	147	147	147	147	147	147
148	148	148	148	148	148	148	148	148	148	148
149	149	149	149	149	149	149	149	149	149	149
150	150	150	150	150	150	150	150	150	150	150
151	151	151	151	151	151	151	151	151	151	151
152	152	152	152	152	152	152	152	152	152	152
153	153	153	153	153	153	153	153	153	153	154
154	154	154	154	154	154	154	154	154	155	155
155	155	155	155	155	155	155	156	156	156	156
156	156	156	156	156	156	156	157	157	157	157
157	157	157	157	157	157	158	158	158	158	158
158	158	158	158	158	159	159	159	159	159	159
159	159	159	159	159	160	160	160	160	160	160
160	160	160	160	160	161	161	161	161	161	161

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
80	72	71	70	69	68	67	66	65	64	63
81	73	72	71	70	69	68	67	66	65	64
82	74	73	72	71	70	69	68	67	66	65
83	75	74	73	72	71	71	70	69	68	67
84	76	75	74	74	73	72	71	70	69	68
85	77	76	76	75	74	73	72	71	70	69
86	78	78	77	76	75	74	73	72	71	70
87	79	79	78	77	76	75	74	74	73	72
88	81	80	79	78	77	77	76	75	74	73
89	82	81	80	79	79	78	77	76	75	74
90	83	82	81	81	80	79	78	77	76	75
91	84	83	82	82	81	80	79	78	78	77
92	85	84	84	83	82	81	80	80	79	78
93	86	85	85	84	83	82	82	81	80	79
94	87	87	86	85	84	84	83	82	81	80
95	88	88	87	86	86	85	84	83	83	82
96	90	89	88	87	87	86	85	85	84	83
97	91	90	89	89	88	87	87	86	85	84
98	92	91	90	90	89	88	88	87	86	85
99	93	92	92	91	90	90	89	88	87	87
100	94	93	93	92	91	91	90	89	89	88
101	95	95	94	93	93	92	91	91	90	89
102	96	96	95	94	94	93	93	92	91	90
103	97	97	96	96	95	94	94	93	92	92
104	99	98	97	97	96	96	95	94	94	93
105	100	99	99	98	97	97	96	96	95	94
106	101	100	100	99	99	98	97	97	96	95
107	102	101	101	100	100	99	99	98	97	97
108	103	103	102	101	101	100	100	99	99	98
109	104	104	103	103	102	102	101	100	100	99
110	105	105	104	104	103	103	102	102	101	100
111	106	106	105	105	104	104	103	103	102	102
112	108	107	107	106	106	105	105	104	103	103
113	109	108	108	107	107	106	106	105	105	104
114	110	109	109	108	108	107	107	106	106	105
115	111	110	110	110	109	109	108	108	107	107
116	112	112	111	111	110	110	109	109	108	108
117	113	113	112	112	111	111	111	110	110	109
118	114	114	113	113	113	112	112	111	111	110
119	115	115	115	114	114	113	113	113	112	112
120	117	116	116	115	115	115	114	114	113	113

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	11	12	13	14	15	16	17	18	19	20
121	118	117	117	117	116	116	115	115	115	114
122	119	118	118	118	117	117	117	116	116	115
123	120	120	119	119	119	118	118	117	117	117
124	121	121	120	120	120	119	119	119	118	118
125	122	122	122	121	121	121	120	120	120	119
126	123	123	123	122	122	122	121	121	121	120
127	124	124	124	124	123	123	123	122	122	122
128	125	125	125	125	124	124	124	124	123	123
129	127	126	126	126	126	125	125	125	124	124
130	128	128	127	127	127	127	126	126	126	125
131	129	129	128	128	128	128	127	127	127	127
132	130	130	130	129	129	129	129	128	128	128
133	131	131	131	131	130	130	130	130	129	129
134	132	132	132	132	131	131	131	131	131	130
135	133	133	133	133	133	132	132	132	132	132
136	134	134	134	134	134	134	133	133	133	133
137	136	135	135	135	135	135	135	135	134	134
138	137	137	136	136	136	136	136	136	136	135
139	138	138	138	137	137	137	137	137	137	137
140	139	139	139	139	139	138	138	138	138	138
141	140	140	140	140	140	140	140	139	139	139
142	141	141	141	141	141	141	141	141	141	140
143	142	142	142	142	142	142	142	142	142	142
144	143	143	143	143	143	143	143	143	143	143
145	145	145	145	144	144	144	144	144	144	144
146	146	146	146	146	146	146	146	146	145	145
147	147	147	147	147	147	147	147	147	147	147
148	148	148	148	148	148	148	148	148	148	148
149	149	149	149	149	149	149	149	149	149	149
150	150	150	150	150	150	150	150	150	150	150
151	151	151	151	151	151	152	152	152	152	152
152	152	153	153	153	153	153	153	153	153	153
153	154	154	154	154	154	154	154	154	154	154
154	155	155	155	155	155	155	155	155	155	155
155	156	156	156	156	156	156	156	156	157	157
156	157	157	157	157	157	157	158	158	158	158
157	158	158	158	158	159	159	159	159	159	159
158	159	159	159	160	160	160	160	160	160	160
159	160	160	161	161	161	161	161	161	162	162
160	161	162	162	162	162	162	162	163	163	163

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	21	22	23	24	25	26	27	28	29	30
80	62	61	60	58	57	56	55	53	52	51
81	63	62	61	60	59	57	56	55	54	52
82	64	63	62	61	60	59	57	56	55	54
83	66	65	64	62	61	60	59	58	56	55
84	67	66	65	64	63	61	60	59	58	56
85	68	67	66	65	64	63	62	60	59	58
86	69	68	67	66	65	64	63	62	61	59
87	71	70	69	68	67	65	64	63	62	61
88	72	71	70	69	68	67	66	65	63	62
89	73	72	71	70	69	68	67	66	65	64
90	75	74	73	72	71	70	68	67	66	65
91	76	75	74	73	72	71	70	69	68	66
92	77	76	75	74	73	72	71	70	69	68
93	78	77	76	76	75	74	73	72	70	69
94	80	79	78	77	76	75	74	73	72	71
95	81	80	79	78	77	76	75	74	73	72
96	82	81	80	79	79	78	77	76	75	74
97	83	83	82	81	80	79	78	77	76	75
98	85	84	83	82	81	80	79	78	77	76
99	86	85	84	83	83	82	81	80	79	78
100	87	86	86	85	84	83	82	81	80	79
101	88	88	87	86	85	84	84	83	82	81
102	90	89	88	87	87	86	85	84	83	82
103	91	90	89	89	88	87	86	85	85	84
104	92	92	91	90	89	88	88	87	86	85
105	93	93	92	91	91	90	89	88	87	86
106	95	94	93	93	92	91	90	90	89	88
107	96	95	95	94	93	93	92	91	90	89
108	97	97	96	95	95	94	93	92	92	91
109	99	98	97	97	96	95	94	94	93	92
110	100	99	99	98	97	97	96	95	94	94
111	101	100	100	99	99	98	97	97	96	95
112	102	102	101	101	100	99	99	98	97	96
113	104	103	102	102	101	101	100	99	99	98
114	105	104	104	103	103	102	101	101	100	99
115	106	106	105	104	104	103	103	102	101	101
116	107	107	106	106	105	105	104	103	103	102
117	109	108	108	107	107	106	105	105	104	104
118	110	109	109	108	108	107	107	106	106	105
119	111	111	110	110	109	109	108	108	107	106
120	112	112	112	111	111	110	110	109	108	108

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	21	22	23	24	25	26	27	28	29	30
121	114	113	113	112	112	111	111	110	110	109
122	115	115	114	114	113	113	112	112	111	111
123	116	116	115	115	115	114	114	113	113	112
124	118	117	117	116	116	115	115	115	114	114
125	119	118	118	118	117	117	116	116	115	115
126	120	120	119	119	119	118	118	117	117	116
127	121	121	121	120	120	120	119	119	118	118
128	123	122	122	122	121	121	121	120	120	119
129	124	124	123	123	123	122	122	122	121	121
130	125	125	125	124	124	124	123	123	123	122
131	126	126	126	126	125	125	125	124	124	124
132	128	127	127	127	127	126	126	126	125	125
133	129	129	128	128	128	128	127	127	127	126
134	130	130	130	129	129	129	129	128	128	128
135	131	131	131	131	131	130	130	130	130	129
136	133	133	132	132	132	132	131	131	131	131
137	134	134	134	133	133	133	133	133	132	132
138	135	135	135	135	135	134	134	134	134	134
139	137	136	136	136	136	136	136	135	135	135
140	138	138	138	137	137	137	137	137	137	136
141	139	139	139	139	139	138	138	138	138	138
142	140	140	140	140	140	140	140	140	139	139
143	142	142	141	141	141	141	141	141	141	141
144	143	143	143	143	143	143	142	142	142	142
145	144	144	144	144	144	144	144	144	144	144
146	145	145	145	145	145	145	145	145	145	145
147	147	147	147	147	147	147	147	147	146	146
148	148	148	148	148	148	148	148	148	148	148
149	149	149	149	149	149	149	149	149	149	149
150	150	150	151	151	151	151	151	151	151	151
151	152	152	152	152	152	152	152	152	152	152
152	153	153	153	153	153	153	153	153	154	154
153	154	154	154	154	155	155	155	155	155	155
154	156	156	156	156	156	156	156	156	156	156
155	157	157	157	157	157	157	157	158	158	158
156	158	158	158	158	159	159	159	159	159	159
157	159	159	160	160	160	160	160	160	161	161
158	161	161	161	161	161	161	162	162	162	162
159	162	162	162	162	163	163	163	163	163	164
160	163	163	164	164	164	164	164	165	165	165

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
80	49	48	46	45	43	42	40	38	36	34
81	51	49	48	46	45	43	41	40	38	36
82	52	51	49	48	46	45	43	41	40	38
83	54	52	51	49	48	46	45	43	41	39
84	55	54	52	51	49	48	46	45	43	41
85	57	55	54	52	51	49	48	46	45	43
86	58	57	55	54	52	51	49	48	46	44
87	59	58	57	55	54	53	51	49	48	46
88	61	60	58	57	56	54	53	51	49	48
89	62	61	60	58	57	56	54	53	51	49
90	64	63	61	60	59	57	56	54	53	51
91	65	64	63	62	60	59	57	56	54	53
92	67	66	64	63	62	60	59	58	56	54
93	68	67	66	65	63	62	61	59	58	56
94	70	68	67	66	65	63	62	61	59	58
95	71	70	69	68	66	65	64	62	61	59
96	73	71	70	69	68	67	65	64	63	61
97	74	73	72	71	69	68	67	66	64	63
98	75	74	73	72	71	70	68	67	66	64
99	77	76	75	74	72	71	70	69	68	66
100	78	77	76	75	74	73	72	70	69	68
101	80	79	78	77	76	74	73	72	71	69
102	81	80	79	78	77	76	75	74	72	71
103	83	82	81	80	79	78	76	75	74	73
104	84	83	82	81	80	79	78	77	76	74
105	86	85	84	83	82	81	80	78	77	76
106	87	86	85	84	83	82	81	80	79	78
107	88	88	87	86	85	84	83	82	81	79
108	90	89	88	87	86	85	84	83	82	81
109	91	91	90	89	88	87	86	85	84	83
110	93	92	91	90	89	88	88	87	86	84
111	94	93	93	92	91	90	89	88	87	86
112	96	95	94	93	92	92	91	90	89	88
113	97	96	96	95	94	93	92	91	90	89
114	99	98	97	96	96	95	94	93	92	91
115	100	99	99	98	97	96	95	95	94	93
116	102	101	100	99	99	98	97	96	95	94
117	103	102	102	101	100	99	99	98	97	96
118	104	104	103	102	102	101	100	99	99	98
119	106	105	105	104	103	103	102	101	100	99
120	107	107	106	105	105	104	103	103	102	101

DENSITY OF -3/4 INCH MATERIAL WITH THE +3/4 INCH MATERIAL SPECIFIC GRAVITY OF **2.7**

PERCENT of + 3/4 MATERIAL

DD	31	32	33	34	35	36	37	38	39	40
121	109	108	108	107	106	106	105	104	104	103
122	110	110	109	108	108	107	107	106	105	104
123	112	111	111	110	109	109	108	108	107	106
124	113	113	112	112	111	110	110	109	108	108
125	115	114	114	113	112	112	111	111	110	109
126	116	116	115	115	114	113	113	112	112	111
127	117	117	117	116	116	115	115	114	113	113
128	119	118	118	118	117	117	116	116	115	114
129	120	120	120	119	119	118	118	117	117	116
130	122	121	121	121	120	120	119	119	118	118
131	123	123	122	122	122	121	121	120	120	119
132	125	124	124	124	123	123	122	122	122	121
133	126	126	125	125	125	124	124	124	123	123
134	128	127	127	127	126	126	126	125	125	124
135	129	129	128	128	128	128	127	127	127	126
136	130	130	130	130	129	129	129	128	128	128
137	132	132	131	131	131	131	130	130	130	129
138	133	133	133	133	132	132	132	132	131	131
139	135	135	134	134	134	134	134	133	133	133
140	136	136	136	136	136	135	135	135	135	134
141	138	138	137	137	137	137	137	137	136	136
142	139	139	139	139	139	138	138	138	138	138
143	141	141	140	140	140	140	140	140	140	139
144	142	142	142	142	142	142	141	141	141	141
145	144	143	143	143	143	143	143	143	143	143
146	145	145	145	145	145	145	145	145	145	144
147	146	146	146	146	146	146	146	146	146	146
148	148	148	148	148	148	148	148	148	148	148
149	149	149	149	149	149	149	149	149	149	149
150	151	151	151	151	151	151	151	151	151	151
151	152	152	152	152	152	153	153	153	153	153
152	154	154	154	154	154	154	154	154	154	154
153	155	155	155	155	156	156	156	156	156	156
154	157	157	157	157	157	157	157	158	158	158
155	158	158	158	158	159	159	159	159	159	159
156	159	160	160	160	160	160	161	161	161	161
157	161	161	161	162	162	162	162	162	163	163
158	162	163	163	163	163	163	164	164	164	164
159	164	164	164	165	165	165	165	166	166	166
160	165	166	166	166	166	167	167	167	168	168

TABLES FOR CONVERTING

TOTAL DRY DENSITY TO DENSITY

OF THE -19 MM MATERIAL

INSTRUCTIONS FOR USING THE TABLES

To use the tables, locate in the index the page number corresponding to the specific gravity (CH), the total dry density (DA), and the percent of +19 mm material (CG). Turn to the selected page and locate the total dry density in the left column and read across the page to the column corresponding to the percent of +19 mm material. The percents of +19 mm material are listed across the top of the page. The value at the intersection is the dry density of the -19 mm material (DB).

EXAMPLE:

Given: Specific Gravity = 2.5
Percent of +19 mm material = 29
Total Dry Density = 1 970 kg/m^3

Turn to the index with the values and select Page 20. Next, turn to Page 20 and notice that a specific gravity of 2.5 is listed at the top of the page. Read down the left column and locate 1 970 kg/m^3. Then read across the page to the column corresponding to 29%. The value of 1 880 kg/m^3 at the intersection is the dry density of the -19 mm material.

INDEX

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1280		1270	1260	1250	1250	1240	1230	1220	1210	1200	1190
1290		1280	1270	1260	1260	1250	1240	1230	1220	1210	1200
1300		1290	1280	1270	1270	1260	1250	1240	1230	1220	1210
1310		1300	1290	1290	1280	1270	1260	1250	1240	1230	1220
1320		1310	1300	1300	1290	1280	1270	1260	1250	1240	1230
1330		1320	1310	1310	1300	1290	1280	1270	1260	1250	1240
1340		1330	1320	1320	1310	1300	1290	1280	1270	1260	1250
1350		1340	1330	1330	1320	1310	1300	1290	1280	1270	1270
1360		1350	1340	1340	1330	1320	1310	1300	1290	1290	1280
1370		1360	1350	1350	1340	1330	1320	1310	1310	1300	1290
1380		1370	1370	1360	1350	1340	1330	1320	1320	1310	1300
1390		1380	1380	1370	1360	1350	1340	1340	1330	1320	1310
1400		1390	1390	1380	1370	1360	1350	1350	1340	1330	1320
1410		1400	1400	1390	1380	1370	1370	1360	1350	1340	1330
1420		1410	1410	1400	1390	1380	1380	1370	1360	1350	1340
1430		1420	1420	1410	1400	1390	1390	1380	1370	1360	1350
1440		1430	1430	1420	1410	1400	1400	1390	1380	1370	1370
1450		1440	1440	1430	1420	1420	1410	1400	1390	1380	1380
1460		1450	1450	1440	1430	1430	1420	1410	1400	1400	1390
1470		1460	1460	1450	1440	1440	1430	1420	1410	1410	1400
1480		1470	1470	1460	1450	1450	1440	1430	1430	1420	1410
1490		1480	1480	1470	1460	1460	1450	1440	1440	1430	1420
1500		1490	1490	1480	1470	1470	1460	1450	1450	1440	1430
1510		1500	1500	1490	1480	1480	1470	1460	1460	1450	1440
1520		1510	1510	1500	1500	1490	1480	1480	1470	1460	1450
1530		1520	1520	1510	1510	1500	1490	1490	1480	1470	1470
1540		1530	1530	1520	1520	1510	1500	1500	1490	1480	1480
1550		1540	1540	1530	1530	1520	1510	1510	1500	1490	1490
1560		1550	1550	1540	1540	1530	1520	1520	1510	1510	1500
1570		1560	1560	1550	1550	1540	1540	1530	1520	1520	1510
1580		1570	1570	1560	1560	1550	1550	1540	1530	1530	1520
1590		1580	1580	1570	1570	1560	1560	1550	1540	1540	1530
1600		1590	1590	1580	1580	1570	1570	1560	1560	1550	1540
1610		1600	1600	1590	1590	1580	1580	1570	1570	1560	1550
1620		1620	1610	1600	1600	1590	1590	1580	1580	1570	1570
1630		1630	1620	1620	1610	1600	1600	1590	1590	1580	1580
1640		1640	1630	1630	1620	1620	1610	1600	1600	1590	1590
1650		1650	1640	1640	1630	1630	1620	1620	1610	1600	1600
1660		1660	1650	1650	1640	1640	1630	1630	1620	1620	1610
1670		1670	1660	1660	1650	1650	1640	1640	1630	1630	1620
1680		1680	1670	1670	1660	1660	1650	1650	1640	1640	1630
1690		1690	1680	1680	1670	1670	1660	1660	1650	1650	1640
1700		1700	1690	1690	1680	1680	1670	1670	1660	1660	1650

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1710	1710	1700	1700	1690	1690	1680	1680	1680	1670	1670
1720	1720	1710	1710	1700	1700	1690	1690	1690	1680	1680
1730	1730	1720	1720	1710	1710	1710	1700	1700	1690	1690
1740	1740	1730	1730	1720	1720	1720	1710	1710	1700	1700
1750	1750	1740	1740	1730	1730	1730	1720	1720	1710	1710
1760	1760	1750	1750	1750	1740	1740	1730	1730	1730	1720
1770	1770	1760	1760	1760	1750	1750	1740	1740	1740	1730
1780	1780	1770	1770	1770	1760	1760	1760	1750	1750	1740
1790	1790	1780	1780	1780	1770	1770	1770	1760	1760	1750
1800	1800	1790	1790	1790	1780	1780	1780	1770	1770	1770
1810	1810	1800	1800	1800	1790	1790	1790	1780	1780	1780
1820	1820	1810	1810	1810	1800	1800	1800	1790	1790	1790
1830	1830	1820	1820	1820	1820	1810	1810	1810	1800	1800
1840	1840	1830	1830	1830	1830	1820	1820	1820	1810	1810
1850	1850	1840	1840	1840	1840	1830	1830	1830	1820	1820
1860	1860	1850	1850	1850	1850	1840	1840	1840	1840	1830
1870	1870	1870	1860	1860	1860	1850	1850	1850	1850	1840
1880	1880	1880	1870	1870	1870	1870	1860	1860	1860	1850
1890	1890	1890	1880	1880	1880	1880	1870	1870	1870	1870
1900	1900	1900	1890	1890	1890	1890	1880	1880	1880	1880
1910	1910	1910	1900	1900	1900	1900	1890	1890	1890	1890
1920	1920	1920	1910	1910	1910	1910	1910	1900	1900	1900
1930	1930	1930	1920	1920	1920	1920	1920	1910	1910	1910
1940	1940	1940	1930	1930	1930	1930	1930	1930	1920	1920
1950	1950	1950	1940	1940	1940	1940	1940	1940	1930	1930
1960	1960	1960	1960	1950	1950	1950	1950	1950	1940	1940
1970	1970	1970	1970	1960	1960	1960	1960	1960	1960	1950
1980	1980	1980	1980	1970	1970	1970	1970	1970	1970	1970
1990	1990	1990	1990	1980	1980	1980	1980	1980	1980	1980
2000	2000	2000	2000	2000	1990	1990	1990	1990	1990	1990
2010	2010	2010	2010	2010	2000	2000	2000	2000	2000	2000
2020	2020	2020	2020	2020	2020	2010	2010	2010	2010	2010
2030	2030	2030	2030	2030	2030	2020	2020	2020	2020	2020
2040	2040	2040	2040	2040	2040	2040	2030	2030	2030	2030
2050	2050	2050	2050	2050	2050	2050	2050	2040	2040	2040
2060	2060	2060	2060	2060	2060	2060	2060	2060	2050	2050
2070	2070	2070	2070	2070	2070	2070	2070	2070	2070	2070
2080	2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
2090	2090	2090	2090	2090	2090	2090	2090	2090	2090	2090
2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
2110	2110	2110	2110	2110	2110	2110	2110	2110	2110	2110
2120	2120	2120	2120	2120	2120	2120	2120	2120	2120	2120
2130	2130	2130	2130	2130	2130	2130	2130	2130	2130	2130

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
2140	2140	2140	2140	2140	2140	2140	2140	2140	2140	2140	2140
2150	2150	2150	2150	2150	2150	2150	2150	2150	2150	2150	2150
2160	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160	2170
2170	2170	2170	2170	2170	2170	2170	2170	2170	2180	2180	2180
2180	2180	2180	2180	2180	2180	2180	2180	2190	2190	2190	2190
2190	2190	2190	2190	2190	2190	2190	2190	2200	2200	2200	2200
2200	2200	2200	2200	2200	2200	2200	2210	2210	2210	2210	2210
2210	2210	2210	2210	2210	2220	2220	2220	2220	2220	2220	2220
2220	2220	2220	2220	2220	2230	2230	2230	2230	2230	2230	2230
2230	2230	2230	2230	2230	2240	2240	2240	2240	2240	2240	2240
2240	2240	2240	2240	2250	2250	2250	2250	2250	2250	2250	2250
2250	2250	2250	2250	2260	2260	2260	2260	2260	2260	2270	2270
2260	2260	2260	2260	2270	2270	2270	2270	2270	2270	2280	2280
2270	2270	2270	2270	2280	2280	2280	2280	2280	2290	2290	2290
2280	2280	2280	2290	2290	2290	2290	2290	2290	2300	2300	2300
2290	2290	2290	2300	2300	2300	2300	2300	2310	2310	2310	2310
2300	2300	2300	2310	2310	2310	2310	2310	2320	2320	2320	2320
2310	2310	2310	2320	2320	2320	2320	2320	2330	2330	2330	2330
2320	2320	2320	2330	2330	2330	2330	2340	2340	2340	2340	2340
2330	2330	2330	2340	2340	2340	2340	2350	2350	2350	2350	2350
2340	2340	2340	2350	2350	2350	2350	2360	2360	2360	2370	2370
2350	2350	2350	2360	2360	2360	2370	2370	2370	2370	2380	2380
2360	2360	2370	2370	2370	2370	2380	2380	2380	2380	2390	2390
2370	2370	2380	2380	2380	2380	2390	2390	2390	2400	2400	2400
2380	2380	2390	2390	2390	2390	2400	2400	2400	2410	2410	2410
2390	2390	2400	2400	2400	2400	2410	2410	2410	2420	2420	2420
2400	2400	2410	2410	2410	2420	2420	2420	2430	2430	2430	2430
2410	2410	2420	2420	2420	2430	2430	2430	2440	2440	2440	2440
2420	2420	2430	2430	2430	2440	2440	2440	2450	2450	2450	2450
2430	2430	2440	2440	2440	2450	2450	2450	2460	2460	2470	2470
2440	2440	2450	2450	2450	2460	2460	2460	2470	2470	2480	2480
2450	2450	2460	2460	2460	2470	2470	2480	2480	2480	2490	2490
2460	2460	2470	2470	2470	2480	2480	2490	2490	2490	2500	2500
2470	2470	2480	2480	2480	2490	2490	2500	2500	2510	2510	2510
2480	2480	2490	2490	2500	2500	2500	2510	2510	2520	2520	2520
2490	2490	2500	2500	2510	2510	2510	2520	2520	2530	2530	2530
2500	2500	2510	2510	2520	2520	2520	2530	2530	2540	2540	2540
2510	2510	2520	2520	2530	2530	2540	2540	2540	2550	2550	2550
2520	2520	2530	2530	2540	2540	2550	2550	2560	2560	2570	2570
2530	2530	2540	2540	2550	2550	2560	2560	2570	2570	2580	2580
2540	2540	2550	2550	2560	2560	2570	2570	2580	2580	2590	2590
2550	2550	2560	2560	2570	2570	2580	2580	2590	2590	2600	2600
2560	2560	2570	2570	2580	2580	2590	2590	2600	2600	2610	2610

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1280		1180	1170	1160	1140	1130	1120	1110	1100	1080	1070
1290		1190	1180	1170	1160	1140	1130	1120	1110	1100	1080
1300		1200	1190	1180	1170	1160	1150	1130	1120	1110	1100
1310		1210	1200	1190	1180	1170	1160	1150	1130	1120	1110
1320		1220	1210	1200	1190	1180	1170	1160	1150	1130	1120
1330		1230	1220	1210	1200	1190	1180	1170	1160	1150	1130
1340		1240	1230	1220	1210	1200	1190	1180	1170	1160	1150
1350		1260	1250	1240	1230	1220	1200	1190	1180	1170	1160
1360		1270	1260	1250	1240	1230	1220	1210	1190	1180	1170
1370		1280	1270	1260	1250	1240	1230	1220	1210	1200	1180
1380		1290	1280	1270	1260	1250	1240	1230	1220	1210	1200
1390		1300	1290	1280	1270	1260	1250	1240	1230	1220	1210
1400		1310	1300	1290	1280	1270	1260	1250	1240	1230	1220
1410		1320	1310	1310	1300	1290	1280	1270	1260	1250	1230
1420		1330	1330	1320	1310	1300	1290	1280	1270	1260	1250
1430		1350	1340	1330	1320	1310	1300	1290	1280	1270	1260
1440		1360	1350	1340	1330	1320	1310	1300	1290	1280	1270
1450		1370	1360	1350	1340	1330	1320	1310	1300	1290	1280
1460		1380	1370	1360	1350	1340	1340	1330	1320	1310	1300
1470		1390	1380	1370	1370	1360	1350	1340	1330	1320	1310
1480		1400	1390	1390	1380	1370	1360	1350	1340	1330	1320
1490		1410	1410	1400	1390	1380	1370	1360	1350	1340	1330
1500		1420	1420	1410	1400	1390	1380	1370	1370	1360	1350
1510		1440	1430	1420	1410	1400	1400	1390	1380	1370	1360
1520		1450	1440	1430	1420	1420	1410	1400	1390	1380	1370
1530		1460	1450	1440	1440	1430	1420	1410	1400	1390	1380
1540		1470	1460	1450	1450	1440	1430	1420	1410	1410	1400
1550		1480	1470	1470	1460	1450	1440	1430	1430	1420	1410
1560		1490	1480	1480	1470	1460	1450	1450	1440	1430	1420
1570		1500	1500	1490	1480	1470	1470	1460	1450	1440	1430
1580		1510	1510	1500	1490	1490	1480	1470	1460	1460	1450
1590		1530	1520	1510	1510	1500	1490	1480	1480	1470	1460
1600		1540	1530	1520	1520	1510	1500	1500	1490	1480	1470
1610		1550	1540	1530	1530	1520	1510	1510	1500	1490	1480
1620		1560	1550	1550	1540	1530	1530	1520	1510	1500	1500
1630		1570	1560	1560	1550	1540	1540	1530	1520	1520	1510
1640		1580	1580	1570	1560	1560	1550	1540	1540	1530	1520
1650		1590	1590	1580	1570	1570	1560	1560	1550	1540	1530
1660		1600	1600	1590	1590	1580	1570	1570	1560	1550	1550
1670		1620	1610	1600	1600	1590	1590	1580	1570	1570	1560
1680		1630	1620	1620	1610	1600	1600	1590	1590	1580	1570
1690		1640	1630	1630	1620	1620	1610	1600	1600	1590	1580
1700		1650	1640	1640	1630	1630	1620	1620	1610	1600	1600

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1710		1660	1660	1650	1640	1640	1630	1630	1620	1620	1610
1720		1670	1670	1660	1660	1650	1650	1640	1630	1630	1620
1730		1680	1680	1670	1670	1660	1660	1650	1650	1640	1630
1740		1690	1690	1680	1680	1670	1670	1660	1660	1650	1650
1750		1710	1700	1700	1690	1690	1680	1680	1670	1670	1660
1760		1720	1710	1710	1700	1700	1690	1690	1680	1680	1670
1770		1730	1720	1720	1710	1710	1700	1700	1690	1690	1680
1780		1740	1730	1730	1730	1720	1720	1710	1710	1700	1700
1790		1750	1750	1740	1740	1730	1730	1720	1720	1710	1710
1800		1760	1760	1750	1750	1740	1740	1740	1730	1730	1720
1810		1770	1770	1760	1760	1760	1750	1750	1740	1740	1730
1820		1780	1780	1780	1770	1770	1760	1760	1760	1750	1750
1830		1800	1790	1790	1780	1780	1780	1770	1770	1760	1760
1840		1810	1800	1800	1800	1790	1790	1780	1780	1780	1770
1850		1820	1810	1810	1810	1800	1800	1800	1790	1790	1780
1860		1830	1830	1820	1820	1820	1810	1810	1800	1800	1800
1870		1840	1840	1830	1830	1830	1820	1820	1820	1810	1810
1880		1850	1850	1850	1840	1840	1840	1830	1830	1830	1820
1890		1860	1860	1860	1850	1850	1850	1840	1840	1840	1830
1900		1870	1870	1870	1870	1860	1860	1860	1850	1850	1850
1910		1890	1880	1880	1880	1870	1870	1870	1870	1860	1860
1920		1900	1890	1890	1890	1890	1880	1880	1880	1870	1870
1930		1910	1910	1900	1900	1900	1900	1890	1890	1890	1880
1940		1920	1920	1910	1910	1910	1910	1900	1900	1900	1900
1950		1930	1930	1930	1920	1920	1920	1920	1910	1910	1910
1960		1940	1940	1940	1940	1930	1930	1930	1930	1920	1920
1970		1950	1950	1950	1950	1940	1940	1940	1940	1940	1930
1980		1960	1960	1960	1960	1960	1950	1950	1950	1950	1950
1990		1970	1970	1970	1970	1970	1970	1970	1960	1960	1960
2000		1990	1980	1980	1980	1980	1980	1980	1980	1970	1970
2010		2000	2000	1990	1990	1990	1990	1990	1990	1990	1980
2020		2010	2010	2010	2010	2000	2000	2000	2000	2000	2000
2030		2020	2020	2020	2020	2020	2010	2010	2010	2010	2010
2040		2030	2030	2030	2030	2030	2030	2030	2020	2020	2020
2050		2040	2040	2040	2040	2040	2040	2040	2040	2040	2030
2060		2050	2050	2050	2050	2050	2050	2050	2050	2050	2050
2070		2060	2060	2060	2060	2060	2060	2060	2060	2060	2060
2080		2080	2080	2080	2070	2070	2070	2070	2070	2070	2070
2090		2090	2090	2090	2090	2090	2090	2090	2090	2080	2080
2100		2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
2110		2110	2110	2110	2110	2110	2110	2110	2110	2110	2110
2120		2120	2120	2120	2120	2120	2120	2120	2120	2120	2120
2130		2130	2130	2130	2130	2130	2130	2130	2130	2130	2130

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
2140		2140	2140	2140	2140	2140	2150	2150	2150	2150	2150
2150		2150	2160	2160	2160	2160	2160	2160	2160	2160	2160
2160		2170	2170	2170	2170	2170	2170	2170	2170	2170	2170
2170		2180	2180	2180	2180	2180	2180	2180	2180	2180	2180
2180		2190	2190	2190	2190	2190	2190	2190	2190	2200	2200
2190		2200	2200	2200	2200	2200	2200	2210	2210	2210	2210
2200		2210	2210	2210	2210	2220	2220	2220	2220	2220	2220
2210		2220	2220	2220	2230	2230	2230	2230	2230	2230	2230
2220		2230	2230	2240	2240	2240	2240	2240	2240	2250	2250
2230		2240	2250	2250	2250	2250	2250	2250	2260	2260	2260
2240		2260	2260	2260	2260	2260	2260	2270	2270	2270	2270
2250		2270	2270	2270	2270	2270	2280	2280	2280	2280	2280
2260		2280	2280	2280	2280	2290	2290	2290	2290	2290	2300
2270		2290	2290	2290	2300	2300	2300	2300	2300	2310	2310
2280		2300	2300	2310	2310	2310	2310	2310	2320	2320	2320
2290		2310	2310	2320	2320	2320	2320	2330	2330	2330	2330
2300		2320	2330	2330	2330	2330	2340	2340	2340	2340	2350
2310		2330	2340	2340	2340	2340	2350	2350	2350	2360	2360
2320		2350	2350	2350	2350	2360	2360	2360	2370	2370	2370
2330		2360	2360	2360	2370	2370	2370	2370	2380	2380	2380
2340		2370	2370	2370	2380	2380	2380	2390	2390	2390	2400
2350		2380	2380	2390	2390	2390	2400	2400	2400	2410	2410
2360		2390	2390	2400	2400	2400	2410	2410	2410	2420	2420
2370		2400	2410	2410	2410	2420	2420	2420	2430	2430	2430
2380		2410	2420	2420	2420	2430	2430	2430	2440	2440	2450
2390		2420	2430	2430	2440	2440	2440	2450	2450	2460	2460
2400		2440	2440	2440	2450	2450	2450	2460	2460	2470	2470
2410		2450	2450	2450	2460	2460	2470	2470	2480	2480	2480
2420		2460	2460	2470	2470	2470	2480	2480	2490	2490	2500
2430		2470	2470	2480	2480	2490	2490	2500	2500	2500	2510
2440		2480	2480	2490	2490	2500	2500	2510	2510	2520	2520
2450		2490	2500	2500	2510	2510	2510	2520	2520	2530	2530
2460		2500	2510	2510	2520	2520	2530	2530	2540	2540	2550
2470		2510	2520	2520	2530	2530	2540	2540	2550	2550	2560
2480		2530	2530	2530	2540	2540	2550	2560	2560	2570	2570
2490		2540	2540	2550	2550	2560	2560	2570	2570	2580	2580
2500		2550	2550	2560	2560	2570	2570	2580	2590	2590	2600
2510		2560	2560	2570	2570	2580	2590	2590	2600	2600	2610
2520		2570	2580	2580	2590	2590	2600	2600	2610	2620	2620
2530		2580	2590	2590	2600	2600	2610	2620	2620	2630	2630
2540		2590	2600	2600	2610	2620	2620	2630	2630	2640	2650
2550		2600	2610	2620	2620	2630	2630	2640	2650	2650	2660
2560		2620	2620	2630	2630	2640	2650	2650	2660	2670	2670

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1280		1060	1050	1030	1020	1000	990	970	960	940	920
1290		1070	1060	1040	1030	1020	1000	990	970	950	940
1300		1080	1070	1060	1040	1030	1010	1000	980	970	950
1310		1100	1080	1070	1060	1040	1030	1010	1000	980	970
1320		1110	1100	1080	1070	1060	1040	1030	1010	1000	980
1330		1120	1110	1100	1080	1070	1060	1040	1030	1010	990
1340		1130	1120	1110	1100	1080	1070	1050	1040	1020	1010
1350		1150	1140	1120	1110	1100	1080	1070	1050	1040	1020
1360		1160	1150	1140	1120	1110	1100	1080	1070	1050	1040
1370		1170	1160	1150	1140	1120	1110	1100	1080	1070	1050
1380		1190	1170	1160	1150	1140	1120	1110	1100	1080	1070
1390		1200	1190	1170	1160	1150	1140	1120	1110	1100	1080
1400		1210	1200	1190	1180	1160	1150	1140	1120	1110	1090
1410		1220	1210	1200	1190	1180	1160	1150	1140	1120	1110
1420		1240	1220	1210	1200	1190	1180	1160	1150	1140	1120
1430		1250	1240	1230	1210	1200	1190	1180	1160	1150	1140
1440		1260	1250	1240	1230	1220	1200	1190	1180	1170	1150
1450		1270	1260	1250	1240	1230	1220	1210	1190	1180	1170
1460		1290	1280	1270	1250	1240	1230	1220	1210	1190	1180
1470		1300	1290	1280	1270	1260	1240	1230	1220	1210	1190
1480		1310	1300	1290	1280	1270	1260	1250	1230	1220	1210
1490		1320	1310	1300	1290	1280	1270	1260	1250	1240	1220
1500		1340	1330	1320	1310	1300	1280	1270	1260	1250	1240
1510		1350	1340	1330	1320	1310	1300	1290	1280	1260	1250
1520		1360	1350	1340	1330	1320	1310	1300	1290	1280	1270
1530		1380	1370	1360	1350	1340	1330	1310	1300	1290	1280
1540		1390	1380	1370	1360	1350	1340	1330	1320	1310	1290
1550		1400	1390	1380	1370	1360	1350	1340	1330	1320	1310
1560		1410	1400	1400	1390	1380	1370	1360	1350	1330	1320
1570		1430	1420	1410	1400	1390	1380	1370	1360	1350	1340
1580		1440	1430	1420	1410	1400	1390	1380	1370	1360	1350
1590		1450	1440	1430	1430	1420	1410	1400	1390	1380	1370
1600		1460	1460	1450	1440	1430	1420	1410	1400	1390	1380
1610		1480	1470	1460	1450	1440	1430	1420	1410	1400	1390
1620		1490	1480	1470	1460	1460	1450	1440	1430	1420	1410
1630		1500	1490	1490	1480	1470	1460	1450	1440	1430	1420
1640		1510	1510	1500	1490	1480	1470	1470	1460	1450	1440
1650		1530	1520	1510	1500	1500	1490	1480	1470	1460	1450
1660		1540	1530	1520	1520	1510	1500	1490	1480	1480	1470
1670		1550	1550	1540	1530	1520	1510	1510	1500	1490	1480
1680		1570	1560	1550	1540	1540	1530	1520	1510	1500	1490
1690		1580	1570	1560	1560	1550	1540	1530	1530	1520	1510
1700		1590	1580	1580	1570	1560	1560	1550	1540	1530	1520

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1710		1600	1600	1590	1580	1580	1570	1560	1550	1550	1540
1720		1620	1610	1600	1600	1590	1580	1580	1570	1560	1550
1730		1630	1620	1620	1610	1600	1600	1590	1580	1570	1570
1740		1640	1640	1630	1620	1620	1610	1600	1600	1590	1580
1750		1650	1650	1640	1640	1630	1620	1620	1610	1600	1590
1760		1670	1660	1650	1650	1640	1640	1630	1620	1620	1610
1770		1680	1670	1670	1660	1660	1650	1640	1640	1630	1620
1780		1690	1690	1680	1680	1670	1660	1660	1650	1640	1640
1790		1700	1700	1690	1690	1680	1680	1670	1660	1660	1650
1800		1720	1710	1710	1700	1700	1690	1680	1680	1670	1670
1810		1730	1720	1720	1710	1710	1700	1700	1690	1690	1680
1820		1740	1740	1730	1730	1720	1720	1710	1710	1700	1690
1830		1760	1750	1750	1740	1740	1730	1730	1720	1710	1710
1840		1770	1760	1760	1750	1750	1740	1740	1730	1730	1720
1850		1780	1780	1770	1770	1760	1760	1750	1750	1740	1740
1860		1790	1790	1780	1780	1780	1770	1770	1760	1760	1750
1870		1810	1800	1800	1790	1790	1780	1780	1780	1770	1770
1880		1820	1810	1810	1810	1800	1800	1790	1790	1790	1780
1890		1830	1830	1820	1820	1820	1810	1810	1800	1800	1790
1900		1840	1840	1840	1830	1830	1830	1820	1820	1810	1810
1910		1860	1850	1850	1850	1840	1840	1840	1830	1830	1820
1920		1870	1870	1860	1860	1860	1850	1850	1850	1840	1840
1930		1880	1880	1880	1870	1870	1870	1860	1860	1860	1850
1940		1890	1890	1890	1890	1880	1880	1880	1870	1870	1870
1950		1910	1900	1900	1900	1900	1890	1890	1890	1880	1880
1960		1920	1920	1910	1910	1910	1910	1900	1900	1900	1890
1970		1930	1930	1930	1930	1920	1920	1920	1910	1910	1910
1980		1940	1940	1940	1940	1940	1930	1930	1930	1930	1920
1990		1960	1960	1950	1950	1950	1950	1940	1940	1940	1940
2000		1970	1970	1970	1960	1960	1960	1960	1960	1950	1950
2010		1980	1980	1980	1980	1980	1970	1970	1970	1970	1970
2020		2000	1990	1990	1990	1990	1990	1990	1980	1980	1980
2030		2010	2010	2010	2000	2000	2000	2000	2000	2000	1990
2040		2020	2020	2020	2020	2020	2010	2010	2010	2010	2010
2050		2030	2030	2030	2030	2030	2030	2030	2030	2020	2020
2060		2050	2050	2040	2040	2040	2040	2040	2040	2040	2040
2070		2060	2060	2060	2060	2060	2060	2050	2050	2050	2050
2080		2070	2070	2070	2070	2070	2070	2070	2070	2070	2070
2090		2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
2100		2100	2100	2100	2100	2100	2100	2100	2100	2100	2090
2110		2110	2110	2110	2110	2110	2110	2110	2110	2110	2110
2120		2120	2120	2120	2120	2120	2120	2120	2120	2120	2120
2130		2130	2140	2140	2140	2140	2140	2140	2140	2140	2140

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
2140		2150	2150	2150	2150	2150	2150	2150	2150	2150	2150
2150		2160	2160	2160	2160	2160	2160	2160	2160	2170	2170
2160		2170	2170	2170	2180	2180	2180	2180	2180	2180	2180
2170		2190	2190	2190	2190	2190	2190	2190	2190	2190	2190
2180		2200	2200	2200	2200	2200	2200	2210	2210	2210	2210
2190		2210	2210	2210	2210	2220	2220	2220	2220	2220	2220
2200		2220	2220	2230	2230	2230	2230	2230	2230	2240	2240
2210		2240	2240	2240	2240	2240	2240	2250	2250	2250	2250
2220		2250	2250	2250	2250	2260	2260	2260	2260	2260	2270
2230		2260	2260	2270	2270	2270	2270	2270	2280	2280	2280
2240		2270	2280	2280	2280	2280	2280	2290	2290	2290	2290
2250		2290	2290	2290	2290	2300	2300	2300	2300	2310	2310
2260		2300	2300	2300	2310	2310	2310	2310	2320	2320	2320
2270		2310	2310	2320	2320	2320	2330	2330	2330	2330	2340
2280		2320	2330	2330	2330	2340	2340	2340	2350	2350	2350
2290		2340	2340	2340	2350	2350	2350	2360	2360	2360	2370
2300		2350	2350	2360	2360	2360	2370	2370	2370	2380	2380
2310		2360	2370	2370	2370	2380	2380	2380	2390	2390	2390
2320		2380	2380	2380	2390	2390	2390	2400	2400	2400	2410
2330		2390	2390	2400	2400	2400	2410	2410	2410	2420	2420
2340		2400	2400	2410	2410	2420	2420	2420	2430	2430	2440
2350		2410	2420	2420	2430	2430	2430	2440	2440	2450	2450
2360		2430	2430	2430	2440	2440	2450	2450	2460	2460	2470
2370		2440	2440	2450	2450	2460	2460	2470	2470	2480	2480
2380		2450	2460	2460	2460	2470	2470	2480	2480	2490	2490
2390		2460	2470	2470	2480	2480	2490	2490	2500	2500	2510
2400		2480	2480	2490	2490	2500	2500	2510	2510	2520	2520
2410		2490	2490	2500	2500	2510	2510	2520	2530	2530	2540
2420		2500	2510	2510	2520	2520	2530	2530	2540	2550	2550
2430		2510	2520	2520	2530	2540	2540	2550	2550	2560	2570
2440		2530	2530	2540	2540	2550	2560	2560	2570	2570	2580
2450		2540	2550	2550	2560	2560	2570	2580	2580	2590	2590
2460		2550	2560	2560	2570	2580	2580	2590	2600	2600	2610
2470		2570	2570	2580	2580	2590	2600	2600	2610	2620	2620
2480		2580	2580	2590	2600	2600	2610	2620	2620	2630	2640
2490		2590	2600	2600	2610	2620	2620	2630	2640	2640	2650
2500		2600	2610	2620	2620	2630	2640	2640	2650	2660	2670
2510		2620	2620	2630	2640	2640	2650	2660	2660	2670	2680
2520		2630	2640	2640	2650	2660	2660	2670	2680	2690	2690
2530		2640	2650	2650	2660	2670	2680	2680	2690	2700	2710
2540		2650	2660	2670	2680	2680	2690	2700	2710	2710	2720
2550		2670	2670	2680	2690	2700	2700	2710	2720	2730	2740
2560		2680	2690	2690	2700	2710	2720	2730	2730	2740	2750

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1280		910	890	870	850	830	810	790	770	750	730
1290		920	900	890	870	850	830	810	790	760	740
1300		940	920	900	880	860	840	820	800	780	760
1310		950	930	910	900	880	860	840	820	800	780
1320		960	950	930	910	890	870	850	830	810	790
1330		980	960	940	930	910	890	870	850	830	810
1340		990	980	960	940	920	910	890	870	850	830
1350		1010	990	970	960	940	920	900	880	860	840
1360		1020	1010	990	970	960	940	920	900	880	860
1370		1040	1020	1000	990	970	950	930	920	900	880
1380		1050	1040	1020	1000	990	970	950	930	910	890
1390		1070	1050	1030	1020	1000	980	970	950	930	910
1400		1080	1060	1050	1030	1020	1000	980	960	940	930
1410		1090	1080	1060	1050	1030	1020	1000	980	960	940
1420		1110	1090	1080	1060	1050	1030	1010	1000	980	960
1430		1120	1110	1090	1080	1060	1050	1030	1010	990	980
1440		1140	1120	1110	1090	1080	1060	1050	1030	1010	990
1450		1150	1140	1120	1110	1090	1080	1060	1040	1030	1010
1460		1170	1150	1140	1120	1110	1090	1080	1060	1040	1030
1470		1180	1170	1150	1140	1120	1110	1090	1080	1060	1040
1480		1200	1180	1170	1150	1140	1120	1110	1090	1080	1060
1490		1210	1200	1180	1170	1160	1140	1120	1110	1090	1080
1500		1230	1210	1200	1180	1170	1160	1140	1120	1110	1090
1510		1240	1230	1210	1200	1190	1170	1160	1140	1130	1110
1520		1250	1240	1230	1220	1200	1190	1170	1160	1140	1130
1530		1270	1260	1240	1230	1220	1200	1190	1170	1160	1140
1540		1280	1270	1260	1250	1230	1220	1200	1190	1170	1160
1550		1300	1290	1270	1260	1250	1230	1220	1210	1190	1180
1560		1310	1300	1290	1280	1260	1250	1240	1220	1210	1190
1570		1330	1310	1300	1290	1280	1270	1250	1240	1220	1210
1580		1340	1330	1320	1310	1290	1280	1270	1250	1240	1230
1590		1360	1340	1330	1320	1310	1300	1280	1270	1260	1240
1600		1370	1360	1350	1340	1320	1310	1300	1290	1270	1260
1610		1380	1370	1360	1350	1340	1330	1320	1300	1290	1280
1620		1400	1390	1380	1370	1360	1340	1330	1320	1310	1290
1630		1410	1400	1390	1380	1370	1360	1350	1330	1320	1310
1640		1430	1420	1410	1400	1390	1370	1360	1350	1340	1330
1650		1440	1430	1420	1410	1400	1390	1380	1370	1350	1340
1660		1460	1450	1440	1430	1420	1410	1390	1380	1370	1360
1670		1470	1460	1450	1440	1430	1420	1410	1400	1390	1380
1680		1490	1480	1470	1460	1450	1440	1430	1420	1400	1390
1690		1500	1490	1480	1470	1460	1450	1440	1430	1420	1410
1700		1510	1510	1500	1490	1480	1470	1460	1450	1440	1430

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1710		1530	1520	1510	1500	1490	1480	1470	1460	1450	1440
1720		1540	1540	1530	1520	1510	1500	1490	1480	1470	1460
1730		1560	1550	1540	1530	1520	1520	1510	1500	1490	1480
1740		1570	1560	1560	1550	1540	1530	1520	1510	1500	1490
1750		1590	1580	1570	1560	1560	1550	1540	1530	1520	1510
1760		1600	1590	1590	1580	1570	1560	1550	1540	1530	1530
1770		1620	1610	1600	1590	1590	1580	1570	1560	1550	1540
1780		1630	1620	1620	1610	1600	1590	1590	1580	1570	1560
1790		1650	1640	1630	1620	1620	1610	1600	1590	1580	1580
1800		1660	1650	1650	1640	1630	1620	1620	1610	1600	1590
1810		1670	1670	1660	1650	1650	1640	1630	1620	1620	1610
1820		1690	1680	1680	1670	1660	1660	1650	1640	1630	1630
1830		1700	1700	1690	1680	1680	1670	1660	1660	1650	1640
1840		1720	1710	1710	1700	1690	1690	1680	1670	1670	1660
1850		1730	1730	1720	1720	1710	1700	1700	1690	1680	1680
1860		1750	1740	1740	1730	1720	1720	1710	1710	1700	1690
1870		1760	1760	1750	1750	1740	1730	1730	1720	1720	1710
1880		1780	1770	1770	1760	1760	1750	1740	1740	1730	1730
1890		1790	1790	1780	1780	1770	1770	1760	1750	1750	1740
1900		1800	1800	1800	1790	1790	1780	1780	1770	1760	1760
1910		1820	1810	1810	1810	1800	1800	1790	1790	1780	1780
1920		1830	1830	1830	1820	1820	1810	1810	1800	1800	1790
1930		1850	1840	1840	1840	1830	1830	1820	1820	1810	1810
1940		1860	1860	1860	1850	1850	1840	1840	1830	1830	1830
1950		1880	1870	1870	1870	1860	1860	1850	1850	1850	1840
1960		1890	1890	1890	1880	1880	1870	1870	1870	1860	1860
1970		1910	1900	1900	1900	1890	1890	1890	1880	1880	1880
1980		1920	1920	1910	1910	1910	1910	1900	1900	1900	1890
1990		1940	1930	1930	1930	1920	1920	1920	1920	1910	1910
2000		1950	1950	1940	1940	1940	1940	1930	1930	1930	1930
2010		1960	1960	1960	1960	1960	1950	1950	1950	1940	1940
2020		1980	1980	1970	1970	1970	1970	1970	1960	1960	1960
2030		1990	1990	1990	1990	1990	1980	1980	1980	1980	1980
2040		2010	2010	2000	2000	2000	2000	2000	2000	1990	1990
2050		2020	2020	2020	2020	2020	2020	2010	2010	2010	2010
2060		2040	2040	2030	2030	2030	2030	2030	2030	2030	2030
2070		2050	2050	2050	2050	2050	2050	2050	2040	2040	2040
2080		2070	2060	2060	2060	2060	2060	2060	2060	2060	2060
2090		2080	2080	2080	2080	2080	2080	2080	2080	2080	2080
2100		2090	2090	2090	2090	2090	2090	2090	2090	2090	2090
2110		2110	2110	2110	2110	2110	2110	2110	2110	2110	2110
2120		2120	2120	2120	2120	2120	2120	2120	2120	2130	2130
2130		2140	2140	2140	2140	2140	2140	2140	2140	2140	2140

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.4
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
2140		2150	2150	2150	2150	2160	2160	2160	2160	2160	2160
2150		2170	2170	2170	2170	2170	2170	2170	2170	2170	2180
2160		2180	2180	2180	2180	2190	2190	2190	2190	2190	2190
2170		2200	2200	2200	2200	2200	2200	2200	2210	2210	2210
2180		2210	2210	2210	2220	2220	2220	2220	2220	2220	2230
2190		2230	2230	2230	2230	2230	2230	2240	2240	2240	2240
2200		2240	2240	2240	2250	2250	2250	2250	2250	2260	2260
2210		2250	2260	2260	2260	2260	2270	2270	2270	2270	2280
2220		2270	2270	2270	2280	2280	2280	2280	2290	2290	2290
2230		2280	2290	2290	2290	2290	2300	2300	2300	2310	2310
2240		2300	2300	2300	2310	2310	2310	2320	2320	2320	2330
2250		2310	2310	2320	2320	2320	2330	2330	2330	2340	2340
2260		2330	2330	2330	2340	2340	2340	2350	2350	2350	2360
2270		2340	2340	2350	2350	2360	2360	2360	2370	2370	2380
2280		2360	2360	2360	2370	2370	2370	2380	2380	2390	2390
2290		2370	2370	2380	2380	2390	2390	2390	2400	2400	2410
2300		2380	2390	2390	2400	2400	2410	2410	2420	2420	2430
2310		2400	2400	2410	2410	2420	2420	2430	2430	2440	2440
2320		2410	2420	2420	2430	2430	2440	2440	2450	2450	2460
2330		2430	2430	2440	2440	2450	2450	2460	2460	2470	2480
2340		2440	2450	2450	2460	2460	2470	2470	2480	2490	2490
2350		2460	2460	2470	2470	2480	2480	2490	2500	2500	2510
2360		2470	2480	2480	2490	2490	2500	2510	2510	2520	2530
2370		2490	2490	2500	2500	2510	2520	2520	2530	2530	2540
2380		2500	2510	2510	2520	2520	2530	2540	2540	2550	2560
2390		2510	2520	2530	2530	2540	2550	2550	2560	2570	2580
2400		2530	2540	2540	2550	2560	2560	2570	2580	2580	2590
2410		2540	2550	2560	2560	2570	2580	2590	2590	2600	2610
2420		2560	2560	2570	2580	2590	2590	2600	2610	2620	2630
2430		2570	2580	2590	2590	2600	2610	2620	2620	2630	2640
2440		2590	2590	2600	2610	2620	2620	2630	2640	2650	2660
2450		2600	2610	2620	2620	2630	2640	2650	2660	2670	2680
2460		2620	2620	2630	2640	2650	2660	2660	2670	2680	2690
2470		2630	2640	2650	2650	2660	2670	2680	2690	2700	2710
2480		2650	2650	2660	2670	2680	2690	2700	2710	2720	2730
2490		2660	2670	2680	2680	2690	2700	2710	2720	2730	2740
2500		2670	2680	2690	2700	2710	2720	2730	2740	2750	2760
2510		2690	2700	2710	2720	2720	2730	2740	2750	2760	2780
2520		2700	2710	2720	2730	2740	2750	2760	2770	2780	2790
2530		2720	2730	2740	2750	2760	2770	2780	2790	2800	2810
2540		2730	2740	2750	2760	2770	2780	2790	2800	2810	2830
2550		2750	2760	2770	2780	2790	2800	2810	2820	2830	2840
2560		2760	2770	2780	2790	2800	2810	2820	2830	2850	2860

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1280		1270	1260	1250	1240	1230	1220	1210	1200	1190	1180
1290		1280	1270	1260	1250	1240	1230	1220	1210	1200	1190
1300		1290	1280	1270	1260	1250	1240	1230	1220	1210	1200
1310		1300	1290	1280	1270	1260	1250	1240	1230	1220	1210
1320		1310	1300	1290	1280	1270	1260	1250	1240	1230	1220
1330		1320	1310	1300	1290	1280	1270	1260	1250	1240	1230
1340		1330	1320	1310	1300	1290	1290	1280	1270	1250	1240
1350		1340	1330	1320	1310	1310	1300	1290	1280	1270	1260
1360		1350	1340	1330	1320	1320	1310	1300	1290	1280	1270
1370		1360	1350	1340	1340	1330	1320	1310	1300	1290	1280
1380		1370	1360	1350	1350	1340	1330	1320	1310	1300	1290
1390		1380	1370	1360	1360	1350	1340	1330	1320	1310	1300
1400		1390	1380	1380	1370	1360	1350	1340	1330	1320	1310
1410		1400	1390	1390	1380	1370	1360	1350	1340	1330	1320
1420		1410	1400	1400	1390	1380	1370	1360	1350	1340	1330
1430		1420	1410	1410	1400	1390	1380	1370	1360	1350	1340
1440		1430	1420	1420	1410	1400	1390	1380	1370	1360	1360
1450		1440	1430	1430	1420	1410	1400	1390	1380	1380	1370
1460		1450	1440	1440	1430	1420	1410	1400	1400	1390	1380
1470		1460	1460	1450	1440	1430	1420	1420	1410	1400	1390
1480		1470	1470	1460	1450	1440	1430	1430	1420	1410	1400
1490		1480	1480	1470	1460	1450	1440	1440	1430	1420	1410
1500		1490	1490	1480	1470	1460	1460	1450	1440	1430	1420
1510		1500	1500	1490	1480	1470	1470	1460	1450	1440	1430
1520		1510	1510	1500	1490	1480	1480	1470	1460	1450	1440
1530		1520	1520	1510	1500	1490	1490	1480	1470	1460	1460
1540		1530	1530	1520	1510	1510	1500	1490	1480	1470	1470
1550		1540	1540	1530	1520	1520	1510	1500	1490	1490	1480
1560		1550	1550	1540	1530	1530	1520	1510	1500	1500	1490
1570		1560	1560	1550	1540	1540	1530	1520	1520	1510	1500
1580		1570	1570	1560	1550	1550	1540	1530	1530	1520	1510
1590		1580	1580	1570	1560	1560	1550	1540	1540	1530	1520
1600		1590	1590	1580	1570	1570	1560	1550	1550	1540	1530
1610		1600	1600	1590	1590	1580	1570	1570	1560	1550	1540
1620		1610	1610	1600	1600	1590	1580	1580	1570	1560	1560
1630		1620	1620	1610	1610	1600	1590	1590	1580	1570	1570
1640		1630	1630	1620	1620	1610	1600	1600	1590	1580	1580
1650		1640	1640	1630	1630	1620	1610	1610	1600	1600	1590
1660		1650	1650	1640	1640	1630	1630	1620	1610	1610	1600
1670		1660	1660	1650	1650	1640	1640	1630	1620	1620	1610
1680		1670	1670	1660	1660	1650	1650	1640	1630	1630	1620
1690		1680	1680	1670	1670	1660	1660	1650	1650	1640	1630
1700		1690	1690	1680	1680	1670	1670	1660	1660	1650	1640

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1710		1710	1700	1690	1690	1680	1680	1670	1670	1660	1660
1720		1720	1710	1710	1700	1690	1690	1680	1680	1670	1670
1730		1730	1720	1720	1710	1710	1700	1690	1690	1680	1680
1740		1740	1730	1730	1720	1720	1710	1710	1700	1690	1690
1750		1750	1740	1740	1730	1730	1720	1720	1710	1710	1700
1760		1760	1750	1750	1740	1740	1730	1730	1720	1720	1710
1770		1770	1760	1760	1750	1750	1740	1740	1730	1730	1720
1780		1780	1770	1770	1760	1760	1750	1750	1740	1740	1730
1790		1790	1780	1780	1770	1770	1760	1760	1750	1750	1740
1800		1800	1790	1790	1780	1780	1770	1770	1770	1760	1760
1810		1810	1800	1800	1790	1790	1790	1780	1780	1770	1770
1820		1820	1810	1810	1800	1800	1800	1790	1790	1780	1780
1830		1830	1820	1820	1810	1810	1810	1800	1800	1790	1790
1840		1840	1830	1830	1820	1820	1820	1810	1810	1800	1800
1850		1850	1840	1840	1840	1830	1830	1820	1820	1820	1810
1860		1860	1850	1850	1850	1840	1840	1830	1830	1830	1820
1870		1870	1860	1860	1860	1850	1850	1850	1840	1840	1830
1880		1880	1870	1870	1870	1860	1860	1860	1850	1850	1840
1890		1890	1880	1880	1880	1870	1870	1870	1860	1860	1860
1900		1900	1890	1890	1890	1880	1880	1880	1870	1870	1870
1910		1910	1900	1900	1900	1890	1890	1890	1880	1880	1880
1920		1920	1910	1910	1910	1910	1900	1900	1900	1890	1890
1930		1930	1920	1920	1920	1920	1910	1910	1910	1900	1900
1940		1940	1930	1930	1930	1930	1920	1920	1920	1910	1910
1950		1950	1940	1940	1940	1940	1930	1930	1930	1930	1920
1960		1960	1960	1950	1950	1950	1940	1940	1940	1940	1930
1970		1970	1970	1960	1960	1960	1960	1950	1950	1950	1940
1980		1980	1980	1970	1970	1970	1970	1960	1960	1960	1960
1990		1990	1990	1980	1980	1980	1980	1970	1970	1970	1970
2000		2000	2000	1990	1990	1990	1990	1980	1980	1980	1980
2010		2010	2010	2000	2000	2000	2000	2000	1990	1990	1990
2020		2020	2020	2010	2010	2010	2010	2010	2000	2000	2000
2030		2030	2030	2020	2020	2020	2020	2020	2020	2010	2010
2040		2040	2040	2040	2030	2030	2030	2030	2030	2020	2020
2050		2050	2050	2050	2040	2040	2040	2040	2040	2040	2030
2060		2060	2060	2060	2050	2050	2050	2050	2050	2050	2040
2070		2070	2070	2070	2060	2060	2060	2060	2060	2060	2060
2080		2080	2080	2080	2070	2070	2070	2070	2070	2070	2070
2090		2090	2090	2090	2090	2080	2080	2080	2080	2080	2080
2100		2100	2100	2100	2100	2090	2090	2090	2090	2090	2090
2110		2110	2110	2110	2110	2110	2100	2100	2100	2100	2100
2120		2120	2120	2120	2120	2120	2110	2110	2110	2110	2110
2130		2130	2130	2130	2130	2130	2130	2120	2120	2120	2120

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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
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D	D	1	2	3	4	5	6	7	8	9	10
2140	2140	2140	2140	2140	2140	2140	2140	2130	2130	2130
2150	2150	2150	2150	2150	2150	2150	2150	2150	2150	2140
2160	2160	2160	2160	2160	2160	2160	2160	2160	2160	2160
2170	2170	2170	2170	2170	2170	2170	2170	2170	2170	2170
2180	2180	2180	2180	2180	2180	2180	2180	2180	2180	2180
2190	2190	2190	2190	2190	2190	2190	2190	2190	2190	2190
2200	2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
2210	2210	2210	2210	2210	2210	2210	2210	2210	2210	2210
2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
2230	2230	2230	2230	2230	2230	2230	2230	2230	2230	2230
2240	2240	2240	2240	2240	2240	2240	2240	2240	2240	2240
2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2260
2260	2260	2260	2260	2260	2260	2260	2260	2270	2270	2270
2270	2270	2270	2270	2270	2270	2270	2280	2280	2280	2280
2280	2280	2280	2280	2280	2280	2290	2290	2290	2290	2290
2290	2290	2290	2290	2290	2290	2300	2300	2300	2300	2300
2300	2300	2300	2300	2300	2310	2310	2310	2310	2310	2310
2310	2310	2310	2310	2310	2320	2320	2320	2320	2320	2320
2320	2320	2320	2320	2320	2330	2330	2330	2330	2330	2330
2330	2330	2330	2330	2340	2340	2340	2340	2340	2340	2340
2340	2340	2340	2340	2350	2350	2350	2350	2350	2350	2360
2350	2350	2350	2350	2360	2360	2360	2360	2360	2360	2370
2360	2360	2360	2360	2370	2370	2370	2370	2370	2380	2380
2370	2370	2370	2380	2380	2380	2380	2380	2380	2390	2390
2380	2380	2380	2390	2390	2390	2390	2390	2400	2400	2400
2390	2390	2390	2400	2400	2400	2400	2400	2410	2410	2410
2400	2400	2400	2410	2410	2410	2410	2420	2420	2420	2420
2410	2410	2410	2420	2420	2420	2420	2430	2430	2430	2430
2420	2420	2420	2430	2430	2430	2430	2440	2440	2440	2440
2430	2430	2430	2440	2440	2440	2440	2450	2450	2450	2460
2440	2440	2440	2450	2450	2450	2460	2460	2460	2460	2470
2450	2450	2460	2460	2460	2460	2470	2470	2470	2470	2480
2460	2460	2470	2470	2470	2470	2480	2480	2480	2490	2490
2470	2470	2480	2480	2480	2480	2490	2490	2490	2500	2500
2480	2480	2490	2490	2490	2490	2500	2500	2500	2510	2510
2490	2490	2500	2500	2500	2510	2510	2510	2520	2520	2520
2500	2500	2510	2510	2510	2520	2520	2520	2530	2530	2530
2510	2510	2520	2520	2520	2530	2530	2530	2540	2540	2540
2520	2520	2530	2530	2530	2540	2540	2540	2550	2550	2560
2530	2530	2540	2540	2540	2550	2550	2550	2560	2560	2570
2540	2540	2550	2550	2550	2560	2560	2570	2570	2570	2580
2550	2550	2560	2560	2560	2570	2570	2580	2580	2580	2590
2560	2560	2570	2570	2570	2580	2580	2590	2590	2600	2600

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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1280		1170	1150	1140	1130	1120	1100	1090	1080	1060	1050
1290		1180	1170	1150	1140	1130	1120	1100	1090	1080	1060
1300		1190	1180	1170	1150	1140	1130	1120	1100	1090	1070
1310		1200	1190	1180	1170	1150	1140	1130	1110	1100	1090
1320		1210	1200	1190	1180	1160	1150	1140	1130	1110	1100
1330		1220	1210	1200	1190	1180	1160	1150	1140	1130	1110
1340		1230	1220	1210	1200	1190	1180	1160	1150	1140	1120
1350		1240	1230	1220	1210	1200	1190	1180	1160	1150	1140
1360		1260	1250	1230	1220	1210	1200	1190	1180	1160	1150
1370		1270	1260	1250	1230	1220	1210	1200	1190	1180	1160
1380		1280	1270	1260	1250	1240	1220	1210	1200	1190	1170
1390		1290	1280	1270	1260	1250	1240	1220	1210	1200	1190
1400		1300	1290	1280	1270	1260	1250	1240	1220	1210	1200
1410		1310	1300	1290	1280	1270	1260	1250	1240	1220	1210
1420		1320	1310	1300	1290	1280	1270	1260	1250	1240	1220
1430		1330	1320	1310	1300	1290	1280	1270	1260	1250	1240
1440		1350	1340	1330	1320	1310	1300	1280	1270	1260	1250
1450		1360	1350	1340	1330	1320	1310	1300	1290	1270	1260
1460		1370	1360	1350	1340	1330	1320	1310	1300	1290	1270
1470		1380	1370	1360	1350	1340	1330	1320	1310	1300	1290
1480		1390	1380	1370	1360	1350	1340	1330	1320	1310	1300
1490		1400	1390	1380	1370	1360	1350	1340	1330	1320	1310
1500		1410	1400	1400	1390	1380	1370	1360	1350	1340	1320
1510		1420	1420	1410	1400	1390	1380	1370	1360	1350	1340
1520		1440	1430	1420	1410	1400	1390	1380	1370	1360	1350
1530		1450	1440	1430	1420	1410	1400	1390	1380	1370	1360
1540		1460	1450	1440	1430	1420	1410	1400	1400	1390	1370
1550		1470	1460	1450	1440	1440	1430	1420	1410	1400	1390
1560		1480	1470	1460	1460	1450	1440	1430	1420	1410	1400
1570		1490	1480	1480	1470	1460	1450	1440	1430	1420	1410
1580		1500	1500	1490	1480	1470	1460	1450	1440	1430	1420
1590		1510	1510	1500	1490	1480	1470	1470	1460	1450	1440
1600		1530	1520	1510	1500	1490	1490	1480	1470	1460	1450
1610		1540	1530	1520	1510	1510	1500	1490	1480	1470	1460
1620		1550	1540	1530	1530	1520	1510	1500	1490	1480	1470
1630		1560	1550	1540	1540	1530	1520	1510	1500	1500	1490
1640		1570	1560	1560	1550	1540	1530	1530	1520	1510	1500
1650		1580	1570	1570	1560	1550	1550	1540	1530	1520	1510
1660		1590	1590	1580	1570	1560	1560	1550	1540	1530	1520
1670		1600	1600	1590	1580	1580	1570	1560	1550	1550	1540
1680		1620	1610	1600	1600	1590	1580	1570	1570	1560	1550
1690		1630	1620	1610	1610	1600	1590	1590	1580	1570	1560
1700		1640	1630	1630	1620	1610	1600	1600	1590	1580	1570

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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1710		1650	1640	1640	1630	1620	1620	1610	1600	1600	1590
1720		1660	1650	1650	1640	1640	1630	1620	1610	1610	1600
1730		1670	1670	1660	1650	1650	1640	1630	1630	1620	1610
1740		1680	1680	1670	1670	1660	1650	1650	1640	1630	1620
1750		1690	1690	1680	1680	1670	1660	1660	1650	1640	1640
1760		1710	1700	1690	1690	1680	1680	1670	1660	1660	1650
1770		1720	1710	1710	1700	1690	1690	1680	1680	1670	1660
1780		1730	1720	1720	1710	1710	1700	1690	1690	1680	1670
1790		1740	1730	1730	1720	1720	1710	1710	1700	1690	1690
1800		1750	1750	1740	1730	1730	1720	1720	1710	1710	1700
1810		1760	1760	1750	1750	1740	1740	1730	1720	1720	1710
1820		1770	1770	1760	1760	1750	1750	1740	1740	1730	1720
1830		1780	1780	1770	1770	1760	1760	1750	1750	1740	1740
1840		1800	1790	1790	1780	1780	1770	1770	1760	1760	1750
1850		1810	1800	1800	1790	1790	1780	1780	1770	1770	1760
1860		1820	1810	1810	1800	1800	1800	1790	1790	1780	1770
1870		1830	1820	1820	1820	1810	1810	1800	1800	1790	1790
1880		1840	1840	1830	1830	1820	1820	1810	1810	1800	1800
1890		1850	1850	1840	1840	1840	1830	1830	1820	1820	1810
1900		1860	1860	1860	1850	1850	1840	1840	1830	1830	1820
1910		1870	1870	1870	1860	1860	1850	1850	1850	1840	1840
1920		1890	1880	1880	1870	1870	1870	1860	1860	1850	1850
1930		1900	1890	1890	1890	1880	1880	1870	1870	1870	1860
1940		1910	1900	1900	1900	1890	1890	1890	1880	1880	1870
1950		1920	1920	1910	1910	1910	1900	1900	1900	1890	1890
1960		1930	1930	1920	1920	1920	1910	1910	1910	1900	1900
1970		1940	1940	1940	1930	1930	1930	1920	1920	1920	1910
1980		1950	1950	1950	1940	1940	1940	1930	1930	1930	1920
1990		1960	1960	1960	1960	1950	1950	1950	1940	1940	1940
2000		1980	1970	1970	1970	1960	1960	1960	1960	1950	1950
2010		1990	1980	1980	1980	1980	1970	1970	1970	1970	1960
2020		2000	2000	1990	1990	1990	1990	1980	1980	1980	1970
2030		2010	2010	2000	2000	2000	2000	2000	1990	1990	1990
2040		2020	2020	2020	2010	2010	2010	2010	2000	2000	2000
2050		2030	2030	2030	2030	2020	2020	2020	2020	2010	2010
2060		2040	2040	2040	2040	2040	2030	2030	2030	2030	2020
2070		2050	2050	2050	2050	2050	2050	2040	2040	2040	2040
2080		2070	2060	2060	2060	2060	2060	2060	2050	2050	2050
2090		2080	2070	2070	2070	2070	2070	2070	2070	2060	2060
2100		2090	2090	2090	2080	2080	2080	2080	2080	2080	2070
2110		2100	2100	2100	2100	2090	2090	2090	2090	2090	2090
2120		2110	2110	2110	2110	2110	2100	2100	2100	2100	2100
2130		2120	2120	2120	2120	2120	2120	2120	2110	2110	2110

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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
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D	D	11	12	13	14	15	16	17	18	19	20
2140		2130	2130	2130	2130	2130	2130	2130	2130	2130	2120
2150		2140	2140	2140	2140	2140	2140	2140	2140	2140	2140
2160		2160	2150	2150	2150	2150	2150	2150	2150	2150	2150
2170		2170	2170	2170	2170	2160	2160	2160	2160	2160	2160
2180		2180	2180	2180	2180	2180	2180	2180	2180	2180	2170
2190		2190	2190	2190	2190	2190	2190	2190	2190	2190	2190
2200		2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
2210		2210	2210	2210	2210	2210	2210	2210	2210	2210	2210
2220		2220	2220	2220	2220	2220	2220	2220	2220	2220	2220
2230		2230	2230	2230	2230	2240	2240	2240	2240	2240	2240
2240		2240	2250	2250	2250	2250	2250	2250	2250	2250	2250
2250		2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
2260		2270	2270	2270	2270	2270	2270	2270	2270	2270	2270
2270		2280	2280	2280	2280	2280	2280	2280	2290	2290	2290
2280		2290	2290	2290	2290	2290	2300	2300	2300	2300	2300
2290		2300	2300	2300	2300	2310	2310	2310	2310	2310	2310
2300		2310	2310	2310	2320	2320	2320	2320	2320	2320	2320
2310		2320	2320	2330	2330	2330	2330	2330	2330	2340	2340
2320		2330	2340	2340	2340	2340	2340	2340	2350	2350	2350
2330		2350	2350	2350	2350	2350	2350	2360	2360	2360	2360
2340		2360	2360	2360	2360	2360	2370	2370	2370	2370	2370
2350		2370	2370	2370	2370	2380	2380	2380	2380	2390	2390
2360		2380	2380	2380	2390	2390	2390	2390	2400	2400	2400
2370		2390	2390	2400	2400	2400	2400	2400	2410	2410	2410
2380		2400	2400	2410	2410	2410	2410	2420	2420	2420	2420
2390		2410	2420	2420	2420	2420	2430	2430	2430	2430	2440
2400		2420	2430	2430	2430	2440	2440	2440	2440	2450	2450
2410		2440	2440	2440	2440	2450	2450	2450	2460	2460	2460
2420		2450	2450	2450	2460	2460	2460	2470	2470	2470	2470
2430		2460	2460	2460	2470	2470	2470	2480	2480	2480	2490
2440		2470	2470	2480	2480	2480	2490	2490	2490	2500	2500
2450		2480	2480	2490	2490	2490	2500	2500	2500	2510	2510
2460		2490	2500	2500	2500	2510	2510	2510	2520	2520	2520
2470		2500	2510	2510	2510	2520	2520	2530	2530	2530	2540
2480		2510	2520	2520	2530	2530	2530	2540	2540	2550	2550
2490		2530	2530	2530	2540	2540	2550	2550	2550	2560	2560
2500		2540	2540	2540	2550	2550	2560	2560	2570	2570	2570
2510		2550	2550	2560	2560	2560	2570	2570	2580	2580	2590
2520		2560	2560	2570	2570	2580	2580	2590	2590	2600	2600
2530		2570	2570	2580	2580	2590	2590	2600	2600	2610	2610
2540		2580	2590	2590	2600	2600	2600	2610	2610	2620	2620
2550		2590	2600	2600	2610	2610	2620	2620	2630	2630	2640
2560		2600	2610	2610	2620	2620	2630	2630	2640	2640	2650

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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1280		1040	1020	1010	990	970	960	940	920	900	890
1290		1050	1030	1020	1000	990	970	950	940	920	900
1300		1060	1050	1030	1020	1000	980	970	950	930	910
1310		1070	1060	1040	1030	1010	1000	980	960	950	930
1320		1090	1070	1060	1040	1030	1010	990	980	960	940
1330		1100	1080	1070	1060	1040	1020	1010	990	970	960
1340		1110	1100	1080	1070	1050	1040	1020	1010	990	970
1350		1120	1110	1100	1080	1070	1050	1040	1020	1000	990
1360		1140	1120	1110	1090	1080	1060	1050	1030	1020	1000
1370		1150	1140	1120	1110	1090	1080	1060	1050	1030	1010
1380		1160	1150	1140	1120	1110	1090	1080	1060	1050	1030
1390		1170	1160	1150	1130	1120	1110	1090	1070	1060	1040
1400		1190	1170	1160	1150	1130	1120	1100	1090	1070	1060
1410		1200	1190	1170	1160	1150	1130	1120	1100	1090	1070
1420		1210	1200	1190	1170	1160	1150	1130	1120	1100	1090
1430		1230	1210	1200	1190	1170	1160	1150	1130	1120	1100
1440		1240	1230	1210	1200	1190	1170	1160	1140	1130	1110
1450		1250	1240	1230	1210	1200	1190	1170	1160	1140	1130
1460		1260	1250	1240	1230	1210	1200	1190	1170	1160	1140
1470		1280	1260	1250	1240	1230	1210	1200	1190	1170	1160
1480		1290	1280	1260	1250	1240	1230	1210	1200	1190	1170
1490		1300	1290	1280	1270	1250	1240	1230	1210	1200	1190
1500		1310	1300	1290	1280	1270	1250	1240	1230	1210	1200
1510		1330	1320	1300	1290	1280	1270	1250	1240	1230	1210
1520		1340	1330	1320	1310	1290	1280	1270	1260	1240	1230
1530		1350	1340	1330	1320	1310	1290	1280	1270	1260	1240
1540		1360	1350	1340	1330	1320	1310	1300	1280	1270	1260
1550		1380	1370	1360	1340	1330	1320	1310	1300	1280	1270
1560		1390	1380	1370	1360	1350	1340	1320	1310	1300	1290
1570		1400	1390	1380	1370	1360	1350	1340	1320	1310	1300
1580		1420	1410	1390	1380	1370	1360	1350	1340	1330	1310
1590		1430	1420	1410	1400	1390	1380	1360	1350	1340	1330
1600		1440	1430	1420	1410	1400	1390	1380	1370	1350	1340
1610		1450	1440	1430	1420	1410	1400	1390	1380	1370	1360
1620		1470	1460	1450	1440	1430	1420	1410	1390	1380	1370
1630		1480	1470	1460	1450	1440	1430	1420	1410	1400	1390
1640		1490	1480	1470	1460	1450	1440	1430	1420	1410	1400
1650		1500	1490	1490	1480	1470	1460	1450	1440	1430	1410
1660		1520	1510	1500	1490	1480	1470	1460	1450	1440	1430
1670		1530	1520	1510	1500	1490	1480	1470	1460	1450	1440
1680		1540	1530	1520	1520	1510	1500	1490	1480	1470	1460
1690		1550	1550	1540	1530	1520	1510	1500	1490	1480	1470
1700		1570	1560	1550	1540	1530	1520	1520	1510	1500	1490

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1710		1580	1570	1560	1560	1550	1540	1530	1520	1510	1500
1720		1590	1580	1580	1570	1560	1550	1540	1530	1520	1510
1730		1610	1600	1590	1580	1570	1560	1560	1550	1540	1530
1740		1620	1610	1600	1590	1590	1580	1570	1560	1550	1540
1750		1630	1620	1620	1610	1600	1590	1580	1570	1570	1560
1760		1640	1640	1630	1620	1610	1610	1600	1590	1580	1570
1770		1660	1650	1640	1630	1630	1620	1610	1600	1590	1590
1780		1670	1660	1650	1650	1640	1630	1620	1620	1610	1600
1790		1680	1670	1670	1660	1650	1650	1640	1630	1620	1610
1800		1690	1690	1680	1670	1670	1660	1650	1640	1640	1630
1810		1710	1700	1690	1690	1680	1670	1670	1660	1650	1640
1820		1720	1710	1710	1700	1690	1690	1680	1670	1660	1660
1830		1730	1730	1720	1710	1710	1700	1690	1690	1680	1670
1840		1740	1740	1730	1730	1720	1710	1710	1700	1690	1690
1850		1760	1750	1750	1740	1730	1730	1720	1710	1710	1700
1860		1770	1760	1760	1750	1750	1740	1730	1730	1720	1710
1870		1780	1780	1770	1770	1760	1750	1750	1740	1740	1730
1880		1790	1790	1780	1780	1770	1770	1760	1760	1750	1740
1890		1810	1800	1800	1790	1790	1780	1780	1770	1760	1760
1900		1820	1820	1810	1810	1800	1790	1790	1780	1780	1770
1910		1830	1830	1820	1820	1810	1810	1800	1800	1790	1790
1920		1850	1840	1840	1830	1830	1820	1820	1810	1810	1800
1930		1860	1850	1850	1840	1840	1840	1830	1820	1820	1810
1940		1870	1870	1860	1860	1850	1850	1840	1840	1830	1830
1950		1880	1880	1880	1870	1870	1860	1860	1850	1850	1840
1960		1900	1890	1890	1880	1880	1880	1870	1870	1860	1860
1970		1910	1910	1900	1900	1890	1890	1880	1880	1880	1870
1980		1920	1920	1910	1910	1910	1900	1900	1890	1890	1890
1990		1930	1930	1930	1920	1920	1920	1910	1910	1900	1900
2000		1950	1940	1940	1940	1930	1930	1930	1920	1920	1910
2010		1960	1960	1950	1950	1950	1940	1940	1940	1930	1930
2020		1970	1970	1970	1960	1960	1960	1950	1950	1950	1940
2030		1980	1980	1980	1980	1970	1970	1970	1960	1960	1960
2040		2000	1990	1990	1990	1990	1980	1980	1980	1970	1970
2050		2010	2010	2010	2000	2000	2000	1990	1990	1990	1990
2060		2020	2020	2020	2020	2010	2010	2010	2010	2000	2000
2070		2040	2030	2030	2030	2030	2020	2020	2020	2020	2010
2080		2050	2050	2040	2040	2040	2040	2040	2030	2030	2030
2090		2060	2060	2060	2060	2050	2050	2050	2050	2050	2040
2100		2070	2070	2070	2070	2070	2060	2060	2060	2060	2060
2110		2090	2080	2080	2080	2080	2080	2080	2070	2070	2070
2120		2100	2100	2100	2090	2090	2090	2090	2090	2090	2090
2130		2110	2110	2110	2110	2110	2110	2100	2100	2100	2100

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
2140		2120	2120	2120	2120	2120	2120	2120	2120	2120	2110
2150		2140	2140	2140	2130	2130	2130	2130	2130	2130	2130
2160		2150	2150	2150	2150	2150	2150	2150	2140	2140	2140
2170		2160	2160	2160	2160	2160	2160	2160	2160	2160	2160
2180		2170	2170	2170	2170	2170	2170	2170	2170	2170	2170
2190		2190	2190	2190	2190	2190	2190	2190	2190	2190	2190
2200		2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
2210		2210	2210	2210	2210	2210	2210	2210	2210	2210	2210
2220		2230	2230	2230	2230	2230	2230	2230	2230	2230	2230
2230		2240	2240	2240	2240	2240	2240	2240	2240	2240	2240
2240		2250	2250	2250	2250	2250	2250	2250	2260	2260	2260
2250		2260	2260	2260	2270	2270	2270	2270	2270	2270	2270
2260		2280	2280	2280	2280	2280	2280	2280	2280	2280	2290
2270		2290	2290	2290	2290	2290	2290	2300	2300	2300	2300
2280		2300	2300	2300	2310	2310	2310	2310	2310	2310	2310
2290		2310	2320	2320	2320	2320	2320	2320	2320	2330	2330
2300		2330	2330	2330	2330	2330	2340	2340	2340	2340	2340
2310		2340	2340	2340	2340	2350	2350	2350	2350	2350	2360
2320		2350	2350	2360	2360	2360	2360	2360	2370	2370	2370
2330		2360	2370	2370	2370	2370	2380	2380	2380	2380	2390
2340		2380	2380	2380	2380	2390	2390	2390	2390	2400	2400
2350		2390	2390	2390	2400	2400	2400	2410	2410	2410	2410
2360		2400	2410	2410	2410	2410	2420	2420	2420	2430	2430
2370		2420	2420	2420	2420	2430	2430	2430	2440	2440	2440
2380		2430	2430	2430	2440	2440	2440	2450	2450	2450	2460
2390		2440	2440	2450	2450	2450	2460	2460	2460	2470	2470
2400		2450	2460	2460	2460	2470	2470	2470	2480	2480	2490
2410		2470	2470	2470	2480	2480	2480	2490	2490	2500	2500
2420		2480	2480	2490	2490	2490	2500	2500	2510	2510	2510
2430		2490	2490	2500	2500	2510	2510	2520	2520	2520	2530
2440		2500	2510	2510	2520	2520	2520	2530	2530	2540	2540
2450		2520	2520	2520	2530	2530	2540	2540	2550	2550	2560
2460		2530	2530	2540	2540	2550	2550	2560	2560	2570	2570
2470		2540	2550	2550	2560	2560	2560	2570	2570	2580	2590
2480		2550	2560	2560	2570	2570	2580	2580	2590	2590	2600
2490		2570	2570	2580	2580	2590	2590	2600	2600	2610	2610
2500		2580	2580	2590	2590	2600	2610	2610	2620	2620	2630
2510		2590	2600	2600	2610	2610	2620	2620	2630	2640	2640
2520		2610	2610	2620	2620	2630	2630	2640	2640	2650	2660
2530		2620	2620	2630	2630	2640	2650	2650	2660	2660	2670
2540		2630	2640	2640	2650	2650	2660	2670	2670	2680	2690
2550		2640	2650	2650	2660	2670	2670	2680	2690	2690	2700
2560		2660	2660	2670	2670	2680	2690	2690	2700	2710	2710

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1280		870	850	830	810	780	760	740	720	690	670
1290		880	860	840	820	800	780	760	730	710	680
1300		900	880	860	840	820	790	770	750	720	700
1310		910	890	870	850	830	810	790	760	740	720
1320		920	910	890	870	850	820	800	780	760	730
1330		940	920	900	880	860	840	820	800	770	750
1340		950	940	920	900	880	860	830	810	790	770
1350		970	950	930	910	890	870	850	830	810	780
1360		980	960	950	930	910	890	870	850	820	800
1370		1000	980	960	940	920	900	880	860	840	820
1380		1010	990	980	960	940	920	900	880	860	830
1390		1030	1010	990	970	950	930	910	890	870	850
1400		1040	1020	1010	990	970	950	930	910	890	870
1410		1060	1040	1020	1000	980	970	950	930	900	880
1420		1070	1050	1040	1020	1000	980	960	940	920	900
1430		1080	1070	1050	1030	1020	1000	980	960	940	920
1440		1100	1080	1070	1050	1030	1010	990	970	950	930
1450		1110	1100	1080	1060	1050	1030	1010	990	970	950
1460		1130	1110	1100	1080	1060	1040	1030	1010	990	970
1470		1140	1130	1110	1090	1080	1060	1040	1020	1000	980
1480		1160	1140	1130	1110	1090	1070	1060	1040	1020	1000
1490		1170	1160	1140	1120	1110	1090	1070	1050	1040	1020
1500		1190	1170	1160	1140	1120	1110	1090	1070	1050	1030
1510		1200	1190	1170	1150	1140	1120	1100	1090	1070	1050
1520		1210	1200	1190	1170	1150	1140	1120	1100	1090	1070
1530		1230	1210	1200	1180	1170	1150	1140	1120	1100	1080
1540		1240	1230	1210	1200	1180	1170	1150	1140	1120	1100
1550		1260	1240	1230	1220	1200	1180	1170	1150	1130	1120
1560		1270	1260	1240	1230	1220	1200	1180	1170	1150	1130
1570		1290	1270	1260	1250	1230	1220	1200	1180	1170	1150
1580		1300	1290	1270	1260	1250	1230	1220	1200	1180	1170
1590		1320	1300	1290	1280	1260	1250	1230	1220	1200	1180
1600		1330	1320	1300	1290	1280	1260	1250	1230	1220	1200
1610		1340	1330	1320	1310	1290	1280	1260	1250	1230	1220
1620		1360	1350	1330	1320	1310	1290	1280	1260	1250	1230
1630		1370	1360	1350	1340	1320	1310	1300	1280	1270	1250
1640		1390	1380	1360	1350	1340	1320	1310	1300	1280	1270
1650		1400	1390	1380	1370	1350	1340	1330	1310	1300	1280
1660		1420	1410	1390	1380	1370	1360	1340	1330	1310	1300
1670		1430	1420	1410	1400	1380	1370	1360	1350	1330	1320
1680		1450	1440	1420	1410	1400	1390	1370	1360	1350	1330
1690		1460	1450	1440	1430	1420	1400	1390	1380	1360	1350
1700		1480	1460	1450	1440	1430	1420	1410	1390	1380	1370

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1710		1490	1480	1470	1460	1450	1430	1420	1410	1400	1380
1720		1500	1490	1480	1470	1460	1450	1440	1430	1410	1400
1730		1520	1510	1500	1490	1480	1470	1450	1440	1430	1420
1740		1530	1520	1510	1500	1490	1480	1470	1460	1450	1430
1750		1550	1540	1530	1520	1510	1500	1490	1470	1460	1450
1760		1560	1550	1540	1530	1520	1510	1500	1490	1480	1470
1770		1580	1570	1560	1550	1540	1530	1520	1510	1500	1480
1780		1590	1580	1570	1560	1550	1540	1530	1520	1510	1500
1790		1610	1600	1590	1580	1570	1560	1550	1540	1530	1520
1800		1620	1610	1600	1590	1580	1570	1570	1550	1540	1530
1810		1630	1630	1620	1610	1600	1590	1580	1570	1560	1550
1820		1650	1640	1630	1620	1620	1610	1600	1590	1580	1570
1830		1660	1660	1650	1640	1630	1620	1610	1600	1590	1580
1840		1680	1670	1660	1650	1650	1640	1630	1620	1610	1600
1850		1690	1690	1680	1670	1660	1650	1640	1640	1630	1620
1860		1710	1700	1690	1680	1680	1670	1660	1650	1640	1630
1870		1720	1710	1710	1700	1690	1680	1680	1670	1660	1650
1880		1740	1730	1720	1720	1710	1700	1690	1680	1680	1670
1890		1750	1740	1740	1730	1720	1720	1710	1700	1690	1680
1900		1770	1760	1750	1750	1740	1730	1720	1720	1710	1700
1910		1780	1770	1770	1760	1750	1750	1740	1730	1720	1720
1920		1790	1790	1780	1780	1770	1760	1760	1750	1740	1730
1930		1810	1800	1800	1790	1780	1780	1770	1760	1760	1750
1940		1820	1820	1810	1810	1800	1790	1790	1780	1770	1770
1950		1840	1830	1830	1820	1820	1810	1800	1800	1790	1780
1960		1850	1850	1840	1840	1830	1820	1820	1810	1810	1800
1970		1870	1860	1860	1850	1850	1840	1830	1830	1820	1820
1980		1880	1880	1870	1870	1860	1860	1850	1850	1840	1830
1990		1900	1890	1890	1880	1880	1870	1870	1860	1860	1850
2000		1910	1910	1900	1900	1890	1890	1880	1880	1870	1870
2010		1920	1920	1920	1910	1910	1900	1900	1890	1890	1880
2020		1940	1940	1930	1930	1920	1920	1910	1910	1900	1900
2030		1950	1950	1950	1940	1940	1930	1930	1930	1920	1920
2040		1970	1960	1960	1960	1950	1950	1950	1940	1940	1930
2050		1980	1980	1980	1970	1970	1970	1960	1960	1950	1950
2060		2000	1990	1990	1990	1980	1980	1980	1970	1970	1970
2070		2010	2010	2010	2000	2000	2000	1990	1990	1990	1980
2080		2030	2020	2020	2020	2020	2010	2010	2010	2000	2000
2090		2040	2040	2040	2030	2030	2030	2030	2020	2020	2020
2100		2060	2050	2050	2050	2050	2040	2040	2040	2040	2030
2110		2070	2070	2070	2060	2060	2060	2060	2050	2050	2050
2120		2080	2080	2080	2080	2080	2070	2070	2070	2070	2070
2130		2100	2100	2100	2090	2090	2090	2090	2090	2090	2080

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.5
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
2140		2110	2110	2110	2110	2110	2110	2100	2100	2100	2100
2150		2130	2130	2130	2120	2120	2120	2120	2120	2120	2120
2160		2140	2140	2140	2140	2140	2140	2140	2140	2130	2130
2170		2160	2160	2160	2150	2150	2150	2150	2150	2150	2150
2180		2170	2170	2170	2170	2170	2170	2170	2170	2170	2170
2190		2190	2190	2190	2180	2180	2180	2180	2180	2180	2180
2200		2200	2200	2200	2200	2200	2200	2200	2200	2200	2200
2210		2210	2210	2210	2220	2220	2220	2220	2220	2220	2220
2220		2230	2230	2230	2230	2230	2230	2230	2230	2230	2230
2230		2240	2240	2240	2250	2250	2250	2250	2250	2250	2250
2240		2260	2260	2260	2260	2260	2260	2260	2260	2270	2270
2250		2270	2270	2270	2280	2280	2280	2280	2280	2280	2280
2260		2290	2290	2290	2290	2290	2290	2300	2300	2300	2300
2270		2300	2300	2300	2310	2310	2310	2310	2310	2310	2320
2280		2320	2320	2320	2320	2320	2320	2330	2330	2330	2330
2290		2330	2330	2330	2340	2340	2340	2340	2350	2350	2350
2300		2340	2350	2350	2350	2350	2360	2360	2360	2360	2370
2310		2360	2360	2360	2370	2370	2370	2370	2380	2380	2380
2320		2370	2380	2380	2380	2380	2390	2390	2390	2400	2400
2330		2390	2390	2390	2400	2400	2400	2410	2410	2410	2420
2340		2400	2410	2410	2410	2420	2420	2420	2430	2430	2430
2350		2420	2420	2420	2430	2430	2430	2440	2440	2450	2450
2360		2430	2440	2440	2440	2450	2450	2450	2460	2460	2470
2370		2450	2450	2450	2460	2460	2470	2470	2470	2480	2480
2380		2460	2460	2470	2470	2480	2480	2490	2490	2500	2500
2390		2480	2480	2480	2490	2490	2500	2500	2510	2510	2520
2400		2490	2490	2500	2500	2510	2510	2520	2520	2530	2530
2410		2500	2510	2510	2520	2520	2530	2530	2540	2540	2550
2420		2520	2520	2530	2530	2540	2540	2550	2550	2560	2570
2430		2530	2540	2540	2550	2550	2560	2570	2570	2580	2580
2440		2550	2550	2560	2560	2570	2570	2580	2590	2590	2600
2450		2560	2570	2570	2580	2580	2590	2600	2600	2610	2620
2460		2580	2580	2590	2590	2600	2610	2610	2620	2630	2630
2470		2590	2600	2600	2610	2620	2620	2630	2640	2640	2650
2480		2610	2610	2620	2620	2630	2640	2640	2650	2660	2670
2490		2620	2630	2630	2640	2650	2650	2660	2670	2680	2680
2500		2630	2640	2650	2650	2660	2670	2680	2680	2690	2700
2510		2650	2660	2660	2670	2680	2680	2690	2700	2710	2720
2520		2660	2670	2680	2680	2690	2700	2710	2720	2720	2730
2530		2680	2690	2690	2700	2710	2720	2720	2730	2740	2750
2540		2690	2700	2710	2720	2720	2730	2740	2750	2760	2770
2550		2710	2710	2720	2730	2740	2750	2760	2760	2770	2780
2560		2720	2730	2740	2750	2750	2760	2770	2780	2790	2800

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1280		1270	1260	1250	1240	1230	1220	1200	1190	1180	1170
1290		1280	1270	1260	1250	1240	1230	1210	1200	1190	1180
1300		1290	1280	1270	1260	1250	1240	1230	1210	1200	1190
1310		1300	1290	1280	1270	1260	1250	1240	1220	1210	1200
1320		1310	1300	1290	1280	1270	1260	1250	1240	1220	1210
1330		1320	1310	1300	1290	1280	1270	1260	1250	1240	1220
1340		1330	1320	1310	1300	1290	1280	1270	1260	1250	1230
1350		1340	1330	1320	1310	1300	1290	1280	1270	1260	1250
1360		1350	1340	1330	1320	1310	1300	1290	1280	1270	1260
1370		1360	1350	1340	1330	1320	1310	1300	1290	1280	1270
1380		1370	1360	1350	1340	1330	1320	1310	1300	1290	1280
1390		1380	1370	1360	1350	1340	1330	1320	1310	1300	1290
1400		1390	1380	1370	1360	1350	1340	1330	1320	1310	1300
1410		1400	1390	1380	1370	1360	1350	1340	1330	1320	1310
1420		1410	1400	1390	1380	1370	1360	1350	1340	1330	1320
1430		1420	1410	1400	1390	1380	1380	1370	1360	1350	1330
1440		1430	1420	1410	1400	1400	1390	1380	1370	1360	1350
1450		1440	1430	1420	1420	1410	1400	1390	1380	1370	1360
1460		1450	1440	1430	1430	1420	1410	1400	1390	1380	1370
1470		1460	1450	1440	1440	1430	1420	1410	1400	1390	1380
1480		1470	1460	1460	1450	1440	1430	1420	1410	1400	1390
1490		1480	1470	1470	1460	1450	1440	1430	1420	1410	1400
1500		1490	1480	1480	1470	1460	1450	1440	1430	1420	1410
1510		1500	1490	1490	1480	1470	1460	1450	1440	1430	1420
1520		1510	1500	1500	1490	1480	1470	1460	1450	1440	1430
1530		1520	1510	1510	1500	1490	1480	1470	1460	1460	1450
1540		1530	1520	1520	1510	1500	1490	1480	1470	1470	1460
1550		1540	1530	1530	1520	1510	1500	1490	1490	1480	1470
1560		1550	1550	1540	1530	1520	1510	1510	1500	1490	1480
1570		1560	1560	1550	1540	1530	1520	1520	1510	1500	1490
1580		1570	1570	1560	1550	1540	1530	1530	1520	1510	1500
1590		1580	1580	1570	1560	1550	1550	1540	1530	1520	1510
1600		1590	1590	1580	1570	1560	1560	1550	1540	1530	1520
1610		1600	1600	1590	1580	1570	1570	1560	1550	1540	1530
1620		1610	1610	1600	1590	1580	1580	1570	1560	1550	1550
1630		1620	1620	1610	1600	1600	1590	1580	1570	1560	1560
1640		1630	1630	1620	1610	1610	1600	1590	1580	1580	1570
1650		1640	1640	1630	1620	1620	1610	1600	1590	1590	1580
1660		1650	1650	1640	1630	1630	1620	1610	1610	1600	1590
1670		1660	1660	1650	1640	1640	1630	1620	1620	1610	1600
1680		1670	1670	1660	1650	1650	1640	1630	1630	1620	1610
1690		1680	1680	1670	1670	1660	1650	1640	1640	1630	1620
1700		1690	1690	1680	1680	1670	1660	1660	1650	1640	1630

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1710	1700	1700	1690	1690	1680	1670	1670	1660	1650	1650	
1720	1710	1710	1700	1700	1690	1680	1680	1670	1660	1660	
1730	1720	1720	1710	1710	1700	1690	1690	1680	1670	1670	
1740	1730	1730	1720	1720	1710	1710	1700	1690	1690	1680	
1750	1740	1740	1730	1730	1720	1720	1710	1700	1700	1690	
1760	1750	1750	1740	1740	1730	1730	1720	1710	1710	1700	
1770	1760	1760	1750	1750	1740	1740	1730	1720	1720	1710	
1780	1770	1770	1760	1760	1750	1750	1740	1740	1730	1720	
1790	1780	1780	1770	1770	1760	1760	1750	1750	1740	1730	
1800	1800	1790	1780	1780	1770	1770	1760	1760	1750	1750	
1810	1810	1800	1800	1790	1780	1780	1770	1770	1760	1760	
1820	1820	1810	1810	1800	1800	1790	1780	1780	1770	1770	
1830	1830	1820	1820	1810	1810	1800	1800	1790	1780	1780	
1840	1840	1830	1830	1820	1820	1810	1810	1800	1800	1790	
1850	1850	1840	1840	1830	1830	1820	1820	1810	1810	1800	
1860	1860	1850	1850	1840	1840	1830	1830	1820	1820	1810	
1870	1870	1860	1860	1850	1850	1840	1840	1830	1830	1820	
1880	1880	1870	1870	1860	1860	1850	1850	1840	1840	1830	
1890	1890	1880	1880	1870	1870	1860	1860	1860	1850	1850	
1900	1900	1890	1890	1880	1880	1880	1870	1870	1860	1860	
1910	1910	1900	1900	1890	1890	1890	1880	1880	1870	1870	
1920	1920	1910	1910	1900	1900	1900	1890	1890	1880	1880	
1930	1930	1920	1920	1920	1910	1910	1900	1900	1890	1890	
1940	1940	1930	1930	1930	1920	1920	1910	1910	1910	1900	
1950	1950	1940	1940	1940	1930	1930	1920	1920	1920	1910	
1960	1960	1950	1950	1950	1940	1940	1940	1930	1930	1920	
1970	1970	1960	1960	1960	1950	1950	1950	1940	1940	1930	
1980	1980	1970	1970	1970	1960	1960	1960	1950	1950	1950	
1990	1990	1980	1980	1980	1970	1970	1970	1960	1960	1960	
2000	2000	1990	1990	1990	1980	1980	1980	1970	1970	1970	
2010	2010	2000	2000	2000	2000	1990	1990	1990	1980	1980	
2020	2020	2010	2010	2010	2010	2000	2000	2000	1990	1990	
2030	2030	2020	2020	2020	2020	2010	2010	2010	2000	2000	
2040	2040	2030	2030	2030	2030	2020	2020	2020	2020	2010	
2050	2050	2050	2040	2040	2040	2030	2030	2030	2030	2020	
2060	2060	2060	2050	2050	2050	2050	2040	2040	2040	2030	
2070	2070	2070	2060	2060	2060	2060	2050	2050	2050	2050	
2080	2080	2080	2070	2070	2070	2070	2060	2060	2060	2060	
2090	2090	2090	2080	2080	2080	2080	2080	2070	2070	2070	
2100	2100	2100	2090	2090	2090	2090	2090	2080	2080	2080	
2110	2110	2110	2100	2100	2100	2100	2100	2090	2090	2090	
2120	2120	2120	2110	2110	2110	2110	2110	2110	2100	2100	
2130	2130	2130	2130	2120	2120	2120	2120	2120	2110	2110	

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
2140	2140	2140	2140	2130	2130	2130	2130	2130	2130	2120	
2150	2150	2150	2150	2140	2140	2140	2140	2140	2140	2130	
2160	2160	2160	2160	2150	2150	2150	2150	2150	2150	2150	
2170	2170	2170	2170	2170	2160	2160	2160	2160	2160	2160	
2180	2180	2180	2180	2180	2170	2170	2170	2170	2170	2170	
2190	2190	2190	2190	2190	2180	2180	2180	2180	2180	2180	
2200	2200	2200	2200	2200	2200	2190	2190	2190	2190	2190	
2210	2210	2210	2210	2210	2210	2210	2200	2200	2200	2200	
2220	2220	2220	2220	2220	2220	2220	2210	2210	2210	2210	
2230	2230	2230	2230	2230	2230	2230	2230	2220	2220	2220	
2240	2240	2240	2240	2240	2240	2240	2240	2240	2240	2230	
2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	2250	
2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	2260	
2270	2270	2270	2270	2270	2270	2270	2270	2270	2270	2270	
2280	2280	2280	2280	2280	2280	2280	2280	2280	2280	2280	
2290	2290	2290	2290	2290	2290	2290	2290	2290	2290	2290	
2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	
2310	2310	2310	2310	2310	2310	2310	2310	2310	2310	2310	
2320	2320	2320	2320	2320	2320	2320	2320	2320	2320	2320	
2330	2330	2330	2330	2330	2330	2330	2330	2330	2330	2330	
2340	2340	2340	2340	2340	2340	2340	2340	2340	2350	2350	
2350	2350	2350	2350	2350	2350	2350	2350	2360	2360	2360	
2360	2360	2360	2360	2360	2360	2360	2370	2370	2370	2370	
2370	2370	2370	2370	2370	2370	2380	2380	2380	2380	2380	
2380	2380	2380	2380	2380	2380	2390	2390	2390	2390	2390	
2390	2390	2390	2390	2390	2400	2400	2400	2400	2400	2400	
2400	2400	2400	2400	2400	2410	2410	2410	2410	2410	2410	
2410	2410	2410	2410	2420	2420	2420	2420	2420	2420	2420	
2420	2420	2420	2420	2430	2430	2430	2430	2430	2430	2430	
2430	2430	2430	2430	2440	2440	2440	2440	2440	2440	2450	
2440	2440	2440	2440	2450	2450	2450	2450	2450	2460	2460	
2450	2450	2450	2460	2460	2460	2460	2460	2460	2470	2470	
2460	2460	2460	2470	2470	2470	2470	2470	2470	2480	2480	
2470	2470	2470	2480	2480	2480	2480	2480	2490	2490	2490	
2480	2480	2480	2490	2490	2490	2490	2490	2500	2500	2500	
2490	2490	2490	2500	2500	2500	2500	2510	2510	2510	2510	
2500	2500	2500	2510	2510	2510	2510	2520	2520	2520	2520	
2510	2510	2510	2520	2520	2520	2520	2530	2530	2530	2530	
2520	2520	2520	2530	2530	2530	2530	2540	2540	2540	2550	
2530	2530	2530	2540	2540	2540	2550	2550	2550	2550	2560	
2540	2540	2550	2550	2550	2550	2560	2560	2560	2560	2570	
2550	2550	2560	2560	2560	2560	2570	2570	2570	2580	2580	
2560	2560	2570	2570	2570	2570	2580	2580	2580	2590	2590	

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1280		1160	1140	1130	1120	1100	1090	1070	1060	1040	1030
1290		1170	1150	1140	1130	1110	1100	1090	1070	1060	1040
1300		1180	1170	1150	1140	1130	1110	1100	1080	1070	1050
1310		1190	1180	1160	1150	1140	1120	1110	1100	1080	1070
1320		1200	1190	1180	1160	1150	1140	1120	1110	1090	1080
1330		1210	1200	1190	1170	1160	1150	1130	1120	1110	1090
1340		1220	1210	1200	1190	1170	1160	1150	1130	1120	1100
1350		1230	1220	1210	1200	1180	1170	1160	1140	1130	1120
1360		1250	1230	1220	1210	1200	1180	1170	1160	1140	1130
1370		1260	1240	1230	1220	1210	1200	1180	1170	1150	1140
1380		1270	1260	1240	1230	1220	1210	1190	1180	1170	1150
1390		1280	1270	1260	1240	1230	1220	1210	1190	1180	1170
1400		1290	1280	1270	1260	1240	1230	1220	1210	1190	1180
1410		1300	1290	1280	1270	1260	1240	1230	1220	1200	1190
1420		1310	1300	1290	1280	1270	1250	1240	1230	1220	1200
1430		1320	1310	1300	1290	1280	1270	1250	1240	1230	1220
1440		1340	1320	1310	1300	1290	1280	1270	1250	1240	1230
1450		1350	1340	1320	1310	1300	1290	1280	1270	1250	1240
1460		1360	1350	1340	1330	1310	1300	1290	1280	1270	1250
1470		1370	1360	1350	1340	1330	1310	1300	1290	1280	1270
1480		1380	1370	1360	1350	1340	1330	1310	1300	1290	1280
1490		1390	1380	1370	1360	1350	1340	1330	1310	1300	1290
1500		1400	1390	1380	1370	1360	1350	1340	1330	1320	1300
1510		1410	1400	1390	1380	1370	1360	1350	1340	1330	1320
1520		1430	1420	1410	1390	1380	1370	1360	1350	1340	1330
1530		1440	1430	1420	1410	1400	1390	1370	1360	1350	1340
1540		1450	1440	1430	1420	1410	1400	1390	1380	1360	1350
1550		1460	1450	1440	1430	1420	1410	1400	1390	1380	1370
1560		1470	1460	1450	1440	1430	1420	1410	1400	1390	1380
1570		1480	1470	1460	1450	1440	1430	1420	1410	1400	1390
1580		1490	1480	1470	1460	1460	1450	1430	1420	1410	1400
1590		1500	1490	1490	1480	1470	1460	1450	1440	1430	1420
1600		1510	1510	1500	1490	1480	1470	1460	1450	1440	1430
1610		1530	1520	1510	1500	1490	1480	1470	1460	1450	1440
1620		1540	1530	1520	1510	1500	1490	1480	1470	1460	1450
1630		1550	1540	1530	1520	1510	1500	1500	1490	1480	1470
1640		1560	1550	1540	1530	1530	1520	1510	1500	1490	1480
1650		1570	1560	1550	1550	1540	1530	1520	1510	1500	1490
1660		1580	1570	1570	1560	1550	1540	1530	1520	1510	1500
1670		1590	1590	1580	1570	1560	1550	1540	1530	1530	1520
1680		1600	1600	1590	1580	1570	1560	1560	1550	1540	1530
1690		1620	1610	1600	1590	1580	1580	1570	1560	1550	1540
1700		1630	1620	1610	1600	1600	1590	1580	1570	1560	1550

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1710		1640	1630	1620	1620	1610	1600	1590	1580	1570	1570
1720		1650	1640	1640	1630	1620	1610	1600	1600	1590	1580
1730		1660	1650	1650	1640	1630	1620	1620	1610	1600	1590
1740		1670	1670	1660	1650	1640	1640	1630	1620	1610	1600
1750		1680	1680	1670	1660	1660	1650	1640	1630	1620	1620
1760		1690	1690	1680	1670	1670	1660	1650	1640	1640	1630
1770		1710	1700	1690	1690	1680	1670	1660	1660	1650	1640
1780		1720	1710	1700	1700	1690	1680	1680	1670	1660	1650
1790		1730	1720	1720	1710	1700	1700	1690	1680	1670	1670
1800		1740	1730	1730	1720	1710	1710	1700	1690	1690	1680
1810		1750	1740	1740	1730	1730	1720	1710	1710	1700	1690
1820		1760	1760	1750	1740	1740	1730	1720	1720	1710	1700
1830		1770	1770	1760	1760	1750	1740	1740	1730	1720	1720
1840		1780	1780	1770	1770	1760	1750	1750	1740	1730	1730
1850		1800	1790	1780	1780	1770	1770	1760	1750	1750	1740
1860		1810	1800	1800	1790	1780	1780	1770	1770	1760	1750
1870		1820	1810	1810	1800	1800	1790	1780	1780	1770	1770
1880		1830	1820	1820	1810	1810	1800	1800	1790	1780	1780
1890		1840	1840	1830	1830	1820	1810	1810	1800	1800	1790
1900		1850	1850	1840	1840	1830	1830	1820	1810	1810	1800
1910		1860	1860	1850	1850	1840	1840	1830	1830	1820	1820
1920		1870	1870	1870	1860	1860	1850	1840	1840	1830	1830
1930		1890	1880	1880	1870	1870	1860	1860	1850	1850	1840
1940		1900	1890	1890	1880	1880	1870	1870	1860	1860	1850
1950		1910	1900	1900	1890	1890	1890	1880	1880	1870	1870
1960		1920	1920	1910	1910	1900	1900	1890	1890	1880	1880
1970		1930	1930	1920	1920	1910	1910	1900	1900	1900	1890
1980		1940	1940	1930	1930	1930	1920	1920	1910	1910	1900
1990		1950	1950	1950	1940	1940	1930	1930	1920	1920	1920
2000		1960	1960	1960	1950	1950	1950	1940	1940	1930	1930
2010		1980	1970	1970	1960	1960	1960	1950	1950	1940	1940
2020		1990	1980	1980	1980	1970	1970	1970	1960	1960	1950
2030		2000	1990	1990	1990	1980	1980	1980	1970	1970	1970
2040		2010	2010	2000	2000	2000	1990	1990	1990	1980	1980
2050		2020	2020	2010	2010	2010	2000	2000	2000	1990	1990
2060		2030	2030	2030	2020	2020	2020	2010	2010	2010	2000
2070		2040	2040	2040	2030	2030	2030	2030	2020	2020	2020
2080		2050	2050	2050	2050	2040	2040	2040	2030	2030	2030
2090		2070	2060	2060	2060	2060	2050	2050	2050	2040	2040
2100		2080	2070	2070	2070	2070	2060	2060	2060	2060	2050
2110		2090	2090	2080	2080	2080	2080	2070	2070	2070	2070
2120		2100	2100	2090	2090	2090	2090	2090	2080	2080	2080
2130		2110	2110	2110	2100	2100	2100	2100	2100	2090	2090

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
2140	2120	2120	2120	2120	2110	2110	2110	2110	2110	2100	
2150	2130	2130	2130	2130	2130	2120	2120	2120	2120	2120	
2160	2140	2140	2140	2140	2140	2140	2130	2130	2130	2130	
2170	2160	2150	2150	2150	2150	2150	2150	2140	2140	2140	
2180	2170	2170	2160	2160	2160	2160	2160	2160	2150	2150	
2190	2180	2180	2180	2170	2170	2170	2170	2170	2170	2170	
2200	2190	2190	2190	2190	2180	2180	2180	2180	2180	2180	
2210	2200	2200	2200	2200	2200	2200	2190	2190	2190	2190	
2220	2210	2210	2210	2210	2210	2210	2210	2210	2200	2200	
2230	2220	2220	2220	2220	2220	2220	2220	2220	2220	2220	
2240	2230	2230	2230	2230	2230	2230	2230	2230	2230	2230	
2250	2250	2240	2240	2240	2240	2240	2240	2240	2240	2240	
2260	2260	2260	2260	2260	2260	2250	2250	2250	2250	2250	
2270	2270	2270	2270	2270	2270	2270	2270	2270	2270	2270	
2280	2280	2280	2280	2280	2280	2280	2280	2280	2280	2280	
2290	2290	2290	2290	2290	2290	2290	2290	2290	2290	2290	
2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	2300	
2310	2310	2310	2310	2310	2310	2310	2310	2310	2320	2320	
2320	2320	2320	2320	2330	2330	2330	2330	2330	2330	2330	
2330	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340	
2340	2350	2350	2350	2350	2350	2350	2350	2350	2350	2350	
2350	2360	2360	2360	2360	2360	2360	2360	2360	2360	2370	
2360	2370	2370	2370	2370	2370	2370	2370	2380	2380	2380	
2370	2380	2380	2380	2380	2380	2390	2390	2390	2390	2390	
2380	2390	2390	2390	2390	2400	2400	2400	2400	2400	2400	
2390	2400	2400	2410	2410	2410	2410	2410	2410	2410	2420	
2400	2410	2420	2420	2420	2420	2420	2420	2420	2430	2430	
2410	2430	2430	2430	2430	2430	2430	2430	2440	2440	2440	
2420	2440	2440	2440	2440	2440	2450	2450	2450	2450	2450	
2430	2450	2450	2450	2450	2460	2460	2460	2460	2460	2470	
2440	2460	2460	2460	2460	2470	2470	2470	2470	2480	2480	
2450	2470	2470	2470	2480	2480	2480	2480	2490	2490	2490	
2460	2480	2480	2490	2490	2490	2490	2500	2500	2500	2500	
2470	2490	2490	2500	2500	2500	2500	2510	2510	2510	2520	
2480	2500	2510	2510	2510	2510	2520	2520	2520	2530	2530	
2490	2510	2520	2520	2520	2530	2530	2530	2530	2540	2540	
2500	2530	2530	2530	2530	2540	2540	2540	2550	2550	2550	
2510	2540	2540	2540	2550	2550	2550	2560	2560	2560	2570	
2520	2550	2550	2550	2560	2560	2560	2570	2570	2570	2580	
2530	2560	2560	2570	2570	2570	2580	2580	2580	2590	2590	
2540	2570	2570	2580	2580	2580	2590	2590	2600	2600	2600	
2550	2580	2590	2590	2590	2600	2600	2600	2610	2610	2620	
2560	2590	2600	2600	2600	2610	2610	2620	2620	2620	2630	

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1280		1010	1000	980	960	940	930	910	890	870	850
1290		1020	1010	990	970	960	940	920	900	880	860
1300		1040	1020	1000	990	970	950	930	920	900	880
1310		1050	1030	1020	1000	980	970	950	930	910	890
1320		1060	1050	1030	1010	1000	980	960	940	920	910
1330		1080	1060	1040	1030	1010	990	980	960	940	920
1340		1090	1070	1060	1040	1020	1010	990	970	950	930
1350		1100	1090	1070	1050	1040	1020	1000	990	970	950
1360		1110	1100	1080	1070	1050	1030	1020	1000	980	960
1370		1130	1110	1100	1080	1060	1050	1030	1010	1000	980
1380		1140	1120	1110	1090	1080	1060	1040	1030	1010	990
1390		1150	1140	1120	1110	1090	1070	1060	1040	1020	1010
1400		1160	1150	1130	1120	1100	1090	1070	1050	1040	1020
1410		1180	1160	1150	1130	1120	1100	1090	1070	1050	1030
1420		1190	1180	1160	1150	1130	1120	1100	1080	1070	1050
1430		1200	1190	1170	1160	1140	1130	1110	1100	1080	1060
1440		1210	1200	1190	1170	1160	1140	1130	1110	1090	1080
1450		1230	1210	1200	1190	1170	1160	1140	1120	1110	1090
1460		1240	1230	1210	1200	1180	1170	1150	1140	1120	1110
1470		1250	1240	1230	1210	1200	1180	1170	1150	1140	1120
1480		1270	1250	1240	1220	1210	1200	1180	1170	1150	1130
1490		1280	1260	1250	1240	1220	1210	1190	1180	1160	1150
1500		1290	1280	1260	1250	1240	1220	1210	1190	1180	1160
1510		1300	1290	1280	1260	1250	1240	1220	1210	1190	1180
1520		1320	1300	1290	1280	1260	1250	1240	1220	1210	1190
1530		1330	1320	1300	1290	1280	1260	1250	1240	1220	1210
1540		1340	1330	1320	1300	1290	1280	1260	1250	1230	1220
1550		1350	1340	1330	1320	1300	1290	1280	1260	1250	1230
1560		1370	1350	1340	1330	1320	1300	1290	1280	1260	1250
1570		1380	1370	1360	1340	1330	1320	1300	1290	1280	1260
1580		1390	1380	1370	1360	1340	1330	1320	1300	1290	1280
1590		1400	1390	1380	1370	1360	1340	1330	1320	1300	1290
1600		1420	1410	1390	1380	1370	1360	1350	1330	1320	1310
1610		1430	1420	1410	1400	1380	1370	1360	1350	1330	1320
1620		1440	1430	1420	1410	1400	1390	1370	1360	1350	1330
1630		1460	1440	1430	1420	1410	1400	1390	1370	1360	1350
1640		1470	1460	1450	1440	1420	1410	1400	1390	1380	1360
1650		1480	1470	1460	1450	1440	1430	1410	1400	1390	1380
1660		1490	1480	1470	1460	1450	1440	1430	1420	1400	1390
1670		1510	1500	1490	1470	1460	1450	1440	1430	1420	1410
1680		1520	1510	1500	1490	1480	1470	1460	1440	1430	1420
1690		1530	1520	1510	1500	1490	1480	1470	1460	1450	1430
1700		1540	1530	1520	1510	1500	1490	1480	1470	1460	1450

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1710		1560	1550	1540	1530	1520	1510	1500	1490	1470	1460
1720		1570	1560	1550	1540	1530	1520	1510	1500	1490	1480
1730		1580	1570	1560	1550	1540	1530	1520	1510	1500	1490
1740		1590	1590	1580	1570	1560	1550	1540	1530	1520	1510
1750		1610	1600	1590	1580	1570	1560	1550	1540	1530	1520
1760		1620	1610	1600	1590	1580	1570	1560	1550	1540	1530
1770		1630	1620	1620	1610	1600	1590	1580	1570	1560	1550
1780		1640	1640	1630	1620	1610	1600	1590	1580	1570	1560
1790		1660	1650	1640	1630	1620	1620	1610	1600	1590	1580
1800		1670	1660	1650	1650	1640	1630	1620	1610	1600	1590
1810		1680	1680	1670	1660	1650	1640	1630	1620	1610	1610
1820		1700	1690	1680	1670	1660	1660	1650	1640	1630	1620
1830		1710	1700	1690	1690	1680	1670	1660	1650	1640	1630
1840		1720	1710	1710	1700	1690	1680	1670	1670	1660	1650
1850		1730	1730	1720	1710	1700	1700	1690	1680	1670	1660
1860		1750	1740	1730	1720	1720	1710	1700	1690	1690	1680
1870		1760	1750	1750	1740	1730	1720	1720	1710	1700	1690
1880		1770	1760	1760	1750	1740	1740	1730	1720	1710	1710
1890		1780	1780	1770	1760	1760	1750	1740	1740	1730	1720
1900		1800	1790	1780	1780	1770	1760	1760	1750	1740	1730
1910		1810	1800	1800	1790	1780	1780	1770	1760	1760	1750
1920		1820	1820	1810	1800	1800	1790	1780	1780	1770	1760
1930		1830	1830	1820	1820	1810	1800	1800	1790	1780	1780
1940		1850	1840	1840	1830	1820	1820	1810	1800	1800	1790
1950		1860	1850	1850	1840	1840	1830	1820	1820	1810	1810
1960		1870	1870	1860	1860	1850	1840	1840	1830	1830	1820
1970		1890	1880	1880	1870	1860	1860	1850	1850	1840	1830
1980		1900	1890	1890	1880	1880	1870	1870	1860	1850	1850
1990		1910	1910	1900	1900	1890	1890	1880	1870	1870	1860
2000		1920	1920	1910	1910	1900	1900	1890	1890	1880	1880
2010		1940	1930	1930	1920	1920	1910	1910	1900	1900	1890
2020		1950	1940	1940	1940	1930	1930	1920	1920	1910	1910
2030		1960	1960	1950	1950	1940	1940	1930	1930	1920	1920
2040		1970	1970	1970	1960	1960	1950	1950	1940	1940	1930
2050		1990	1980	1980	1970	1970	1970	1960	1960	1950	1950
2060		2000	2000	1990	1990	1980	1980	1980	1970	1970	1960
2070		2010	2010	2000	2000	2000	1990	1990	1990	1980	1980
2080		2020	2020	2020	2010	2010	2010	2000	2000	2000	1990
2090		2040	2030	2030	2030	2020	2020	2020	2010	2010	2010
2100		2050	2050	2040	2040	2040	2030	2030	2030	2020	2020
2110		2060	2060	2060	2050	2050	2050	2040	2040	2040	2030
2120		2080	2070	2070	2070	2060	2060	2060	2050	2050	2050
2130		2090	2090	2080	2080	2080	2070	2070	2070	2070	2060

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
2140		2100	2100	2100	2090	2090	2090	2090	2080	2080	2080
2150		2110	2110	2110	2110	2100	2100	2100	2100	2090	2090
2160		2130	2120	2120	2120	2120	2120	2110	2110	2110	2110
2170		2140	2140	2130	2130	2130	2130	2130	2120	2120	2120
2180		2150	2150	2150	2150	2140	2140	2140	2140	2140	2130
2190		2160	2160	2160	2160	2160	2160	2150	2150	2150	2150
2200		2180	2180	2170	2170	2170	2170	2170	2170	2160	2160
2210		2190	2190	2190	2190	2180	2180	2180	2180	2180	2180
2220		2200	2200	2200	2200	2200	2200	2190	2190	2190	2190
2230		2210	2210	2210	2210	2210	2210	2210	2210	2210	2210
2240		2230	2230	2230	2220	2220	2220	2220	2220	2220	2220
2250		2240	2240	2240	2240	2240	2240	2240	2240	2230	2230
2260		2250	2250	2250	2250	2250	2250	2250	2250	2250	2250
2270		2270	2260	2260	2260	2260	2260	2260	2260	2260	2260
2280		2280	2280	2280	2280	2280	2280	2280	2280	2280	2280
2290		2290	2290	2290	2290	2290	2290	2290	2290	2290	2290
2300		2300	2300	2300	2300	2300	2300	2300	2300	2300	2310
2310		2320	2320	2320	2320	2320	2320	2320	2320	2320	2320
2320		2330	2330	2330	2330	2330	2330	2330	2330	2330	2330
2330		2340	2340	2340	2340	2340	2340	2350	2350	2350	2350
2340		2350	2350	2360	2360	2360	2360	2360	2360	2360	2360
2350		2370	2370	2370	2370	2370	2370	2370	2370	2380	2380
2360		2380	2380	2380	2380	2380	2390	2390	2390	2390	2390
2370		2390	2390	2390	2400	2400	2400	2400	2400	2400	2410
2380		2400	2410	2410	2410	2410	2410	2410	2420	2420	2420
2390		2420	2420	2420	2420	2420	2430	2430	2430	2430	2430
2400		2430	2430	2430	2440	2440	2440	2440	2440	2450	2450
2410		2440	2440	2450	2450	2450	2450	2460	2460	2460	2460
2420		2460	2460	2460	2460	2460	2470	2470	2470	2470	2480
2430		2470	2470	2470	2470	2480	2480	2480	2490	2490	2490
2440		2480	2480	2490	2490	2490	2490	2500	2500	2500	2510
2450		2490	2500	2500	2500	2500	2510	2510	2510	2520	2520
2460		2510	2510	2510	2510	2520	2520	2520	2530	2530	2530
2470		2520	2520	2520	2530	2530	2530	2540	2540	2540	2550
2480		2530	2530	2540	2540	2540	2550	2550	2550	2560	2560
2490		2540	2550	2550	2550	2560	2560	2560	2570	2570	2580
2500		2560	2560	2560	2570	2570	2570	2580	2580	2590	2590
2510		2570	2570	2580	2580	2580	2590	2590	2600	2600	2610
2520		2580	2590	2590	2590	2600	2600	2610	2610	2610	2620
2530		2590	2600	2600	2610	2610	2620	2620	2620	2630	2630
2540		2610	2610	2620	2620	2620	2630	2630	2640	2640	2650
2550		2620	2620	2630	2630	2640	2640	2650	2650	2660	2660
2560		2630	2640	2640	2650	2650	2660	2660	2670	2670	2680

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1280		830	810	780	760	740	710	690	660	640	610
1290		840	820	800	780	750	730	700	680	650	620
1300		860	840	810	790	770	740	720	690	670	640
1310		870	850	830	810	780	760	740	710	680	660
1320		890	860	840	820	800	780	750	730	700	670
1330		900	880	860	840	810	790	770	740	720	690
1340		910	890	870	850	830	810	780	760	730	710
1350		930	910	890	870	840	820	800	780	750	720
1360		940	920	900	880	860	840	810	790	770	740
1370		960	940	920	900	880	850	830	810	780	760
1380		970	950	930	910	890	870	850	820	800	770
1390		990	970	950	930	910	880	860	840	820	790
1400		1000	980	960	940	920	900	880	860	830	810
1410		1020	1000	980	960	940	920	890	870	850	820
1420		1030	1010	990	970	950	930	910	890	870	840
1430		1040	1030	1010	990	970	950	930	900	880	860
1440		1060	1040	1020	1000	980	960	940	920	900	870
1450		1070	1060	1040	1020	1000	980	960	940	910	890
1460		1090	1070	1050	1030	1010	990	970	950	930	910
1470		1100	1090	1070	1050	1030	1010	990	970	950	920
1480		1120	1100	1080	1060	1040	1030	1010	980	960	940
1490		1130	1110	1100	1080	1060	1040	1020	1000	980	960
1500		1150	1130	1110	1090	1080	1060	1040	1020	1000	970
1510		1160	1140	1130	1110	1090	1070	1050	1030	1010	990
1520		1170	1160	1140	1120	1110	1090	1070	1050	1030	1010
1530		1190	1170	1160	1140	1120	1100	1080	1070	1050	1020
1540		1200	1190	1170	1150	1140	1120	1100	1080	1060	1040
1550		1220	1200	1190	1170	1150	1130	1120	1100	1080	1060
1560		1230	1220	1200	1180	1170	1150	1130	1110	1090	1070
1570		1250	1230	1220	1200	1180	1170	1150	1130	1110	1090
1580		1260	1250	1230	1220	1200	1180	1160	1150	1130	1110
1590		1280	1260	1250	1230	1210	1200	1180	1160	1140	1120
1600		1290	1280	1260	1250	1230	1210	1200	1180	1160	1140
1610		1310	1290	1280	1260	1240	1230	1210	1190	1180	1160
1620		1320	1310	1290	1280	1260	1240	1230	1210	1190	1170
1630		1330	1320	1310	1290	1280	1260	1240	1230	1210	1190
1640		1350	1340	1320	1310	1290	1280	1260	1240	1230	1210
1650		1360	1350	1340	1320	1310	1290	1280	1260	1240	1220
1660		1380	1360	1350	1340	1320	1310	1290	1280	1260	1240
1670		1390	1380	1370	1350	1340	1320	1310	1290	1270	1260
1680		1410	1390	1380	1370	1350	1340	1320	1310	1290	1270
1690		1420	1410	1400	1380	1370	1350	1340	1320	1310	1290
1700		1440	1420	1410	1400	1380	1370	1350	1340	1320	1310

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1710		1450	1440	1430	1410	1400	1380	1370	1360	1340	1320
1720		1460	1450	1440	1430	1410	1400	1390	1370	1360	1340
1730		1480	1470	1460	1440	1430	1420	1400	1390	1370	1360
1740		1490	1480	1470	1460	1440	1430	1420	1400	1390	1370
1750		1510	1500	1490	1470	1460	1450	1430	1420	1410	1390
1760		1520	1510	1500	1490	1480	1460	1450	1440	1420	1410
1770		1540	1530	1510	1500	1490	1480	1470	1450	1440	1420
1780		1550	1540	1530	1520	1510	1490	1480	1470	1460	1440
1790		1570	1560	1540	1530	1520	1510	1500	1480	1470	1460
1800		1580	1570	1560	1550	1540	1530	1510	1500	1490	1470
1810		1600	1590	1570	1560	1550	1540	1530	1520	1500	1490
1820		1610	1600	1590	1580	1570	1560	1550	1530	1520	1510
1830		1620	1610	1600	1590	1580	1570	1560	1550	1540	1520
1840		1640	1630	1620	1610	1600	1590	1580	1570	1550	1540
1850		1650	1640	1630	1620	1610	1600	1590	1580	1570	1560
1860		1670	1660	1650	1640	1630	1620	1610	1600	1590	1570
1870		1680	1670	1660	1650	1640	1630	1620	1610	1600	1590
1880		1700	1690	1680	1670	1660	1650	1640	1630	1620	1610
1890		1710	1700	1690	1680	1680	1670	1660	1650	1640	1620
1900		1730	1720	1710	1700	1690	1680	1670	1660	1650	1640
1910		1740	1730	1720	1720	1710	1700	1690	1680	1670	1660
1920		1750	1750	1740	1730	1720	1710	1700	1690	1680	1670
1930		1770	1760	1750	1750	1740	1730	1720	1710	1700	1690
1940		1780	1780	1770	1760	1750	1740	1740	1730	1720	1710
1950		1800	1790	1780	1780	1770	1760	1750	1740	1730	1720
1960		1810	1810	1800	1790	1780	1780	1770	1760	1750	1740
1970		1830	1820	1810	1810	1800	1790	1780	1780	1770	1760
1980		1840	1840	1830	1820	1810	1810	1800	1790	1780	1770
1990		1860	1850	1840	1840	1830	1820	1810	1810	1800	1790
2000		1870	1860	1860	1850	1840	1840	1830	1820	1820	1810
2010		1890	1880	1870	1870	1860	1850	1850	1840	1830	1820
2020		1900	1890	1890	1880	1880	1870	1860	1860	1850	1840
2030		1910	1910	1900	1900	1890	1880	1880	1870	1870	1860
2040		1930	1920	1920	1910	1910	1900	1890	1890	1880	1870
2050		1940	1940	1930	1930	1920	1920	1910	1900	1900	1890
2060		1960	1950	1950	1940	1940	1930	1930	1920	1910	1910
2070		1970	1970	1960	1960	1950	1950	1940	1940	1930	1920
2080		1990	1980	1980	1970	1970	1960	1960	1950	1950	1940
2090		2000	2000	1990	1990	1980	1980	1970	1970	1960	1960
2100		2020	2010	2010	2000	2000	1990	1990	1980	1980	1970
2110		2030	2030	2020	2020	2010	2010	2010	2000	2000	1990
2120		2040	2040	2040	2030	2030	2030	2020	2020	2010	2010
2130		2060	2060	2050	2050	2040	2040	2040	2030	2030	2020

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.6
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
2140		2070	2070	2070	2060	2060	2060	2050	2050	2050	2040
2150		2090	2090	2080	2080	2080	2070	2070	2070	2060	2060
2160		2100	2100	2100	2090	2090	2090	2080	2080	2080	2070
2170		2120	2110	2110	2110	2110	2100	2100	2100	2090	2090
2180		2130	2130	2130	2120	2120	2120	2120	2110	2110	2110
2190		2150	2140	2140	2140	2140	2130	2130	2130	2130	2120
2200		2160	2160	2160	2150	2150	2150	2150	2150	2140	2140
2210		2170	2170	2170	2170	2170	2170	2160	2160	2160	2160
2220		2190	2190	2190	2180	2180	2180	2180	2180	2180	2170
2230		2200	2200	2200	2200	2200	2200	2200	2190	2190	2190
2240		2220	2220	2220	2220	2210	2210	2210	2210	2210	2210
2250		2230	2230	2230	2230	2230	2230	2230	2230	2230	2220
2260		2250	2250	2250	2250	2240	2240	2240	2240	2240	2240
2270		2260	2260	2260	2260	2260	2260	2260	2260	2260	2260
2280		2280	2280	2280	2280	2280	2280	2280	2280	2270	2270
2290		2290	2290	2290	2290	2290	2290	2290	2290	2290	2290
2300		2310	2310	2310	2310	2310	2310	2310	2310	2310	2310
2310		2320	2320	2320	2320	2320	2320	2320	2320	2320	2320
2320		2330	2340	2340	2340	2340	2340	2340	2340	2340	2340
2330		2350	2350	2350	2350	2350	2350	2350	2360	2360	2360
2340		2360	2360	2370	2370	2370	2370	2370	2370	2370	2370
2350		2380	2380	2380	2380	2380	2380	2390	2390	2390	2390
2360		2390	2390	2400	2400	2400	2400	2400	2400	2410	2410
2370		2410	2410	2410	2410	2410	2420	2420	2420	2420	2420
2380		2420	2420	2430	2430	2430	2430	2430	2440	2440	2440
2390		2440	2440	2440	2440	2440	2450	2450	2450	2460	2460
2400		2450	2450	2460	2460	2460	2460	2470	2470	2470	2470
2410		2460	2470	2470	2470	2480	2480	2480	2480	2490	2490
2420		2480	2480	2490	2490	2490	2490	2500	2500	2500	2510
2430		2490	2500	2500	2500	2510	2510	2510	2520	2520	2520
2440		2510	2510	2510	2520	2520	2530	2530	2530	2540	2540
2450		2520	2530	2530	2530	2540	2540	2550	2550	2550	2560
2460		2540	2540	2540	2550	2550	2560	2560	2570	2570	2570
2470		2550	2560	2560	2560	2570	2570	2580	2580	2590	2590
2480		2570	2570	2570	2580	2580	2590	2590	2600	2600	2610
2490		2580	2590	2590	2590	2600	2600	2610	2610	2620	2620
2500		2600	2600	2600	2610	2610	2620	2620	2630	2640	2640
2510		2610	2610	2620	2620	2630	2630	2640	2650	2650	2660
2520		2620	2630	2630	2640	2640	2650	2660	2660	2670	2670
2530		2640	2640	2650	2650	2660	2670	2670	2680	2680	2690
2540		2650	2660	2660	2670	2680	2680	2690	2690	2700	2710
2550		2670	2670	2680	2680	2690	2700	2700	2710	2720	2720
2560		2680	2690	2690	2700	2710	2710	2720	2730	2730	2740

WEST VIRGINIA DIVISION OF HIGHWAYS
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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1280	1270	1260	1250	1230	1220	1210	1200	1180	1170	1160	
1290	1280	1270	1260	1240	1230	1220	1210	1200	1180	1170	
1300	1290	1280	1270	1260	1240	1230	1220	1210	1190	1180	
1310	1300	1290	1280	1270	1250	1240	1230	1220	1200	1190	
1320	1310	1300	1290	1280	1260	1250	1240	1230	1220	1200	
1330	1320	1310	1300	1290	1270	1260	1250	1240	1230	1210	
1340	1330	1320	1310	1300	1290	1270	1260	1250	1240	1220	
1350	1340	1330	1320	1310	1300	1280	1270	1260	1250	1240	
1360	1350	1340	1330	1320	1310	1300	1280	1270	1260	1250	
1370	1360	1350	1340	1330	1320	1310	1290	1280	1270	1260	
1380	1370	1360	1350	1340	1330	1320	1310	1290	1280	1270	
1390	1380	1370	1360	1350	1340	1330	1320	1300	1290	1280	
1400	1390	1380	1370	1360	1350	1340	1330	1320	1300	1290	
1410	1400	1390	1380	1370	1360	1350	1340	1330	1310	1300	
1420	1410	1400	1390	1380	1370	1360	1350	1340	1330	1310	
1430	1420	1410	1400	1390	1380	1370	1360	1350	1340	1320	
1440	1430	1420	1410	1400	1390	1380	1370	1360	1350	1340	
1450	1440	1430	1420	1410	1400	1390	1380	1370	1360	1350	
1460	1450	1440	1430	1420	1410	1400	1390	1380	1370	1360	
1470	1460	1450	1440	1430	1420	1410	1400	1390	1380	1370	
1480	1470	1460	1450	1440	1430	1420	1410	1400	1390	1380	
1490	1480	1470	1460	1450	1440	1430	1420	1410	1400	1390	
1500	1490	1480	1470	1460	1450	1440	1430	1420	1410	1400	
1510	1500	1490	1480	1470	1460	1450	1440	1430	1420	1410	
1520	1510	1500	1490	1480	1470	1470	1460	1450	1440	1420	
1530	1520	1510	1500	1490	1490	1480	1470	1460	1450	1440	
1540	1530	1520	1510	1510	1500	1490	1480	1470	1460	1450	
1550	1540	1530	1520	1520	1510	1500	1490	1480	1470	1460	
1560	1550	1540	1530	1530	1520	1510	1500	1490	1480	1470	
1570	1560	1550	1550	1540	1530	1520	1510	1500	1490	1480	
1580	1570	1560	1560	1550	1540	1530	1520	1510	1500	1490	
1590	1580	1570	1570	1560	1550	1540	1530	1520	1510	1500	
1600	1590	1580	1580	1570	1560	1550	1540	1530	1520	1510	
1610	1600	1590	1590	1580	1570	1560	1550	1540	1530	1520	
1620	1610	1600	1600	1590	1580	1570	1560	1550	1550	1540	
1630	1620	1610	1610	1600	1590	1580	1570	1570	1560	1550	
1640	1630	1620	1620	1610	1600	1590	1580	1580	1570	1560	
1650	1640	1640	1630	1620	1610	1600	1600	1590	1580	1570	
1660	1650	1650	1640	1630	1620	1610	1610	1600	1590	1580	
1670	1660	1660	1650	1640	1630	1620	1620	1610	1600	1590	
1680	1670	1670	1660	1650	1640	1640	1630	1620	1610	1600	
1690	1680	1680	1670	1660	1650	1650	1640	1630	1620	1610	
1700	1690	1690	1680	1670	1660	1660	1650	1640	1630	1620	

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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
1710	1700	1700	1690	1680	1670	1670	1660	1650	1640	1640	
1720	1710	1710	1700	1690	1690	1680	1670	1660	1660	1650	
1730	1720	1720	1710	1700	1700	1690	1680	1670	1670	1660	
1740	1730	1730	1720	1710	1710	1700	1690	1680	1680	1670	
1750	1740	1740	1730	1720	1720	1710	1700	1700	1690	1680	
1760	1750	1750	1740	1730	1730	1720	1710	1710	1700	1690	
1770	1760	1760	1750	1740	1740	1730	1720	1720	1710	1700	
1780	1770	1770	1760	1760	1750	1740	1740	1730	1720	1710	
1790	1780	1780	1770	1770	1760	1750	1750	1740	1730	1720	
1800	1790	1790	1780	1780	1770	1760	1760	1750	1740	1740	
1810	1800	1800	1790	1790	1780	1770	1770	1760	1750	1750	
1820	1810	1810	1800	1800	1790	1780	1780	1770	1770	1760	
1830	1820	1820	1810	1810	1800	1800	1790	1780	1780	1770	
1840	1830	1830	1820	1820	1810	1810	1800	1790	1790	1780	
1850	1840	1840	1830	1830	1820	1820	1810	1800	1800	1790	
1860	1850	1850	1840	1840	1830	1830	1820	1820	1810	1800	
1870	1860	1860	1850	1850	1840	1840	1830	1830	1820	1810	
1880	1870	1870	1860	1860	1850	1850	1840	1840	1830	1820	
1890	1890	1880	1870	1870	1860	1860	1850	1850	1840	1840	
1900	1900	1890	1890	1880	1870	1870	1860	1860	1850	1850	
1910	1910	1900	1900	1890	1890	1880	1870	1870	1860	1860	
1920	1920	1910	1910	1900	1900	1890	1890	1880	1870	1870	
1930	1930	1920	1920	1910	1910	1900	1900	1890	1890	1880	
1940	1940	1930	1930	1920	1920	1910	1910	1900	1900	1890	
1950	1950	1940	1940	1930	1930	1920	1920	1910	1910	1900	
1960	1960	1950	1950	1940	1940	1930	1930	1920	1920	1910	
1970	1970	1960	1960	1950	1950	1940	1940	1930	1930	1920	
1980	1980	1970	1970	1960	1960	1950	1950	1950	1940	1940	
1990	1990	1980	1980	1970	1970	1970	1960	1960	1950	1950	
2000	2000	1990	1990	1980	1980	1980	1970	1970	1960	1960	
2010	2010	2000	2000	1990	1990	1990	1980	1980	1970	1970	
2020	2020	2010	2010	2010	2000	2000	1990	1990	1980	1980	
2030	2030	2020	2020	2020	2010	2010	2000	2000	2000	1990	
2040	2040	2030	2030	2030	2020	2020	2010	2010	2010	2000	
2050	2050	2040	2040	2040	2030	2030	2030	2020	2020	2010	
2060	2060	2050	2050	2050	2040	2040	2040	2030	2030	2020	
2070	2070	2060	2060	2060	2050	2050	2050	2040	2040	2040	
2080	2080	2070	2070	2070	2060	2060	2060	2050	2050	2050	
2090	2090	2080	2080	2080	2070	2070	2070	2070	2060	2060	
2100	2100	2090	2090	2090	2090	2080	2080	2080	2070	2070	
2110	2110	2100	2100	2100	2100	2090	2090	2090	2080	2080	
2120	2120	2110	2110	2110	2110	2100	2100	2100	2090	2090	
2130	2130	2120	2120	2120	2120	2110	2110	2110	2110	2100	

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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	1	2	3	4	5	6	7	8	9	10
2140	2140	2140	2130	2130	2130	2120	2120	2120	2120	2110
2150	2150	2150	2140	2140	2140	2140	2130	2130	2130	2120
2160	2160	2160	2150	2150	2150	2150	2140	2140	2140	2140
2170	2170	2170	2160	2160	2160	2160	2150	2150	2150	2150
2180	2180	2180	2170	2170	2170	2170	2170	2160	2160	2160
2190	2190	2190	2180	2180	2180	2180	2180	2170	2170	2170
2200	2200	2200	2190	2190	2190	2190	2190	2180	2180	2180
2210	2210	2210	2200	2200	2200	2200	2200	2200	2190	2190
2220	2220	2220	2220	2210	2210	2210	2210	2210	2200	2200
2230	2230	2230	2230	2220	2220	2220	2220	2220	2220	2210
2240	2240	2240	2240	2230	2230	2230	2230	2230	2230	2220
2250	2250	2250	2250	2240	2240	2240	2240	2240	2240	2240
2260	2260	2260	2260	2260	2250	2250	2250	2250	2250	2250
2270	2270	2270	2270	2270	2260	2260	2260	2260	2260	2260
2280	2280	2280	2280	2280	2270	2270	2270	2270	2270	2270
2290	2290	2290	2290	2290	2290	2280	2280	2280	2280	2280
2300	2300	2300	2300	2300	2300	2300	2290	2290	2290	2290
2310	2310	2310	2310	2310	2310	2310	2310	2300	2300	2300
2320	2320	2320	2320	2320	2320	2320	2320	2320	2310	2310
2330	2330	2330	2330	2330	2330	2330	2330	2330	2330	2320
2340	2340	2340	2340	2340	2340	2340	2340	2340	2340	2340
2350	2350	2350	2350	2350	2350	2350	2350	2350	2350	2350
2360	2360	2360	2360	2360	2360	2360	2360	2360	2360	2360
2370	2370	2370	2370	2370	2370	2370	2370	2370	2370	2370
2380	2380	2380	2380	2380	2380	2380	2380	2380	2380	2380
2390	2390	2390	2390	2390	2390	2390	2390	2390	2390	2390
2400	2400	2400	2400	2400	2400	2400	2400	2400	2400	2400
2410	2410	2410	2410	2410	2410	2410	2410	2410	2410	2410
2420	2420	2420	2420	2420	2420	2420	2420	2420	2420	2420
2430	2430	2430	2430	2430	2430	2430	2430	2430	2440	2440
2440	2440	2440	2440	2440	2440	2440	2440	2450	2450	2450
2450	2450	2450	2450	2450	2450	2450	2460	2460	2460	2460
2460	2460	2460	2460	2460	2460	2470	2470	2470	2470	2470
2470	2470	2470	2470	2470	2470	2480	2480	2480	2480	2480
2480	2480	2480	2480	2480	2490	2490	2490	2490	2490	2490
2490	2490	2490	2490	2490	2500	2500	2500	2500	2500	2500
2500	2500	2500	2500	2510	2510	2510	2510	2510	2510	2510
2510	2510	2510	2510	2520	2520	2520	2520	2520	2520	2520
2520	2520	2520	2520	2530	2530	2530	2530	2530	2530	2540
2530	2530	2530	2530	2540	2540	2540	2540	2540	2550	2550
2540	2540	2540	2550	2550	2550	2550	2550	2550	2560	2560
2550	2550	2550	2560	2560	2560	2560	2560	2570	2570	2570
2560	2560	2560	2570	2570	2570	2570	2570	2580	2580	2580

WEST VIRGINIA DIVISION OF HIGHWAYS
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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1280		1140	1130	1120	1100	1090	1070	1060	1040	1020	1010
1290		1160	1140	1130	1110	1100	1080	1070	1050	1040	1020
1300		1170	1150	1140	1120	1110	1100	1080	1060	1050	1030
1310		1180	1160	1150	1140	1120	1110	1090	1080	1060	1040
1320		1190	1180	1160	1150	1130	1120	1100	1090	1070	1060
1330		1200	1190	1170	1160	1150	1130	1120	1100	1080	1070
1340		1210	1200	1190	1170	1160	1140	1130	1110	1100	1080
1350		1220	1210	1200	1180	1170	1150	1140	1120	1110	1090
1360		1230	1220	1210	1190	1180	1170	1150	1140	1120	1110
1370		1250	1230	1220	1210	1190	1180	1160	1150	1130	1120
1380		1260	1240	1230	1220	1200	1190	1180	1160	1150	1130
1390		1270	1260	1240	1230	1220	1200	1190	1170	1160	1140
1400		1280	1270	1250	1240	1230	1210	1200	1190	1170	1160
1410		1290	1280	1270	1250	1240	1230	1210	1200	1180	1170
1420		1300	1290	1280	1260	1250	1240	1220	1210	1200	1180
1430		1310	1300	1290	1280	1260	1250	1240	1220	1210	1190
1440		1320	1310	1300	1290	1270	1260	1250	1230	1220	1210
1450		1340	1320	1310	1300	1290	1270	1260	1250	1230	1220
1460		1350	1340	1320	1310	1300	1290	1270	1260	1250	1230
1470		1360	1350	1330	1320	1310	1300	1280	1270	1260	1240
1480		1370	1360	1350	1330	1320	1310	1300	1280	1270	1260
1490		1380	1370	1360	1350	1330	1320	1310	1300	1280	1270
1500		1390	1380	1370	1360	1350	1330	1320	1310	1290	1280
1510		1400	1390	1380	1370	1360	1350	1330	1320	1310	1290
1520		1410	1400	1390	1380	1370	1360	1340	1330	1320	1310
1530		1430	1410	1400	1390	1380	1370	1360	1340	1330	1320
1540		1440	1430	1420	1400	1390	1380	1370	1360	1340	1330
1550		1450	1440	1430	1420	1400	1390	1380	1370	1360	1340
1560		1460	1450	1440	1430	1420	1400	1390	1380	1370	1360
1570		1470	1460	1450	1440	1430	1420	1400	1390	1380	1370
1580		1480	1470	1460	1450	1440	1430	1420	1410	1390	1380
1590		1490	1480	1470	1460	1450	1440	1430	1420	1410	1390
1600		1500	1490	1480	1470	1460	1450	1440	1430	1420	1410
1610		1520	1510	1500	1490	1470	1460	1450	1440	1430	1420
1620		1530	1520	1510	1500	1490	1480	1470	1450	1440	1430
1630		1540	1530	1520	1510	1500	1490	1480	1470	1460	1440
1640		1550	1540	1530	1520	1510	1500	1490	1480	1470	1460
1650		1560	1550	1540	1530	1520	1510	1500	1490	1480	1470
1660		1570	1560	1550	1540	1530	1520	1510	1500	1490	1480
1670		1580	1570	1560	1560	1550	1540	1530	1520	1500	1490
1680		1590	1590	1580	1570	1560	1550	1540	1530	1520	1510
1690		1610	1600	1590	1580	1570	1560	1550	1540	1530	1520
1700		1620	1610	1600	1590	1580	1570	1560	1550	1540	1530

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
1710		1630	1620	1610	1600	1590	1580	1570	1560	1550	1540
1720		1640	1630	1620	1610	1600	1600	1590	1580	1570	1560
1730		1650	1640	1630	1620	1620	1610	1600	1590	1580	1570
1740		1660	1650	1640	1640	1630	1620	1610	1600	1590	1580
1750		1670	1660	1660	1650	1640	1630	1620	1610	1600	1590
1760		1680	1680	1670	1660	1650	1640	1630	1620	1620	1610
1770		1700	1690	1680	1670	1660	1650	1650	1640	1630	1620
1780		1710	1700	1690	1680	1670	1670	1660	1650	1640	1630
1790		1720	1710	1700	1690	1690	1680	1670	1660	1650	1640
1800		1730	1720	1710	1710	1700	1690	1680	1670	1660	1660
1810		1740	1730	1730	1720	1710	1700	1690	1690	1680	1670
1820		1750	1740	1740	1730	1720	1710	1710	1700	1690	1680
1830		1760	1760	1750	1740	1730	1730	1720	1710	1700	1690
1840		1770	1770	1760	1750	1750	1740	1730	1720	1710	1710
1850		1780	1780	1770	1760	1760	1750	1740	1730	1730	1720
1860		1800	1790	1780	1780	1770	1760	1750	1750	1740	1730
1870		1810	1800	1790	1790	1780	1770	1770	1760	1750	1740
1880		1820	1810	1810	1800	1790	1790	1780	1770	1760	1760
1890		1830	1820	1820	1810	1800	1800	1790	1780	1780	1770
1900		1840	1840	1830	1820	1820	1810	1800	1800	1790	1780
1910		1850	1850	1840	1830	1830	1820	1810	1810	1800	1790
1920		1860	1860	1850	1850	1840	1830	1830	1820	1810	1810
1930		1870	1870	1860	1860	1850	1850	1840	1830	1830	1820
1940		1890	1880	1870	1870	1860	1860	1850	1840	1840	1830
1950		1900	1890	1890	1880	1870	1870	1860	1860	1850	1840
1960		1910	1900	1900	1890	1890	1880	1870	1870	1860	1860
1970		1920	1910	1910	1900	1900	1890	1890	1880	1870	1870
1980		1930	1930	1920	1920	1910	1900	1900	1890	1890	1880
1990		1940	1940	1930	1930	1920	1920	1910	1910	1900	1890
2000		1950	1950	1940	1940	1930	1930	1920	1920	1910	1910
2010		1960	1960	1960	1950	1950	1940	1940	1930	1920	1920
2020		1980	1970	1970	1960	1960	1950	1950	1940	1940	1930
2030		1990	1980	1980	1970	1970	1960	1960	1950	1950	1940
2040		2000	1990	1990	1990	1980	1980	1970	1970	1960	1960
2050		2010	2010	2000	2000	1990	1990	1980	1980	1970	1970
2060		2020	2020	2010	2010	2000	2000	2000	1990	1990	1980
2070		2030	2030	2020	2020	2020	2010	2010	2000	2000	1990
2080		2040	2040	2040	2030	2030	2020	2020	2020	2010	2010
2090		2050	2050	2050	2040	2040	2040	2030	2030	2020	2020
2100		2070	2060	2060	2060	2050	2050	2040	2040	2040	2030
2110		2080	2070	2070	2070	2060	2060	2060	2050	2050	2040
2120		2090	2090	2080	2080	2070	2070	2070	2060	2060	2060
2130		2100	2100	2090	2090	2090	2080	2080	2080	2070	2070

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	11	12	13	14	15	16	17	18	19	20
2140		2110	2110	2100	2100	2100	2100	2090	2090	2080	2080
2150		2120	2120	2120	2110	2110	2110	2100	2100	2100	2090
2160		2130	2130	2130	2120	2120	2120	2120	2110	2110	2110
2170		2140	2140	2140	2140	2130	2130	2130	2120	2120	2120
2180		2160	2150	2150	2150	2150	2140	2140	2140	2130	2130
2190		2170	2160	2160	2160	2160	2150	2150	2150	2150	2140
2200		2180	2180	2170	2170	2170	2170	2160	2160	2160	2160
2210		2190	2190	2190	2180	2180	2180	2180	2170	2170	2170
2220		2200	2200	2200	2190	2190	2190	2190	2190	2180	2180
2230		2210	2210	2210	2210	2200	2200	2200	2200	2200	2190
2240		2220	2220	2220	2220	2220	2210	2210	2210	2210	2210
2250		2230	2230	2230	2230	2230	2230	2220	2220	2220	2220
2260		2250	2240	2240	2240	2240	2240	2240	2230	2230	2230
2270		2260	2260	2250	2250	2250	2250	2250	2250	2250	2240
2280		2270	2270	2270	2260	2260	2260	2260	2260	2260	2260
2290		2280	2280	2280	2280	2270	2270	2270	2270	2270	2270
2300		2290	2290	2290	2290	2290	2290	2280	2280	2280	2280
2310		2300	2300	2300	2300	2300	2300	2300	2300	2290	2290
2320		2310	2310	2310	2310	2310	2310	2310	2310	2310	2310
2330		2320	2320	2320	2320	2320	2320	2320	2320	2320	2320
2340		2340	2340	2330	2330	2330	2330	2330	2330	2330	2330
2350		2350	2350	2350	2350	2350	2350	2340	2340	2340	2340
2360		2360	2360	2360	2360	2360	2360	2360	2360	2360	2360
2370		2370	2370	2370	2370	2370	2370	2370	2370	2370	2370
2380		2380	2380	2380	2380	2380	2380	2380	2380	2380	2380
2390		2390	2390	2390	2390	2390	2390	2390	2390	2390	2390
2400		2400	2400	2400	2400	2400	2400	2400	2410	2410	2410
2410		2410	2410	2420	2420	2420	2420	2420	2420	2420	2420
2420		2430	2430	2430	2430	2430	2430	2430	2430	2430	2430
2430		2440	2440	2440	2440	2440	2440	2440	2440	2440	2440
2440		2450	2450	2450	2450	2450	2450	2450	2450	2460	2460
2450		2460	2460	2460	2460	2460	2460	2470	2470	2470	2470
2460		2470	2470	2470	2470	2470	2480	2480	2480	2480	2480
2470		2480	2480	2480	2490	2490	2490	2490	2490	2490	2490
2480		2490	2490	2500	2500	2500	2500	2500	2500	2500	2510
2490		2500	2510	2510	2510	2510	2510	2510	2520	2520	2520
2500		2520	2520	2520	2520	2520	2520	2530	2530	2530	2530
2510		2530	2530	2530	2530	2530	2540	2540	2540	2540	2540
2520		2540	2540	2540	2540	2550	2550	2550	2550	2550	2560
2530		2550	2550	2550	2560	2560	2560	2560	2560	2570	2570
2540		2560	2560	2560	2570	2570	2570	2570	2580	2580	2580
2550		2570	2570	2580	2580	2580	2580	2590	2590	2590	2590
2560		2580	2590	2590	2590	2590	2600	2600	2600	2600	2610

WEST VIRGINIA DIVISION OF HIGHWAYS
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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1280		990	970	950	930	910	890	870	850	830	810
1290		1000	980	970	950	930	910	890	870	850	820
1300		1010	1000	980	960	940	920	900	880	860	840
1310		1030	1010	990	970	950	940	920	900	870	850
1320		1040	1020	1000	990	970	950	930	910	890	870
1330		1050	1030	1020	1000	980	960	940	920	900	880
1340		1060	1050	1030	1010	990	980	960	940	920	900
1350		1080	1060	1040	1030	1010	990	970	950	930	910
1360		1090	1070	1060	1040	1020	1000	980	960	950	920
1370		1100	1090	1070	1050	1030	1020	1000	980	960	940
1380		1120	1100	1080	1070	1050	1030	1010	990	970	950
1390		1130	1110	1100	1080	1060	1040	1030	1010	990	970
1400		1140	1120	1110	1090	1070	1060	1040	1020	1000	980
1410		1150	1140	1120	1100	1090	1070	1050	1030	1020	1000
1420		1170	1150	1130	1120	1100	1080	1070	1050	1030	1010
1430		1180	1160	1150	1130	1110	1100	1080	1060	1040	1020
1440		1190	1180	1160	1140	1130	1110	1090	1080	1060	1040
1450		1200	1190	1170	1160	1140	1120	1110	1090	1070	1050
1460		1220	1200	1190	1170	1150	1140	1120	1100	1090	1070
1470		1230	1210	1200	1180	1170	1150	1130	1120	1100	1080
1480		1240	1230	1210	1200	1180	1170	1150	1130	1110	1100
1490		1250	1240	1230	1210	1190	1180	1160	1150	1130	1110
1500		1270	1250	1240	1220	1210	1190	1180	1160	1140	1120
1510		1280	1270	1250	1240	1220	1210	1190	1170	1160	1140
1520		1290	1280	1260	1250	1230	1220	1200	1190	1170	1150
1530		1310	1290	1280	1260	1250	1230	1220	1200	1180	1170
1540		1320	1300	1290	1280	1260	1250	1230	1210	1200	1180
1550		1330	1320	1300	1290	1270	1260	1240	1230	1210	1200
1560		1340	1330	1320	1300	1290	1270	1260	1240	1230	1210
1570		1360	1340	1330	1320	1300	1290	1270	1260	1240	1220
1580		1370	1360	1340	1330	1310	1300	1290	1270	1250	1240
1590		1380	1370	1360	1340	1330	1310	1300	1280	1270	1250
1600		1390	1380	1370	1350	1340	1330	1310	1300	1280	1270
1610		1410	1390	1380	1370	1350	1340	1330	1310	1300	1280
1620		1420	1410	1390	1380	1370	1350	1340	1330	1310	1300
1630		1430	1420	1410	1390	1380	1370	1350	1340	1330	1310
1640		1440	1430	1420	1410	1390	1380	1370	1350	1340	1320
1650		1460	1450	1430	1420	1410	1390	1380	1370	1350	1340
1660		1470	1460	1450	1430	1420	1410	1400	1380	1370	1350
1670		1480	1470	1460	1450	1430	1420	1410	1400	1380	1370
1680		1490	1480	1470	1460	1450	1440	1420	1410	1400	1380
1690		1510	1500	1490	1470	1460	1450	1440	1420	1410	1400
1700		1520	1510	1500	1490	1470	1460	1450	1440	1420	1410

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
1710		1530	1520	1510	1500	1490	1480	1460	1450	1440	1420
1720		1550	1530	1520	1510	1500	1490	1480	1460	1450	1440
1730		1560	1550	1540	1530	1510	1500	1490	1480	1470	1450
1740		1570	1560	1550	1540	1530	1520	1500	1490	1480	1470
1750		1580	1570	1560	1550	1540	1530	1520	1510	1490	1480
1760		1600	1590	1580	1570	1550	1540	1530	1520	1510	1500
1770		1610	1600	1590	1580	1570	1560	1550	1530	1520	1510
1780		1620	1610	1600	1590	1580	1570	1560	1550	1540	1520
1790		1630	1620	1610	1600	1590	1580	1570	1560	1550	1540
1800		1650	1640	1630	1620	1610	1600	1590	1580	1560	1550
1810		1660	1650	1640	1630	1620	1610	1600	1590	1580	1570
1820		1670	1660	1650	1640	1630	1620	1610	1600	1590	1580
1830		1680	1680	1670	1660	1650	1640	1630	1620	1610	1600
1840		1700	1690	1680	1670	1660	1650	1640	1630	1620	1610
1850		1710	1700	1690	1680	1670	1670	1660	1650	1640	1620
1860		1720	1710	1710	1700	1690	1680	1670	1660	1650	1640
1870		1740	1730	1720	1710	1700	1690	1680	1670	1660	1650
1880		1750	1740	1730	1720	1710	1710	1700	1690	1680	1670
1890		1760	1750	1740	1740	1730	1720	1710	1700	1690	1680
1900		1770	1770	1760	1750	1740	1730	1720	1710	1710	1700
1910		1790	1780	1770	1760	1750	1750	1740	1730	1720	1710
1920		1800	1790	1780	1780	1770	1760	1750	1740	1730	1720
1930		1810	1800	1800	1790	1780	1770	1770	1760	1750	1740
1940		1820	1820	1810	1800	1790	1790	1780	1770	1760	1750
1950		1840	1830	1820	1820	1810	1800	1790	1780	1780	1770
1960		1850	1840	1840	1830	1820	1810	1810	1800	1790	1780
1970		1860	1860	1850	1840	1830	1830	1820	1810	1800	1800
1980		1870	1870	1860	1850	1850	1840	1830	1830	1820	1810
1990		1890	1880	1870	1870	1860	1850	1850	1840	1830	1820
2000		1900	1890	1890	1880	1870	1870	1860	1850	1850	1840
2010		1910	1910	1900	1890	1890	1880	1870	1870	1860	1850
2020		1930	1920	1910	1910	1900	1890	1890	1880	1870	1870
2030		1940	1930	1930	1920	1910	1910	1900	1900	1890	1880
2040		1950	1950	1940	1930	1930	1920	1920	1910	1900	1900
2050		1960	1960	1950	1950	1940	1940	1930	1920	1920	1910
2060		1980	1970	1970	1960	1950	1950	1940	1940	1930	1920
2070		1990	1980	1980	1970	1970	1960	1960	1950	1950	1940
2080		2000	2000	1990	1990	1980	1980	1970	1960	1960	1950
2090		2010	2010	2000	2000	1990	1990	1980	1980	1970	1970
2100		2030	2020	2020	2010	2010	2000	2000	1990	1990	1980
2110		2040	2030	2030	2030	2020	2020	2010	2010	2000	2000
2120		2050	2050	2040	2040	2030	2030	2030	2020	2020	2010
2130		2060	2060	2060	2050	2050	2040	2040	2030	2030	2020

WEST VIRGINIA DIVISION OF HIGHWAYS
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DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	21	22	23	24	25	26	27	28	29	30
2140		2080	2070	2070	2070	2060	2060	2050	2050	2040	2040
2150		2090	2090	2080	2080	2070	2070	2070	2060	2060	2050
2160		2100	2100	2100	2090	2090	2080	2080	2080	2070	2070
2170		2120	2110	2110	2100	2100	2100	2090	2090	2090	2080
2180		2130	2120	2120	2120	2110	2110	2110	2100	2100	2100
2190		2140	2140	2130	2130	2130	2120	2120	2120	2110	2110
2200		2150	2150	2150	2140	2140	2140	2130	2130	2130	2120
2210		2170	2160	2160	2160	2150	2150	2150	2150	2140	2140
2220		2180	2180	2170	2170	2170	2170	2160	2160	2160	2150
2230		2190	2190	2190	2180	2180	2180	2180	2170	2170	2170
2240		2200	2200	2200	2200	2190	2190	2190	2190	2180	2180
2250		2220	2210	2210	2210	2210	2210	2200	2200	2200	2200
2260		2230	2230	2230	2220	2220	2220	2220	2210	2210	2210
2270		2240	2240	2240	2240	2230	2230	2230	2230	2230	2220
2280		2250	2250	2250	2250	2250	2250	2240	2240	2240	2240
2290		2270	2270	2260	2260	2260	2260	2260	2260	2250	2250
2300		2280	2280	2280	2280	2270	2270	2270	2270	2270	2270
2310		2290	2290	2290	2290	2290	2290	2290	2280	2280	2280
2320		2310	2300	2300	2300	2300	2300	2300	2300	2300	2300
2330		2320	2320	2320	2320	2310	2310	2310	2310	2310	2310
2340		2330	2330	2330	2330	2330	2330	2330	2330	2330	2320
2350		2340	2340	2340	2340	2340	2340	2340	2340	2340	2340
2360		2360	2360	2360	2350	2350	2350	2350	2350	2350	2350
2370		2370	2370	2370	2370	2370	2370	2370	2370	2370	2370
2380		2380	2380	2380	2380	2380	2380	2380	2380	2380	2380
2390		2390	2390	2390	2390	2390	2390	2400	2400	2400	2400
2400		2410	2410	2410	2410	2410	2410	2410	2410	2410	2410
2410		2420	2420	2420	2420	2420	2420	2420	2420	2420	2420
2420		2430	2430	2430	2430	2430	2440	2440	2440	2440	2440
2430		2440	2450	2450	2450	2450	2450	2450	2450	2450	2450
2440		2460	2460	2460	2460	2460	2460	2460	2460	2470	2470
2450		2470	2470	2470	2470	2470	2480	2480	2480	2480	2480
2460		2480	2480	2490	2490	2490	2490	2490	2490	2490	2500
2470		2490	2500	2500	2500	2500	2500	2500	2510	2510	2510
2480		2510	2510	2510	2510	2510	2520	2520	2520	2520	2520
2490		2520	2520	2520	2530	2530	2530	2530	2530	2540	2540
2500		2530	2530	2540	2540	2540	2540	2550	2550	2550	2550
2510		2550	2550	2550	2550	2550	2560	2560	2560	2560	2570
2520		2560	2560	2560	2570	2570	2570	2570	2580	2580	2580
2530		2570	2570	2580	2580	2580	2580	2590	2590	2590	2600
2540		2580	2590	2590	2590	2590	2600	2600	2600	2610	2610
2550		2600	2600	2600	2600	2610	2610	2610	2620	2620	2620
2560		2610	2610	2610	2620	2620	2620	2630	2630	2640	2640

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1280		790	760	740	720	690	660	640	610	580	550
1290		800	780	760	730	710	680	650	620	600	570
1300		820	790	770	750	720	690	670	640	610	580
1310		830	810	780	760	740	710	680	660	630	600
1320		850	820	800	780	750	730	700	670	640	620
1330		860	840	810	790	770	740	720	690	660	630
1340		870	850	830	810	780	760	730	710	680	650
1350		890	870	840	820	800	770	750	720	690	670
1360		900	880	860	840	810	790	760	740	710	680
1370		920	900	870	850	830	800	780	750	730	700
1380		930	910	890	870	840	820	800	770	740	720
1390		950	930	900	880	860	840	810	790	760	730
1400		960	940	920	900	870	850	830	800	780	750
1410		980	960	930	910	890	870	840	820	790	770
1420		990	970	950	930	910	880	860	830	810	780
1430		1000	980	960	940	920	900	870	850	830	800
1440		1020	1000	980	960	940	910	890	870	840	820
1450		1030	1010	990	970	950	930	910	880	860	830
1460		1050	1030	1010	990	970	940	920	900	870	850
1470		1060	1040	1020	1000	980	960	940	910	890	870
1480		1080	1060	1040	1020	1000	980	950	930	910	880
1490		1090	1070	1050	1030	1010	990	970	950	920	900
1500		1110	1090	1070	1050	1030	1010	990	960	940	920
1510		1120	1100	1080	1060	1040	1020	1000	980	960	930
1520		1140	1120	1100	1080	1060	1040	1020	1000	970	950
1530		1150	1130	1110	1090	1070	1050	1030	1010	990	970
1540		1160	1150	1130	1110	1090	1070	1050	1030	1010	980
1550		1180	1160	1140	1120	1110	1090	1060	1040	1020	1000
1560		1190	1180	1160	1140	1120	1100	1080	1060	1040	1020
1570		1210	1190	1170	1150	1140	1120	1100	1080	1050	1030
1580		1220	1210	1190	1170	1150	1130	1110	1090	1070	1050
1590		1240	1220	1200	1190	1170	1150	1130	1110	1090	1070
1600		1250	1230	1220	1200	1180	1160	1140	1120	1100	1080
1610		1270	1250	1230	1220	1200	1180	1160	1140	1120	1100
1620		1280	1260	1250	1230	1210	1190	1180	1160	1140	1120
1630		1290	1280	1260	1250	1230	1210	1190	1170	1150	1130
1640		1310	1290	1280	1260	1240	1230	1210	1190	1170	1150
1650		1320	1310	1290	1280	1260	1240	1220	1210	1190	1170
1660		1340	1320	1310	1290	1270	1260	1240	1220	1200	1180
1670		1350	1340	1320	1310	1290	1270	1260	1240	1220	1200
1680		1370	1350	1340	1320	1310	1290	1270	1250	1240	1220
1690		1380	1370	1350	1340	1320	1300	1290	1270	1250	1230
1700		1400	1380	1370	1350	1340	1320	1300	1290	1270	1250

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
1710		1410	1400	1380	1370	1350	1340	1320	1300	1280	1270
1720		1430	1410	1400	1380	1370	1350	1330	1320	1300	1280
1730		1440	1430	1410	1400	1380	1370	1350	1330	1320	1300
1740		1450	1440	1430	1410	1400	1380	1370	1350	1330	1320
1750		1470	1460	1440	1430	1410	1400	1380	1370	1350	1330
1760		1480	1470	1460	1440	1430	1410	1400	1380	1370	1350
1770		1500	1480	1470	1460	1440	1430	1410	1400	1380	1370
1780		1510	1500	1490	1470	1460	1440	1430	1410	1400	1380
1790		1530	1510	1500	1490	1470	1460	1450	1430	1420	1400
1800		1540	1530	1520	1500	1490	1480	1460	1450	1430	1420
1810		1560	1540	1530	1520	1510	1490	1480	1460	1450	1430
1820		1570	1560	1550	1530	1520	1510	1490	1480	1460	1450
1830		1580	1570	1560	1550	1540	1520	1510	1500	1480	1470
1840		1600	1590	1580	1560	1550	1540	1530	1510	1500	1480
1850		1610	1600	1590	1580	1570	1550	1540	1530	1510	1500
1860		1630	1620	1610	1590	1580	1570	1560	1540	1530	1520
1870		1640	1630	1620	1610	1600	1590	1570	1560	1550	1530
1880		1660	1650	1640	1620	1610	1600	1590	1580	1560	1550
1890		1670	1660	1650	1640	1630	1620	1600	1590	1580	1570
1900		1690	1680	1670	1650	1640	1630	1620	1610	1600	1580
1910		1700	1690	1680	1670	1660	1650	1640	1620	1610	1600
1920		1720	1710	1700	1690	1670	1660	1650	1640	1630	1620
1930		1730	1720	1710	1700	1690	1680	1670	1660	1640	1630
1940		1740	1730	1730	1720	1710	1690	1680	1670	1660	1650
1950		1760	1750	1740	1730	1720	1710	1700	1690	1680	1670
1960		1770	1760	1760	1750	1740	1730	1720	1710	1690	1680
1970		1790	1780	1770	1760	1750	1740	1730	1720	1710	1700
1980		1800	1790	1780	1780	1770	1760	1750	1740	1730	1720
1990		1820	1810	1800	1790	1780	1770	1760	1750	1740	1730
2000		1830	1820	1810	1810	1800	1790	1780	1770	1760	1750
2010		1850	1840	1830	1820	1810	1800	1800	1790	1780	1770
2020		1860	1850	1840	1840	1830	1820	1810	1800	1790	1780
2030		1870	1870	1860	1850	1840	1840	1830	1820	1810	1800
2040		1890	1880	1870	1870	1860	1850	1840	1830	1830	1820
2050		1900	1900	1890	1880	1870	1870	1860	1850	1840	1830
2060		1920	1910	1900	1900	1890	1880	1870	1870	1860	1850
2070		1930	1930	1920	1910	1910	1900	1890	1880	1870	1870
2080		1950	1940	1930	1930	1920	1910	1910	1900	1890	1880
2090		1960	1960	1950	1940	1940	1930	1920	1910	1910	1900
2100		1980	1970	1960	1960	1950	1940	1940	1930	1920	1920
2110		1990	1980	1980	1970	1970	1960	1950	1950	1940	1930
2120		2000	2000	1990	1990	1980	1980	1970	1960	1960	1950
2130		2020	2010	2010	2000	2000	1990	1990	1980	1970	1970

WEST VIRGINIA DIVISION OF HIGHWAYS
CONTRACT ADMINISTRATION DIVISION
DENSITY OF MINUS 19 MM MATERIAL WITH SPECIFIC GRAVITY OF 2.7
PERCENT OF PLUS 19 MM MATERIAL

D	D	31	32	33	34	35	36	37	38	39	40
2140		2030	2030	2020	2020	2010	2010	2000	2000	1990	1980
2150		2050	2040	2040	2030	2030	2020	2020	2010	2010	2000
2160		2060	2060	2050	2050	2040	2040	2030	2030	2020	2020
2170		2080	2070	2070	2060	2060	2050	2050	2040	2040	2030
2180		2090	2090	2080	2080	2070	2070	2060	2060	2050	2050
2190		2110	2100	2100	2090	2090	2090	2080	2080	2070	2070
2200		2120	2120	2110	2110	2110	2100	2100	2090	2090	2080
2210		2140	2130	2130	2120	2120	2120	2110	2110	2100	2100
2220		2150	2150	2140	2140	2140	2130	2130	2120	2120	2120
2230		2160	2160	2160	2150	2150	2150	2140	2140	2140	2130
2240		2180	2180	2170	2170	2170	2160	2160	2160	2150	2150
2250		2190	2190	2190	2190	2180	2180	2180	2170	2170	2170
2260		2210	2210	2200	2200	2200	2190	2190	2190	2190	2180
2270		2220	2220	2220	2220	2210	2210	2210	2210	2200	2200
2280		2240	2230	2230	2230	2230	2230	2220	2220	2220	2220
2290		2250	2250	2250	2250	2240	2240	2240	2240	2240	2230
2300		2270	2260	2260	2260	2260	2260	2260	2250	2250	2250
2310		2280	2280	2280	2280	2270	2270	2270	2270	2270	2270
2320		2290	2290	2290	2290	2290	2290	2290	2290	2280	2280
2330		2310	2310	2310	2310	2310	2300	2300	2300	2300	2300
2340		2320	2320	2320	2320	2320	2320	2320	2320	2320	2320
2350		2340	2340	2340	2340	2340	2340	2330	2330	2330	2330
2360		2350	2350	2350	2350	2350	2350	2350	2350	2350	2350
2370		2370	2370	2370	2370	2370	2370	2370	2370	2370	2370
2380		2380	2380	2380	2380	2380	2380	2380	2380	2380	2380
2390		2400	2400	2400	2400	2400	2400	2400	2400	2400	2400
2400		2410	2410	2410	2410	2410	2410	2410	2410	2420	2420
2410		2430	2430	2430	2430	2430	2430	2430	2430	2430	2430
2420		2440	2440	2440	2440	2440	2440	2450	2450	2450	2450
2430		2450	2460	2460	2460	2460	2460	2460	2460	2460	2470
2440		2470	2470	2470	2470	2470	2480	2480	2480	2480	2480
2450		2480	2480	2490	2490	2490	2490	2490	2500	2500	2500
2460		2500	2500	2500	2500	2510	2510	2510	2510	2510	2520
2470		2510	2510	2520	2520	2520	2520	2530	2530	2530	2530
2480		2530	2530	2530	2530	2540	2540	2540	2540	2550	2550
2490		2540	2540	2550	2550	2550	2550	2560	2560	2560	2570
2500		2560	2560	2560	2560	2570	2570	2570	2580	2580	2580
2510		2570	2570	2580	2580	2580	2590	2590	2590	2600	2600
2520		2580	2590	2590	2590	2600	2600	2600	2610	2610	2620
2530		2600	2600	2610	2610	2610	2620	2620	2620	2630	2630
2540		2610	2620	2620	2620	2630	2630	2640	2640	2640	2650
2550		2630	2630	2640	2640	2640	2650	2650	2660	2660	2670
2560		2640	2650	2650	2650	2660	2660	2670	2670	2680	2680

West Virginia Department of Transportation

Report Fraud, Waste and Abuse

Call the WVDOT

Office of Investigations

HOTLINE

1-866-206-2728

Mail:

WVDOT Office of Investigations
1900 Kanawha Boulevard East
Building #5 Room 503
Charleston, WV 25305

Email:

DOT.Fraud@wv.gov

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