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Concrete Components Packing Handbook

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Abstract

Data in this handbook are based upon a computer model of dry packed, monosized particles adapted from the theories developed by Aims (1967) and Toufar (1967). The model has been demonstrated to adequately describe similar dry packing of powders with varying size distributions in terms of the Rosin-Rammler D' coefficient. The model has been successfully applied to the system cement/fine aggregate/coarse aggregate and has modeled Cement and Concrete Association, Portland Cement Association and Pennsylvania Department of Transportation recommended concrete formulations. The results theoretically support the location of recommended concrete formulations in a region of ternary particle mixing which possesses the maximum dry packing density.

The handbook consists of graphical representation of selected formulation variables and tables detailing packing densities for mix proportioning.

CONCRETE COMPONENTS PACKING HANDBOOK:

Applicability to Highway Concrete Design

EXECUTIVE SUMMARY

Standardized formulations for concretes are recommended by such organizations as the PCA, CCA, ACI and others. The results of research associated with the packing of dry components of the concrete system established the theoretical basis upon which these empirical formulations were developed.

The random arrangement of a polydispersed particle system in a container is defined as the packing density of the powder and represents the volume fraction of the container which is occupied by the solids. Packing densities are always related to volume percentages of the components which are related through density to the masses of the solids being considered.

The results of this modeling demonstrate that the recommended concrete formulations in general occur in the region of maximum dry packing density in the system cement-sand-coarse aggregate. In this region minor fluctuations in the proportioning of the concrete will have very little, if any, effect upon the dry packing density. The body of this handbook consists of two parts: a graphic presentation of the results of the calculations for a large number of variables in typical concrete formulations. The second part of the handbook consists of tables of data for the calculation maximum packing densities for concrete mix formulations.

Evaluation of the effects of packing density of mixtures of particle distributions suggested that the maximum workability without bleed water was achieved when the porosity of the packed powders was just filled with water. This condition occurs along a join drawn between the maximum packing in the sand coarse aggregate system of a concrete and the cement powder.

With the expanding role of mineral admixtures and chemical admixtures available for concrete formulations, it is clear that the application of this type of modeling can be useful in the development of modifications to the current concrete designs which will function to be either more durable, less expensive or both.

INTRODUCTION

A. Scope of Handbook

This handbook has been prepared in two parts. The first part of the text is an illustrative presentation of data intended to graphically present the ranges of maximum dry particle packing of typical concrete components. The calculated packing densities are references to

PA DOT, PCA and CCA recommended formulations in an attempt to provide the user with an understanding of concrete component packing as it relates to common recommended practices. All calculations in this handbook are based upon the Toufar/Aims models (Aimes and Le Goff, 1967/68; Toufar et al., 1967). The presentations in Part I illustrate the changes in packing associated with accepted ranges in the concrete components and therefore illustrate how this variability will impact a specific concrete formulation. The data contained in these graphs is presented in relative terms. For this reason no density values are affixed to the isodensity lines. Detailed values for specific formulations can be retrieved from the numeric tabulations in Part II.

B. Theoretical Basis of Packing

The random arrangement of a polydisperse particle system in a container is defined as the packing density of the powder and represents the volume fraction of the container which is occupied by the solids. Packing densities are always related to volume percentages of the components which are related through density to the masses of the solids being considered. With these simple definitions in mind, the packing density Φ, can be expressed as

$$\Phi = v_o/v$$

where:

v = actual volume occupied by the solid

v_o = specific volume of the solid (weight divided by specific density).

By defining $v_o = 1$, the packing density then becomes:

$$\Phi = 1/v$$

Packing density depends upon the particle size distribution, the particle shape and the method by which the particles were packed. Consider two components with particle diameters d_1 and d_2 such that $d_1 << d_2$ in a mixture with the volume fractions r_1 and r_2 and the packing densities Φ_1 and Φ_2.

In the case of a large content of small particles, $r_1 >> r_2$, the mixture will mainly consist of small particles with the large particles discretely distributed in between; $v = v_1 + v_2$, and $v_1 = r_1/\Phi_1$. The matrix of the small particles has the packing density Φ_1 and contributes to the specific volume with r_1/Φ_1. Assuming the coarse particles contribute no pore volume, the

contribution to the specific volume by the large particles is r_2. The total volume of the mixture is:

$$v = v_1 + v_2 = r_1/\Phi_1 + r_2$$

and the packing density of the mixture is:

$$\Phi_{mix} = 1/v = 1/(r_1/\Phi_1 + r_2).$$

When the volume fraction of the coarse particles is large, $r_1 << r_2$, the small particles are accommodated in voids between the large particles, and contribute little to the volume, as r_1 approaches zero. The specific volume and the packing density of the mixture are therefore:

$$v = r_2/\Phi_2$$

and

$$\Phi_{mix} = \Phi_2/r_2.$$

These considerations are based on the assumption that the coarse particles are much larger than the small particles.

When the assumption $d_1 << d_2$ is not valid, the ratio d_1/d_2 will have an additional effect on the packing density. The small particles may be too large to fit into the voids between the larger particles. Along the walls of the container, the packing densities will be smaller compared to that of the bulk. The magnitude of the "wall effect" will depend on the particle sizes. A similar effect occurs on the surface of large particles in multicomponent systems in which the departure from the bulk packing density is dependent upon the ratio of the small to large particles (Cumberland and Crawford, 1988) as schematically represented in Figure 1.

The above discussion was demonstrated (SHRP C201, 1989) to adequately describe the behavior of polydisperse (multi-size) powder systems even though the original Toufar and Aim publications were developed for monodisperse (single size) particles. Further, the characteristic diameters of the particle size distributions for the components of concrete were shown to be adequately described by the D' from the Rosin-Rammler equation (See Appendix IA):

$$R(D) = \exp\{-D/D^{1})^{n}\}$$

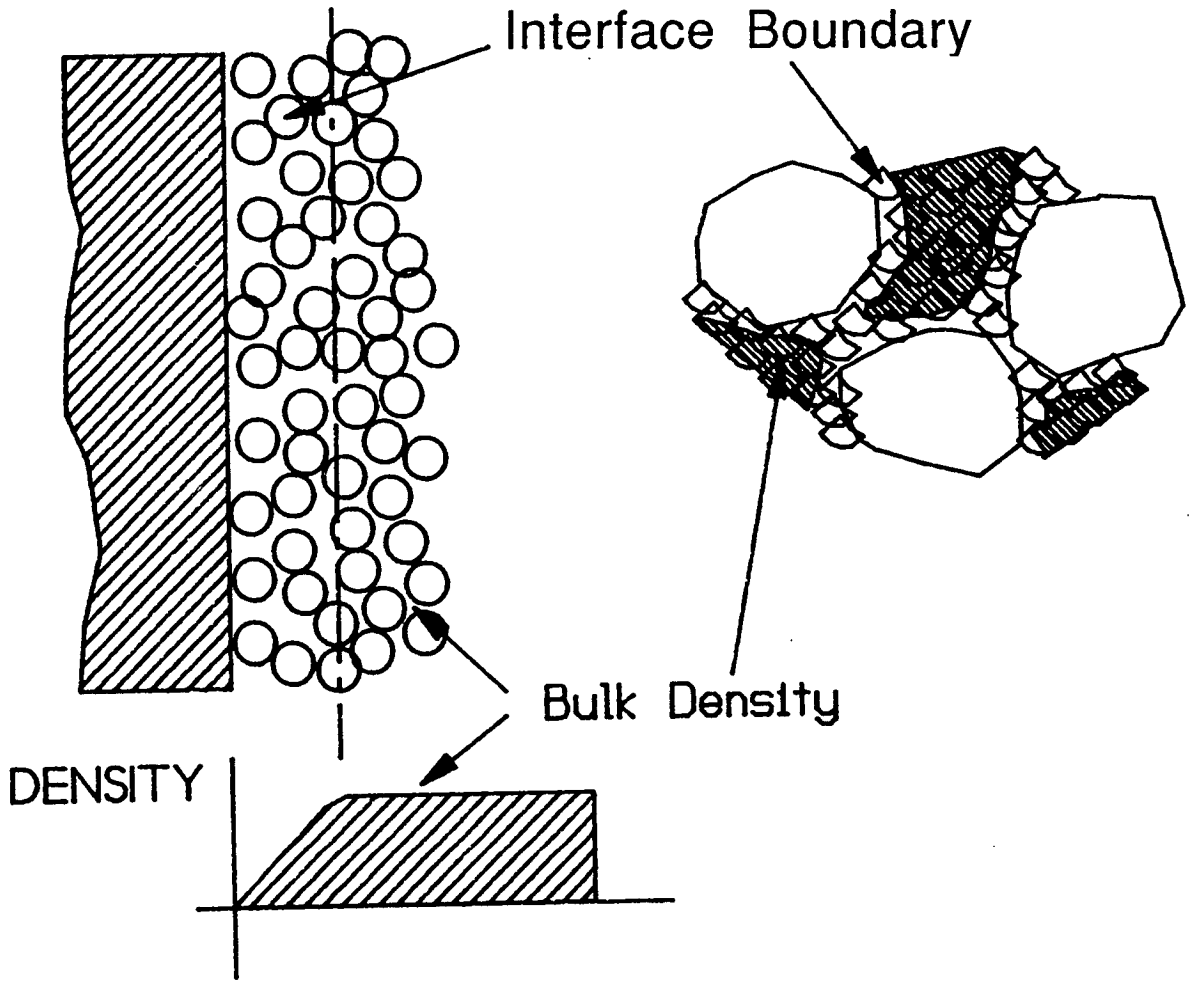

Figure 1. Schematic drawing illustrating lower packing density due to "wall effect" of the container and equivalent effect caused by coarse aggregate in concrete.

where R(D) is the residue fraction, D = diameter, D' = characteristic diameter, and n = constant, ranging from 1.04-4, usually between 1 and 2.

Description of Rosin-Rammler (R-R) Distribution

R-R distribution is: $R(D) = 1 - F(D) = e - (D/D')^n$ where $F(D) = P(d<D)$ is the cumulative probability that the diameter d is less than D. D and n are two parameters describing R-R distribution. To determine D' and n, we transform $R(D) = e - (D/D')^n$ to:

$$\ln\left(\frac{1}{R}\right) = (D/D')^n$$

$$\ln\left(\ln\frac{1}{R}\right) = n\ln D - n\ln D'$$

If we plot

$$\ln\frac{1}{r} \text{ vs. } D$$

on ln-ln paper, then we have: slope n, the intercept = -nlnD'. It follows that

$$\ln D' = \frac{\text{intercept}}{-n}$$

$$D' = \exp\left(-\frac{\text{intercept}}{n}\right)$$

C. General Applicability

The results of the implementation of this mathematical model for dry particle packing, when applied to the PCA, CCA and PADOT recommended concrete formulations, have been found to be located within the area of optimal packing on a ternary diagram, fine aggregate-coarse aggregate-cement. Correlation between dry packing and rheology of the concretes have found that the workability of the concrete at a fixed cement content and a water-to-cement ratio is controlled principally by the binary packing of the fine and coarse aggregates. The optimal workability will be found for the concrete mixture at which the sand-to-coarse aggregate ratio is equal to the densest packing of these two components.

Concrete formulations positioned to the coarse aggregate side of the optimal binary packing will have a tendency to separate, in contrast to formulations with high cement/paste contents which may have a tendency to bleed and/or separate.

PART I

Graphical Representation of Particle Packing: An Aid to Concrete Design

APPROACH

Two widely accepted sources of concrete formulations, the Portland Cement Association (PCA) (Kosmatka and Panarese, 1988) and the Cement and Concrete Association (McIntosh, 1966) recommendations were used as input in order to map out typical concrete formulations references to a ternary mixture of cement/fine aggregate/coarse aggregate. Figure 2 represents the results of the mapping of these two sets of recommendations onto the ternary diagram. The PCA recommendations are based on different formulations with varying coarse aggregate and water-to-cement ratios while the CCA recommendations are based upon cement-to-fine aggregate vs. cement-to-coarse aggregate ratios. In all cases, the data in this diagram are based upon volume percentages of components and the sizes used in the calculation represent the calculated D' for each respective distribution.

The initial portion of this Handbook will deal with the correlation of calculated packing densities to the time tested concrete formulations recommended by the Portland Cement Association. The materials that were utilized in the report are materials that were procured specifically for this program and will therefore represent the data that will directly translate to laboratory practice. These materials are represented by two morphologically distinct coarse aggregates: a rounded to sub-rounded quartz and an angular, crushed limestone. The effects of the utilization of these two extremely different aggregate types will also be discussed.

The second portion of this Handbook will deal in detail with the anticipated differences that are likely to be encountered in the packing densities in highway concretes due to variations in particle sizes of component concrete materials allowed by accepted specifications. In this aspect of the study, the specification for the Pennsylvania Department of Transportation (PADOT, 1987) were used. Experimental packing densities used in those calculations were determined according to procedures outlined in Appendix B and C.

CORRELATION BETWEEN CALCULATED PACKING DENSITY AND STANDARD CONCRETE FORMULATIONS

Figures 3, 4 and 5 represent the calculated packing densities for the PCA formulations which utilize #8, #67 and #57 type coarse aggregates (refer to Figure 2) (ASTM C33) utilizing the angular limestone aggregates. The gradation analyses of the aggregates are presented in Figure 6 and are in compliance with PADOT specification 703.1 for sand (fine aggregate) and 703.2 for coarse aggregates.

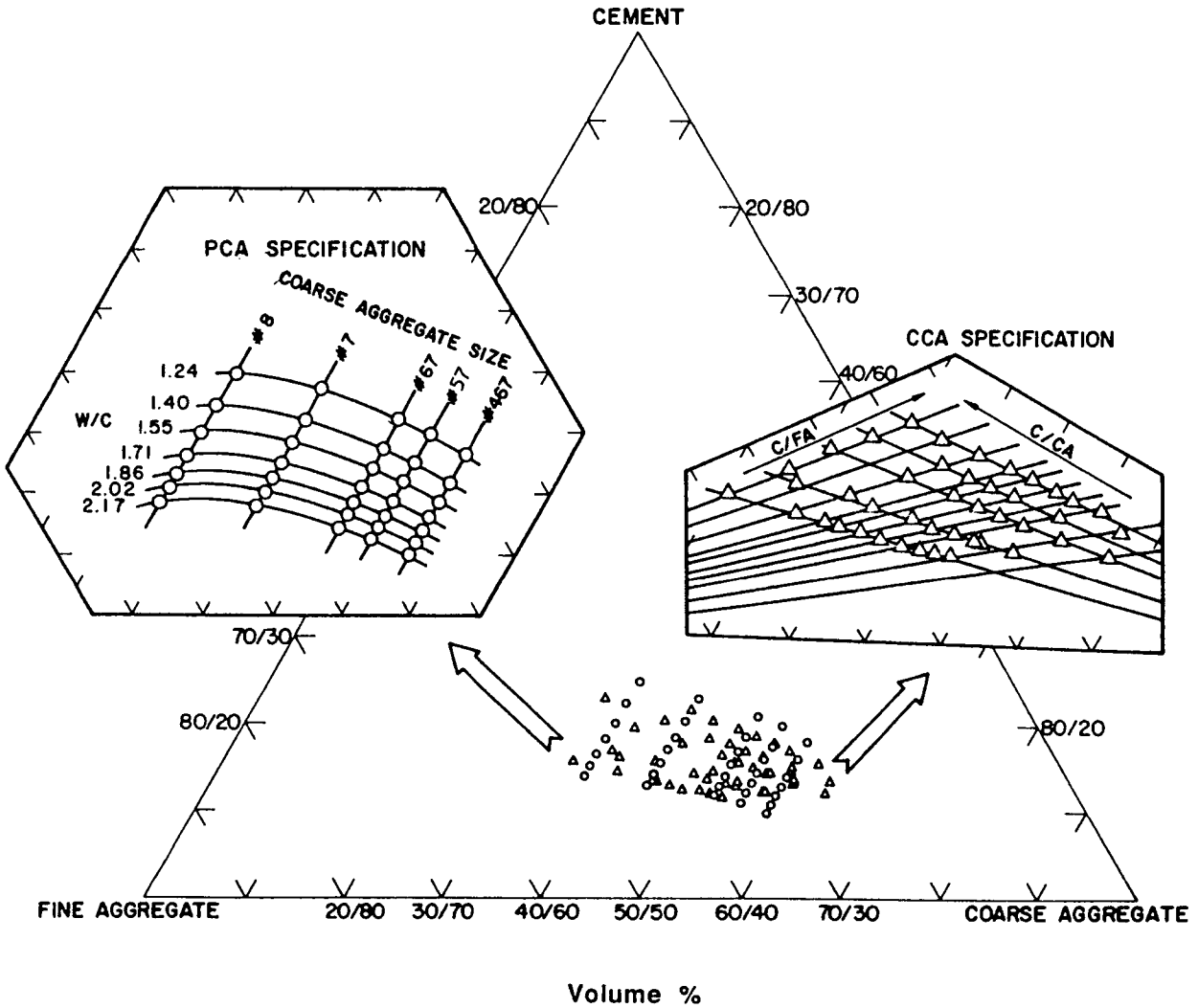

Figure 2. Cement/fine aggregate/coarse aggregate compositional diagram with concrete formulations from the Portland Cement Association and the Cement and Concrete Association mapped onto the diagram. All formulations are expressed as volume percentages expressing the typical compositional range of concrete formulations.

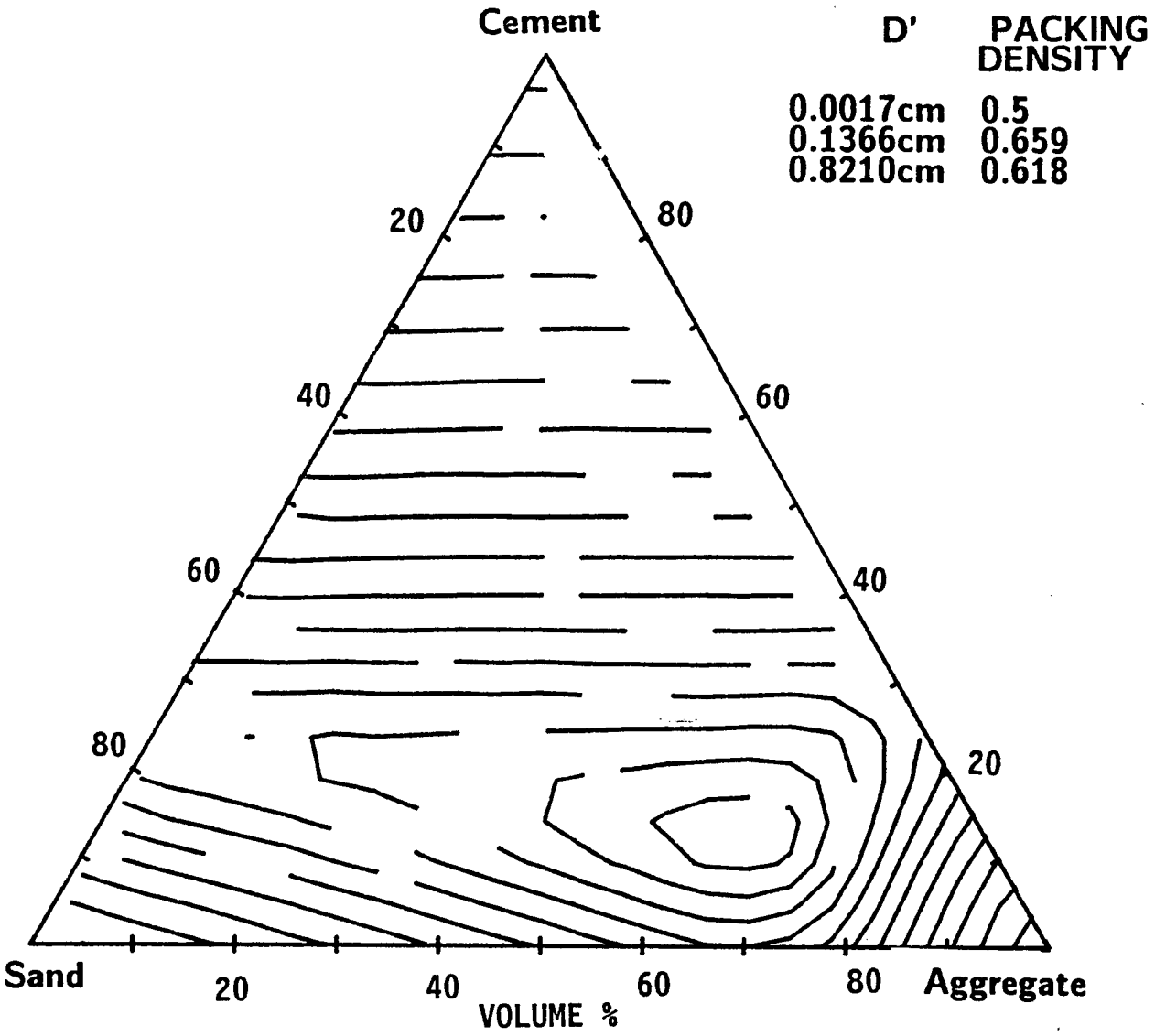

Figure 3. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #8 limestone coarse aggregate.

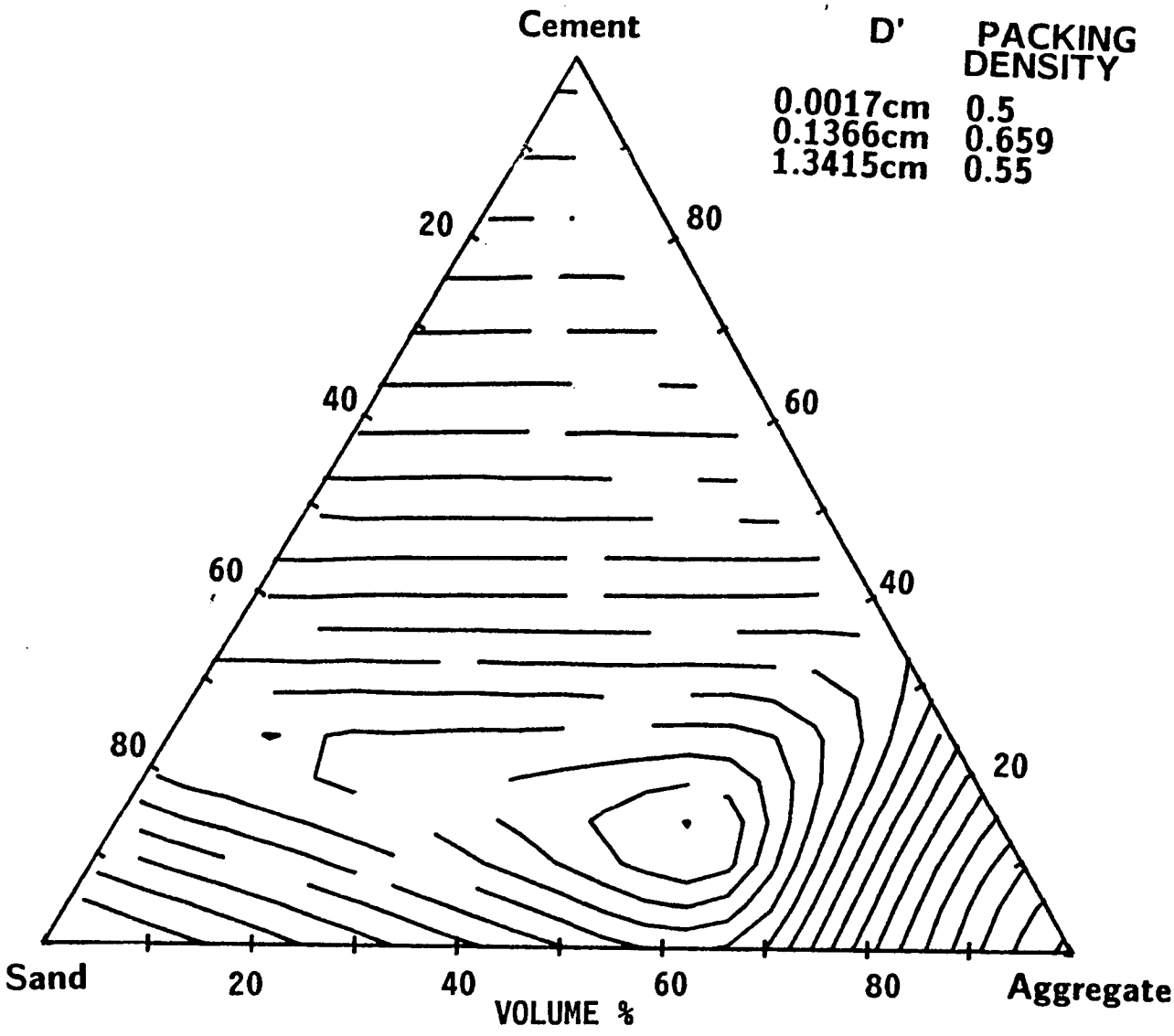

Figure 4. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #67 limestone coarse aggregate.

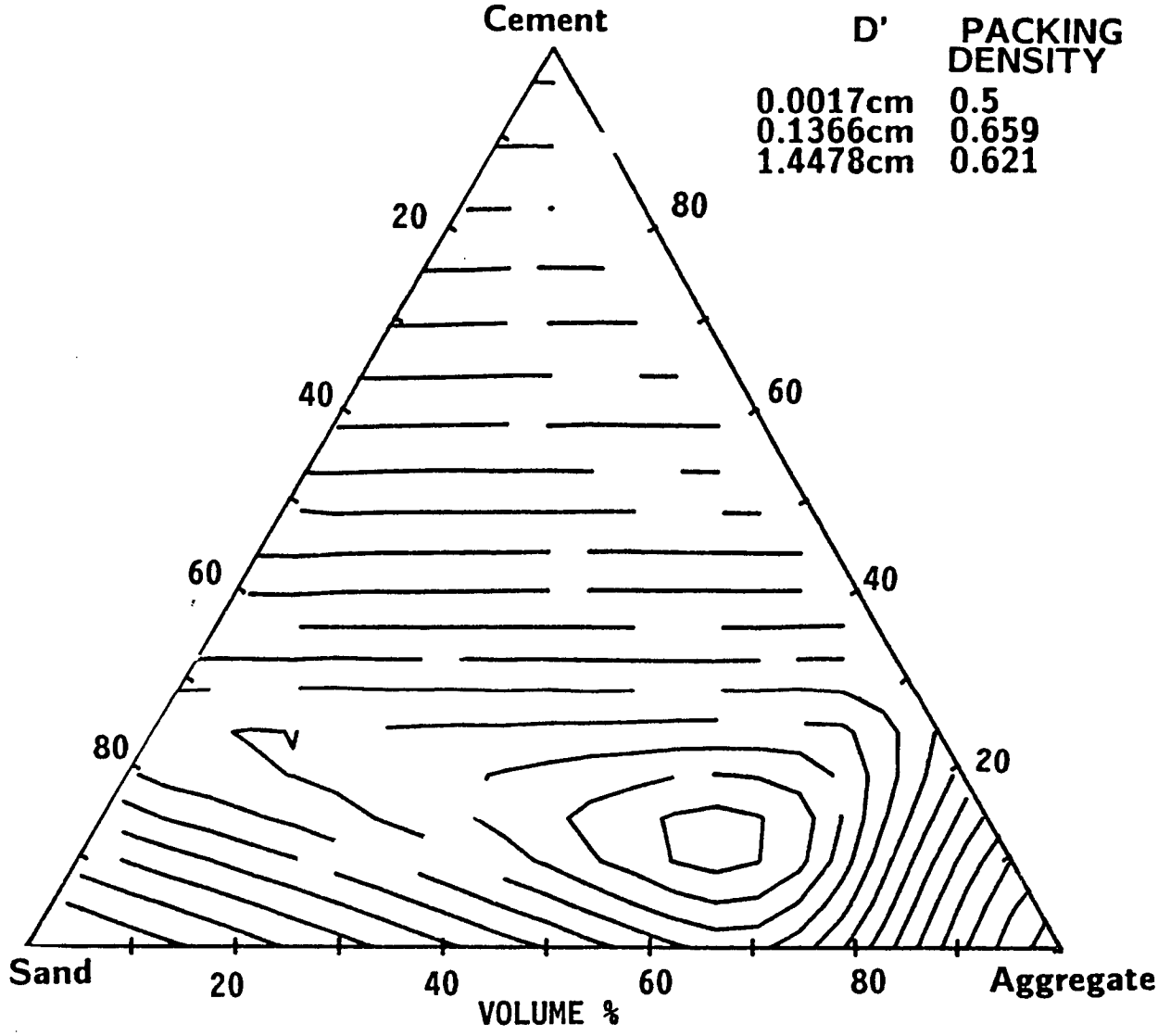

Figure 5. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #57 limestone coarse aggregate.

Figure 3 represents the calculated packing densities for a system cement/fine aggregate/#8 limestone coarse aggregate. The maximum density is calculated to be 86% of theoretical and is located at approximately 15 volume % cement admixed with about 60 volume % coarse aggregate. In the back jacket pocket of this report are two transparencies. The transparency marked #1 has inscribed on it three lines of varying water-to-cement ratios for PCA formulations using #8, #67 and #57 aggregates. The scale of these transparencies is identical to the figure scale and they are designed to be manually overlain onto the figures. Examination of Figure 3 with the transparency in place shows that the PCA #8 formulations occur just off of the maximum packing density in a broad shoulder or plateau region in which very little variation in packing density occurs at approximately 83%.

Figure 4 represents the calculated packing density for the PCA formulations with #67 aggregate using the same distributions for the sand and cement as in the previous figure. The centroid of maximum density is observed to have shifted slightly toward the fine aggregate at approximately the same 15 volume percentage of cement. Placing the transparency over this figure and observing the middle line corresponding to the #67 aggregate, the range of W/C permitted generates mixtures which fall directly in the centroid of maximum packing density. Similar procedures for Figure 5 also reveal that for the #57 aggregate, the W/C variation in the PCA specification procedures mixtures which lie near to the maximum packing densities. The centroid has shifted to slightly lower cement contents.

Figures 7, 8 and 9 represent the same packing density calculations based upon the use of the same cement and sand but with rounded quartz aggregates of the three types. Careful examination of this set of figures suggests that indeed only minor differences can be observed. The differences that do occur are directly attributable to the variation in packing densities of the aggregates which are input as experimental variables in the calculation of the system packing density. For example, the coarse aggregate (CA) having the lowest packing density causes a shift of the centroid to a higher fine aggregate (FA) content than the other two CA's. Figure 10 is presented to exemplify the variations in packing density between the quartz and limestone shapes that are present in Figures 3 and 7; the #8 aggregate. The rounded aggregate has the greater packing density. As can be seen, there is a difference of about 8% between the two different types of #8 aggregate and the variations occur through a region where there is very little change in packing density over the compositional range. In contrast, the #67 aggregate shows a reversed trend with the limestone mixtures (Figure 4) showing denser packing than the gravel mixtures (Figure 8).

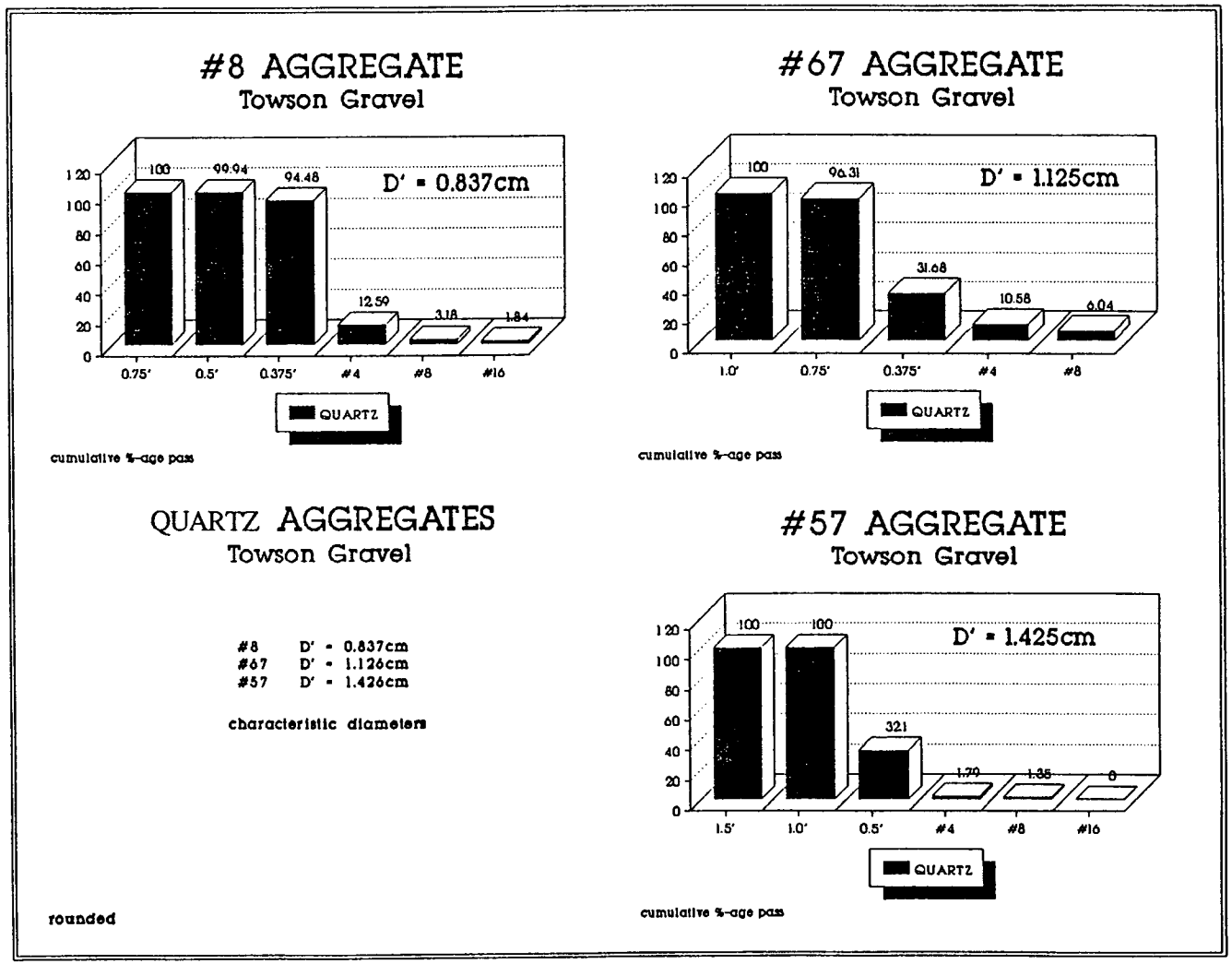

Figure 6. Histograms for sieve distributions for all sand and coarse aggregates used in this study expressed as cumulative percentage passed for the (a) quartz and (b) limestone, respectively. Rosin-Rammler characteristic particle size, D', is marked on each distribution.

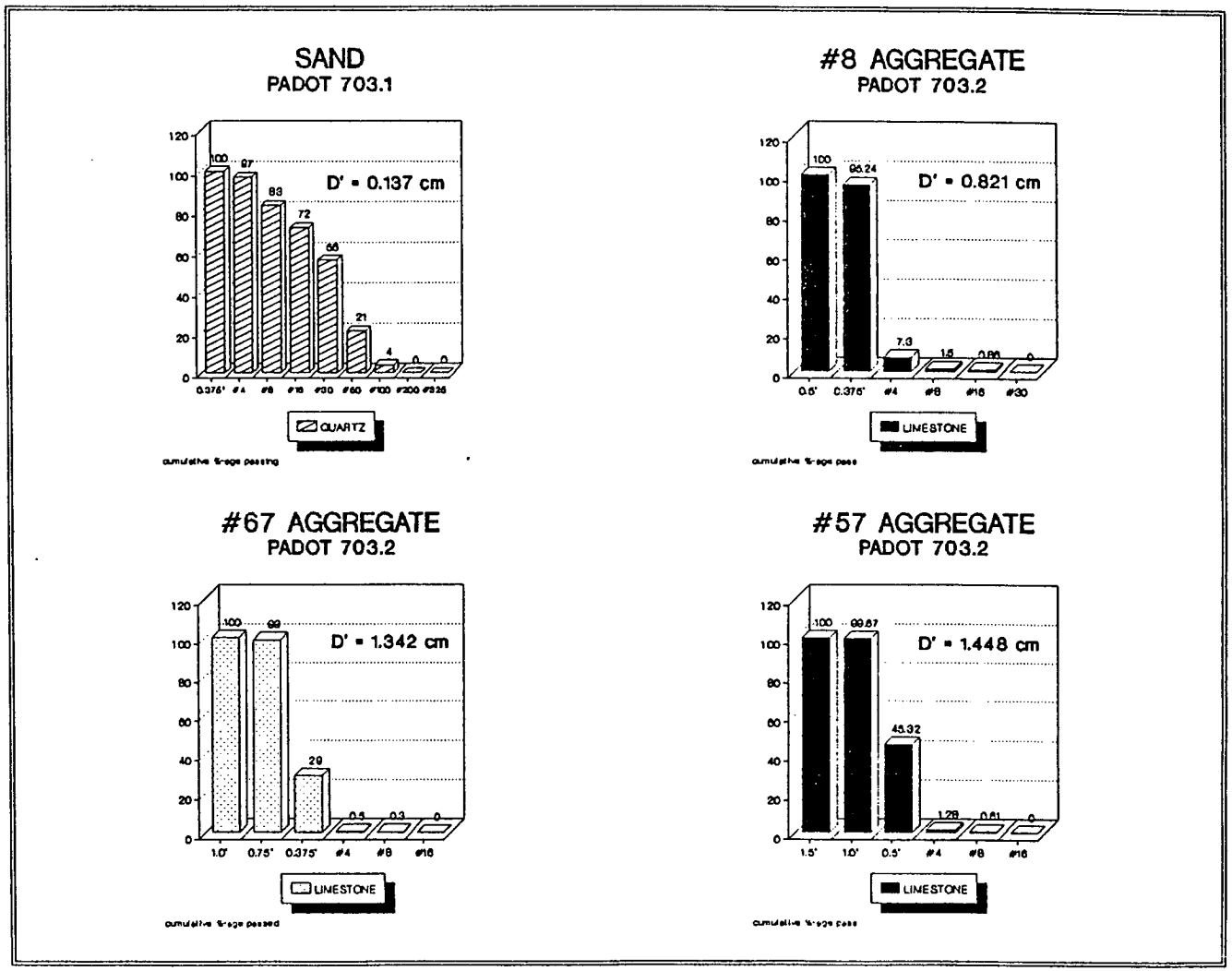

Figure 6. Continued.

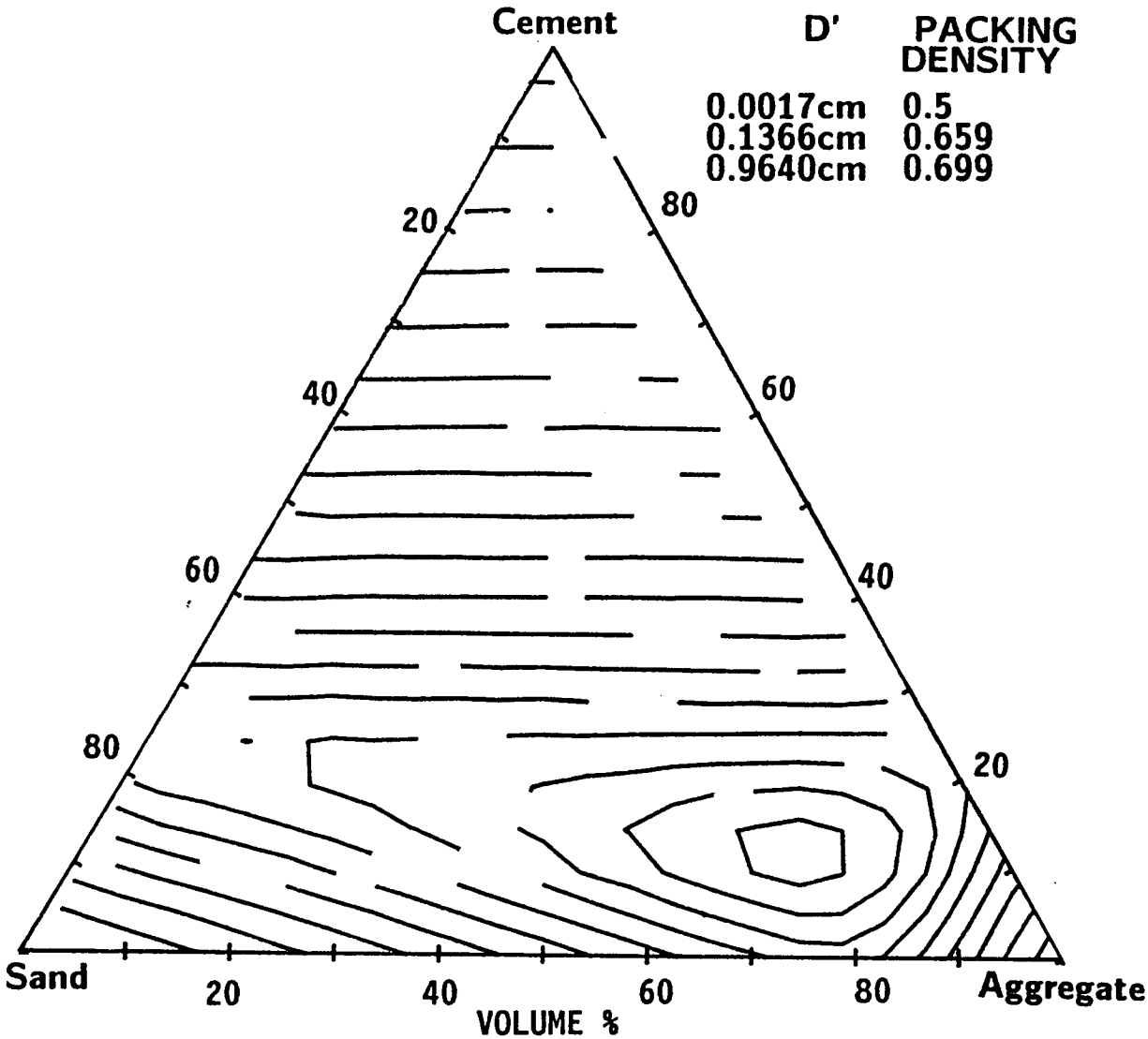

Figure 7. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #8 quartz coarse aggregate.

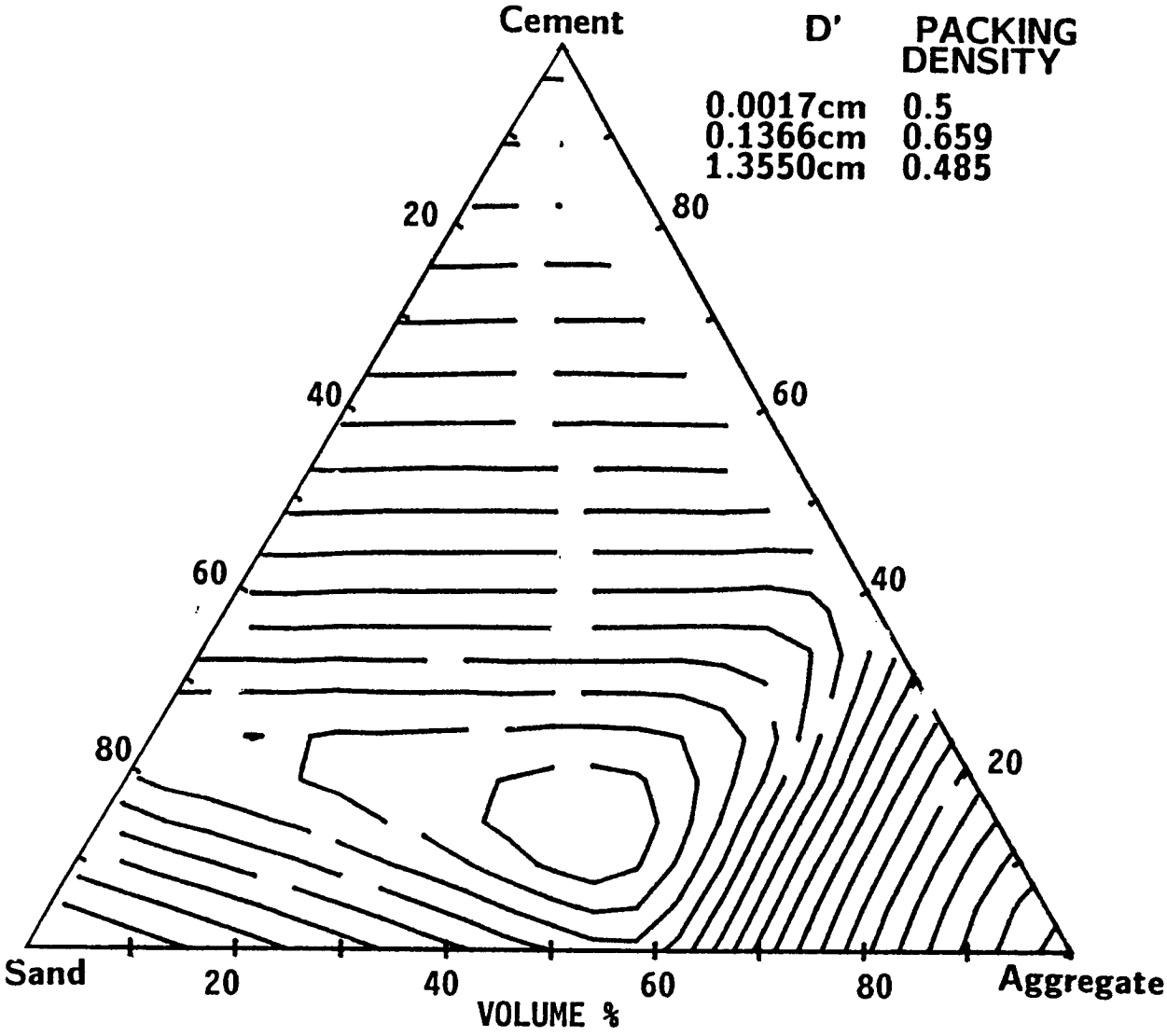

Figure 8. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #67 quartz coarse aggregate.

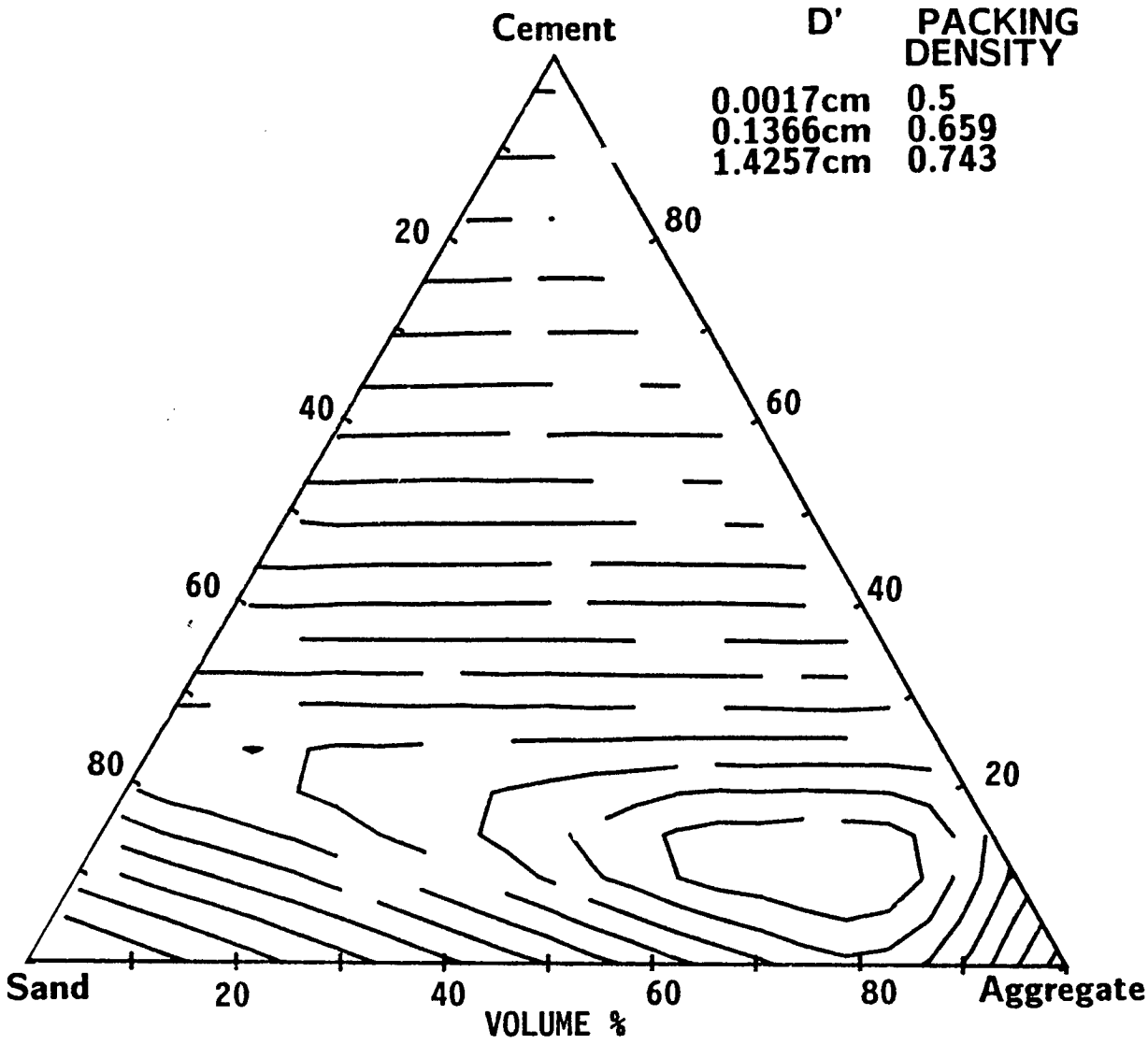

Figure 9. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #57 quartz coarse aggregate.

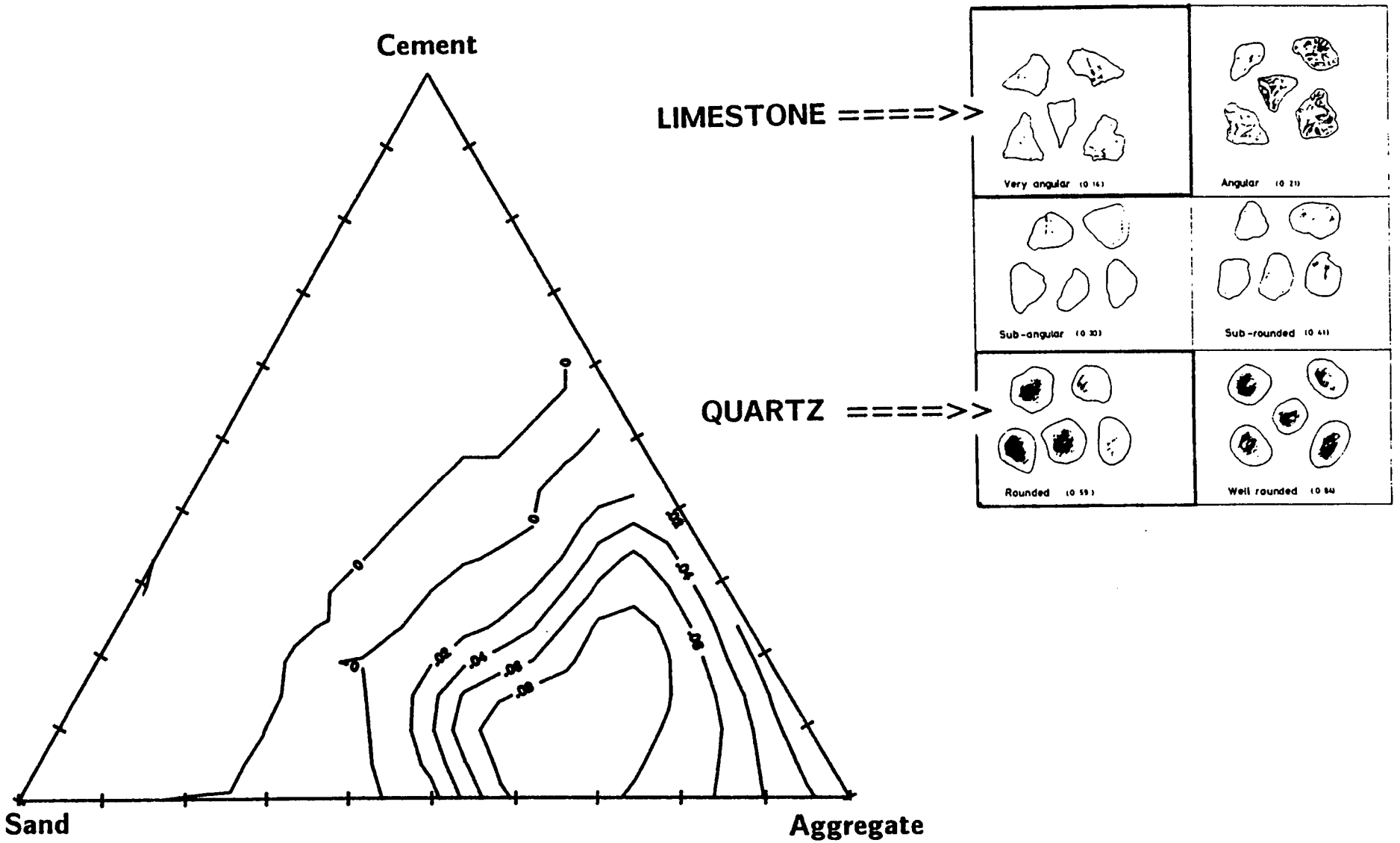

Figure 10. Plot of the differences between the isodensity lines for Figures 3 and 7 composed of cement/sand/#8 coarse aggregates. The differences expressed in this figure represent the effects upon packing density of the angular to subrounded morphology of the limestone and quartz aggregate, respectively.

CORRELATION BETWEEN PACKING DENSITY AND VARIATIONS IN CONCRETE COMPONENT SIZE DISTRIBUTIONS ALLOWED BY STANDARD SPECIFICATIONS

The model for calculating packing densities has the potential for widespread commercial use. One such area concerns the potential for variation in packing and hence in rheologic behavior of standard mixture formulations which result from the use of components which, although meeting acceptable specifications, would tend to represent extremes of the specifications. To address this circumstance, the PADOT specification 704.1(B), formulation AA was chosen as a case example (Figure 11). The variation in formulation allows between 6.25 and 8 bags of cement per cubic yard of concrete at a maximum water-to-cement ratio of 0.47 by weight. Concern for the effects of maximum variation of the concrete components in the specification (703.1 and 703.2 for sand and aggregate) were therefore addressed. Figures 12 and 13 are histograms of the as-received aggregate and the two allowable extremes. The characteristic diameters for the distributions, D', are marked on each figure. In Figure 12, the sand that was received from a commercial supplier is shown to meet the PADOT specification and possessed a characteristic diameter of 1.37 mm. In contrast, the maximum allowable size under these specifications is 1.92 mm and the minimum size is 0.48 mm, a spread of about ±50% over the as-received sand in this case. Figure 13 contains the size distribution for the #67 limestone aggregate with a characteristic diameter of 1.34 cm. The maximum allowable characteristic size in terms of the PADOT specs is 1.83 cm and the minimum size is 1.14 cm; a variation of between 30 and 35% over the extremes. Finally, although not shown, variations in the characteristic size of the cement grind were also explored. The as-received material for this program possessed a D' of 16.5 micrometers and extremes of 30 and 10 micrometers were assumed based upon variations in surface area data reported by Bye (1983).

With these materials variations in hand, three sets of calculations were prepared. The first varied the cement; the second varied the sand; and the third set of calculations varied the coarse aggregate. In the pocket in the rear of the report is a second transparency marked "#2" that is scaled to the same dimensions as the remainder of the ternary figures used in the report. On this transparency is a rhomboidal area which designates the allowable variations in the PADOT 704.1(B) specification for the concrete formulations "AA." The upper horizontal line represents the maximum allowable cement 8 bags/cubic yard and the parallel line below this is equivalent to 6.25 bags. The left and right bounds of this area represent the minimum and maximum permissible coarse aggregate content.

Figures 14, 15 and 16 represent effects of maximum variation in the cement that may be anticipated. By placing the transparency over the Figure 14 (for maximum D'), one finds that the PADOT formulation resides directly in the field of maximum calculated packing density.

TABLE A – CEMENT CONCRETE CRITERIA

CLASS OF CONCRETE	USE	CEMENT[3] FACTOR (Bags/C.Y.) Min.	CEMENT[3] FACTOR (Bags/C.Y.) Max.	MAXIMUM WATER CEMENT RATIO[5] (lbs/lbs)	SLUMP[2] RANGE (INCHES)	MINIMUM MIX[1] DESIGN COMPRESSIVE STRENGTH (PSI) DAYS 3	7	28	PROPORTIONS COARSE[1] AGGREGATE SOLID VOLUME (Cu. Ft/Cu. Yd)
AAA	Bridge Deck	6.75[4]	8.00	0.43	1-3[8]	–	3600	4500	–
AA	Paving	6.25	8.00	0.47[7]	1-3[8]	–	3000	3750	9.93 - 13.10
AA	Structures and Misc.	6.25	8.00	0.47[7]	1-3	–	3000	3750	9.93 - 13.10
A		6.00	8.00	0.50[7]	1-3	–	2750	3300	10.18 - 13.43
C		4.20	7.00	0.66[7]	2-6	–	1500	2000	11.45 - 15.10
H.E.S.		8.00	9.00	0.40[7]	1-3	3000	–	3750	9.10 - 12.00

PADOT 704.1(B)

CEMENT	19.54%
SAND	27.06%
AGGREGATE	44.00%
WATER	9.40%

Figure 11. PADOT specifications 704.1 (B) for various classes of concrete. The nominal compositions presented herein represents an 8 bag class AA formulation.

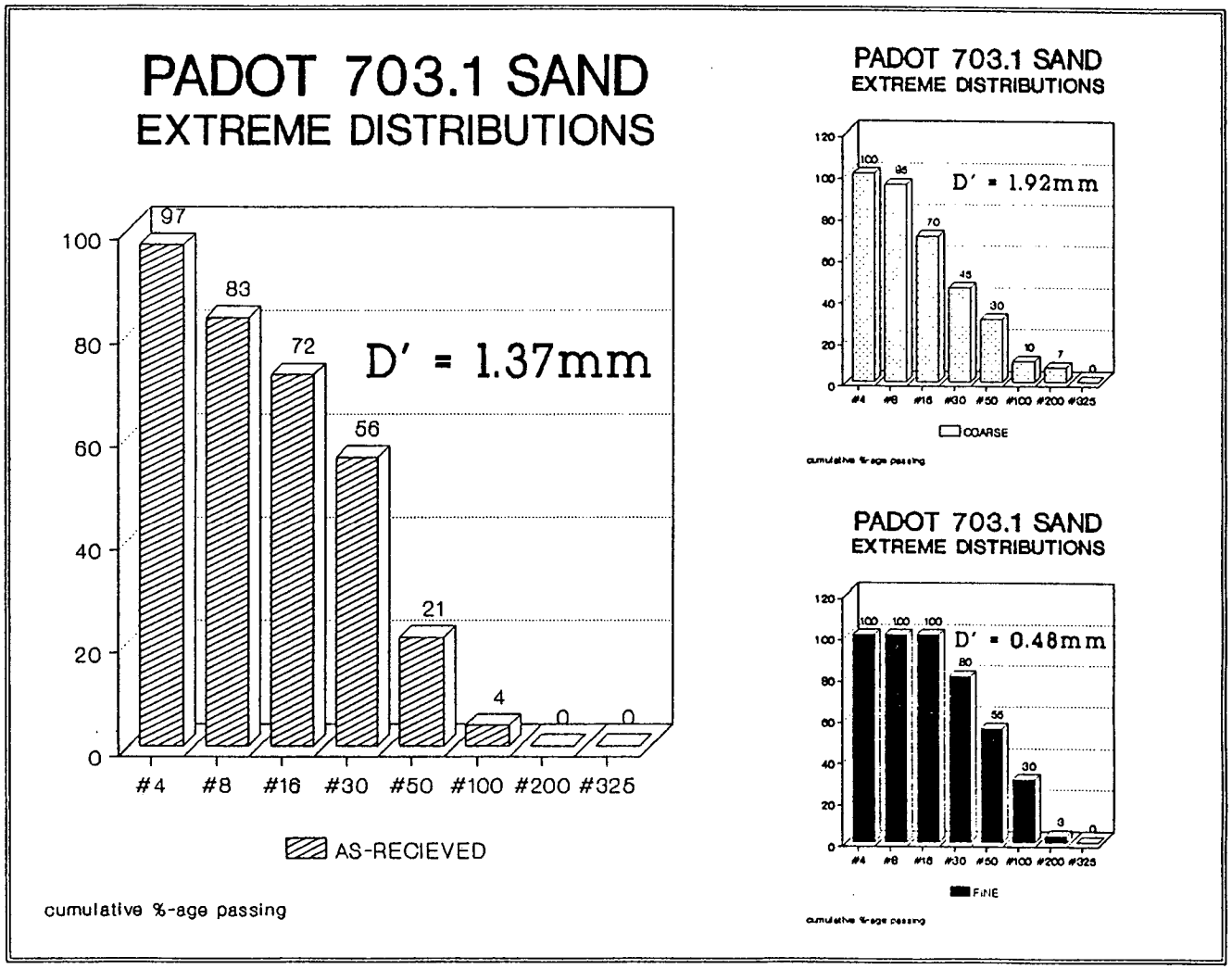

Figure 12. Histograms of as-received sand and the maximum and minimum allowable distribution of sand under PADOT specification703.1.

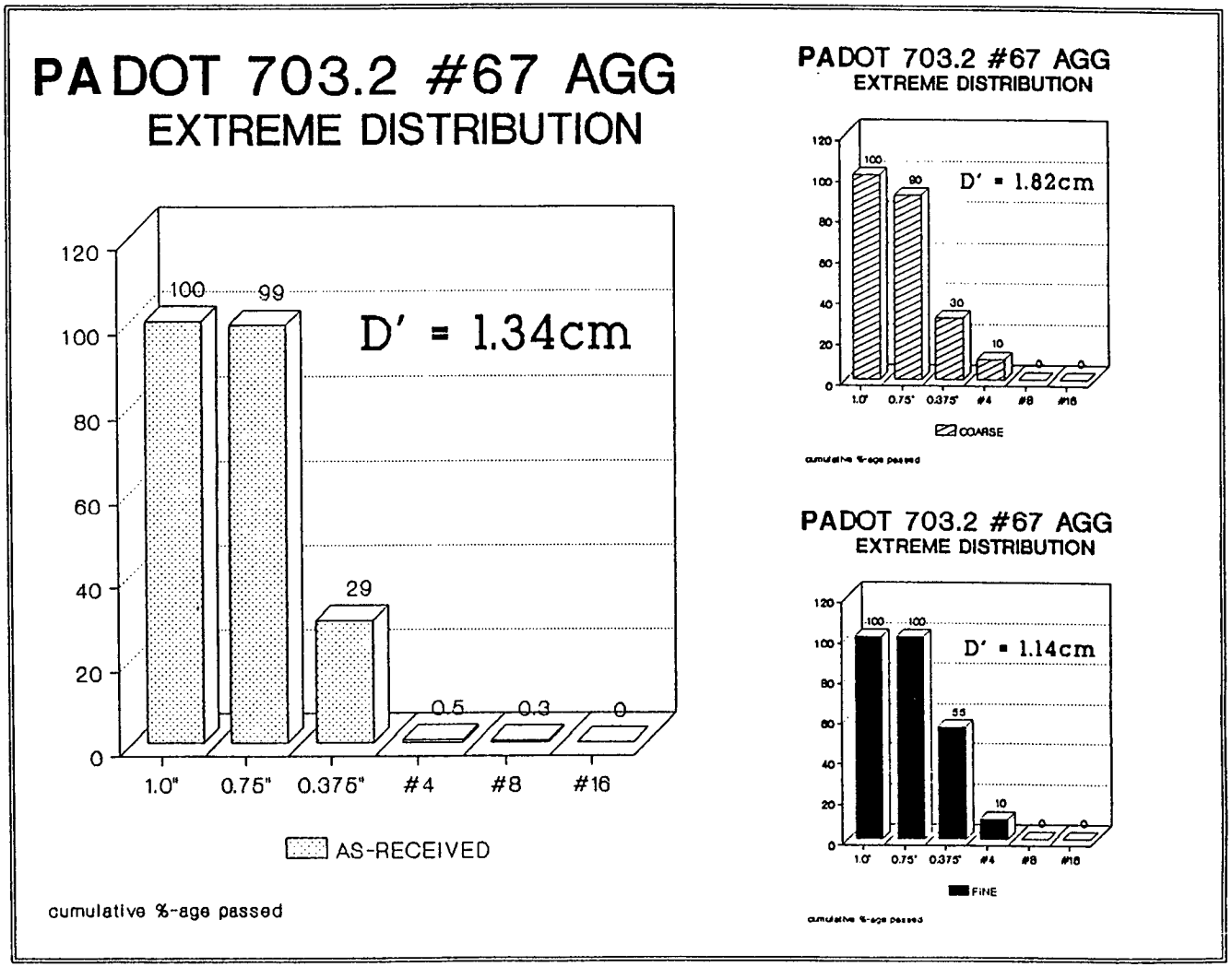

Figure 13. Histograms of as-received #67 limestone aggregate and the maximum and minimum allowable distribution of #67 aggregate under PADOT specification 703.2

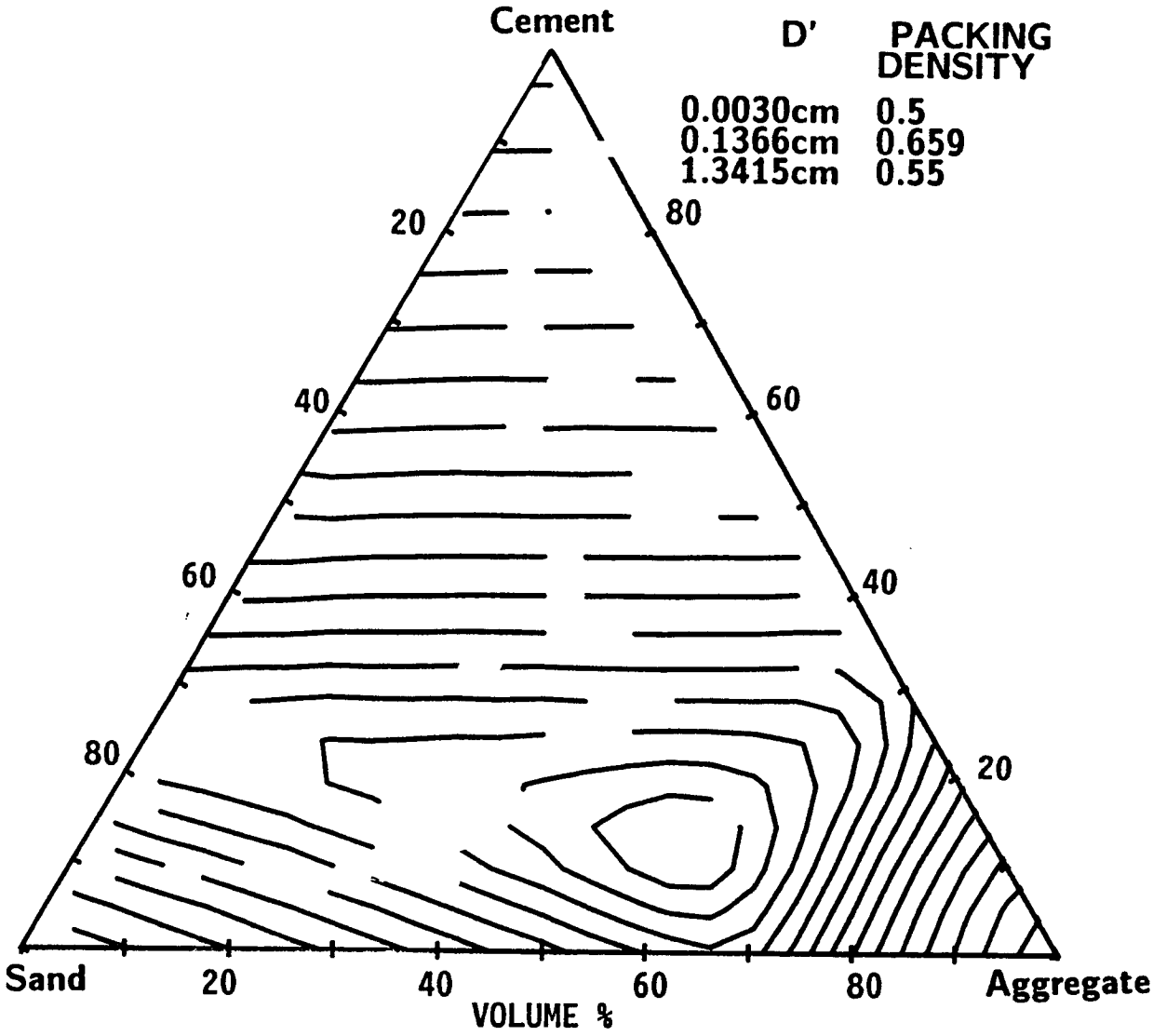

Figure 14. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from a cement with D' = 30 micrometers, sand and #67 limestone aggregate.

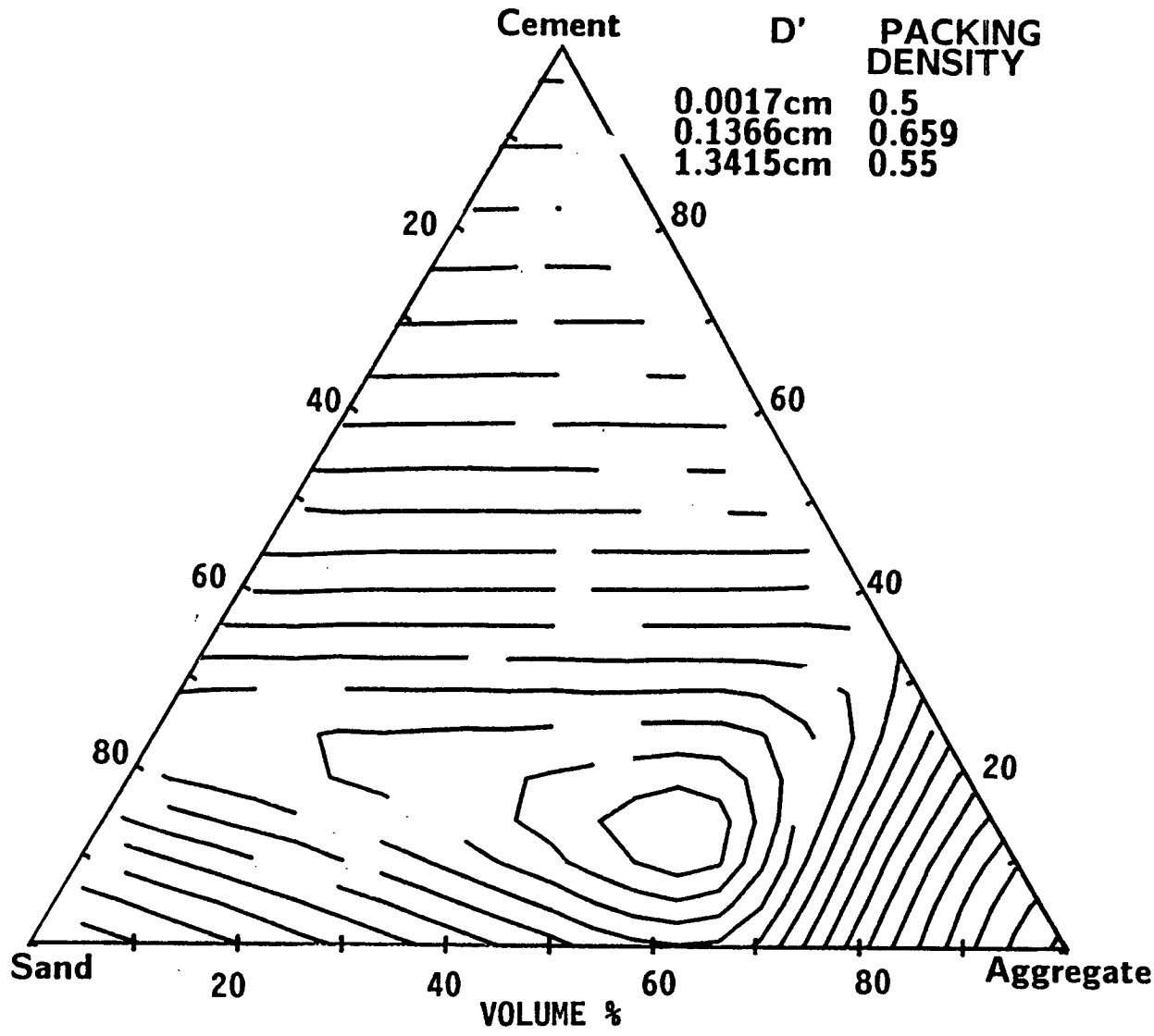

Figure 15. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from a cement with D' = 17 micrometers, sand and #67 limestone aggregate.

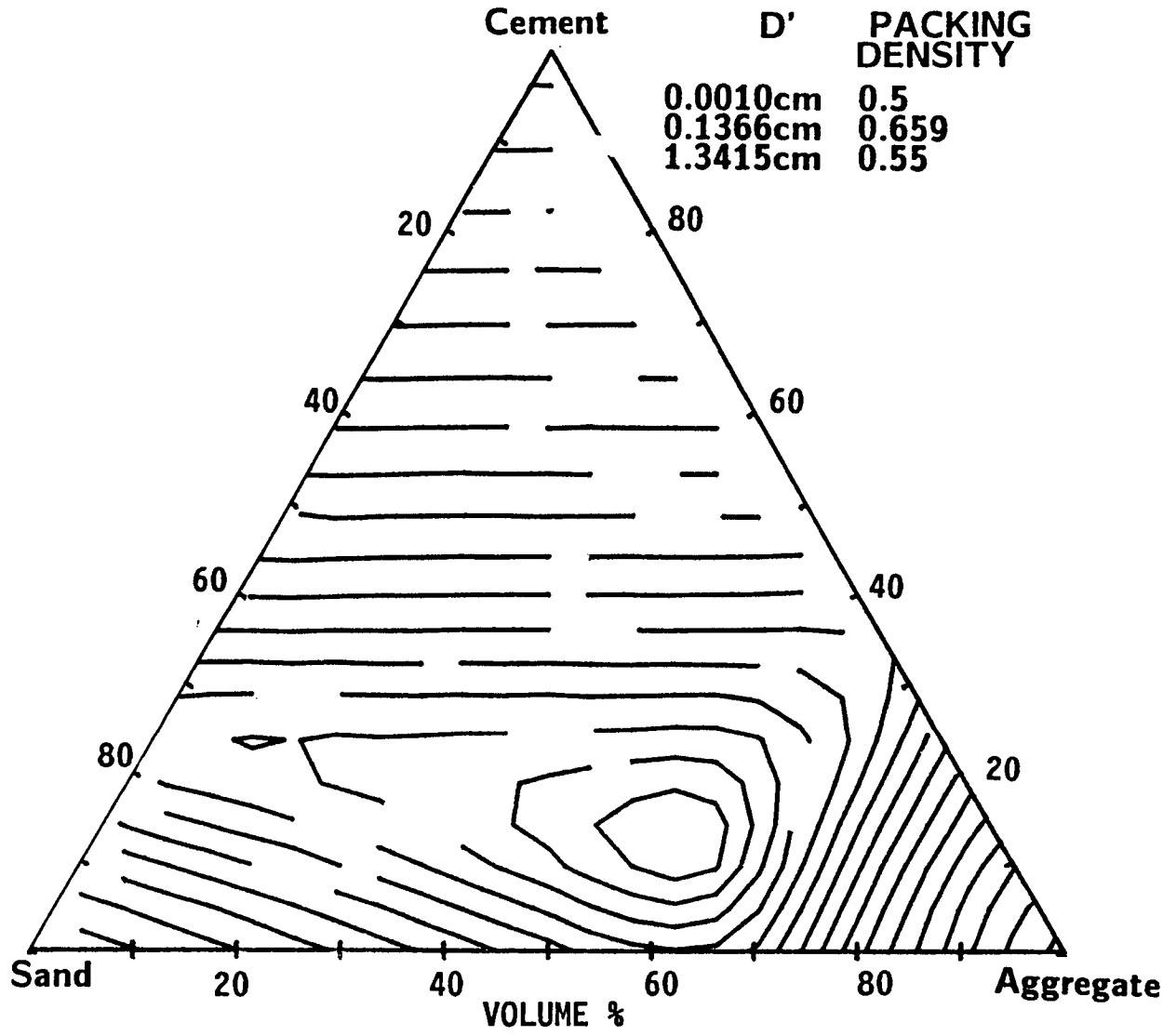

Figure 16. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from a cement with D' = 10 micrometers, sand and #67 limestone aggregate.

More specifically, the leaner mixtures are calculated to achieve 86% of theoretical density while the richer mixtures vary only slight from this value. Continued examination of the as-received and the finest size distribution of the cement, Figures 15 and 16, respectively, reveals only very subtle differences. Figure 15 represents the calculated packing diagram for the as-received materials in this program and hence will serve as the reference for the variations in all of the components.

Figures 17, 15 and 18 represent the variations that are resultant from the allowable variation in the fine aggregate component of the formulation, PADOT AA. Here substantially more change is observed. As in the previous figures, the PADOT formulations fall within the area of maximum packing densities of about 86%. However, in Figure 17, a larger area of the compositional range of the formulation, particularly the lean mixes with larger percentages of coarse aggregate are approaching an area of the diagram in which minor changes will experience rapid change in packing density. As the average size of the fine aggregate increases, Figures 15 and 18, the region of maximum density is drawn into the compositional region of the AA formulation.

Finally, variations in the allowable size of the coarse aggregate were examined and are presented in Figures 19, 15 and 20. In these simulations, the effects of the variation are much more apparent simply because the coarse aggregate comprises an increased proportion of the formulation. In general, all of the materials achieve between 86 and 88% of theoretical density with the AA formulation lying in the midst of the plateau of maximum density. There appears to be a wide range of flexibility in selection of the concrete components for the majority of AA formulation possibilities, with the exception of the extreme design with the maximum use of coarse aggregate; and even then the maximum variations observed are relatively small.

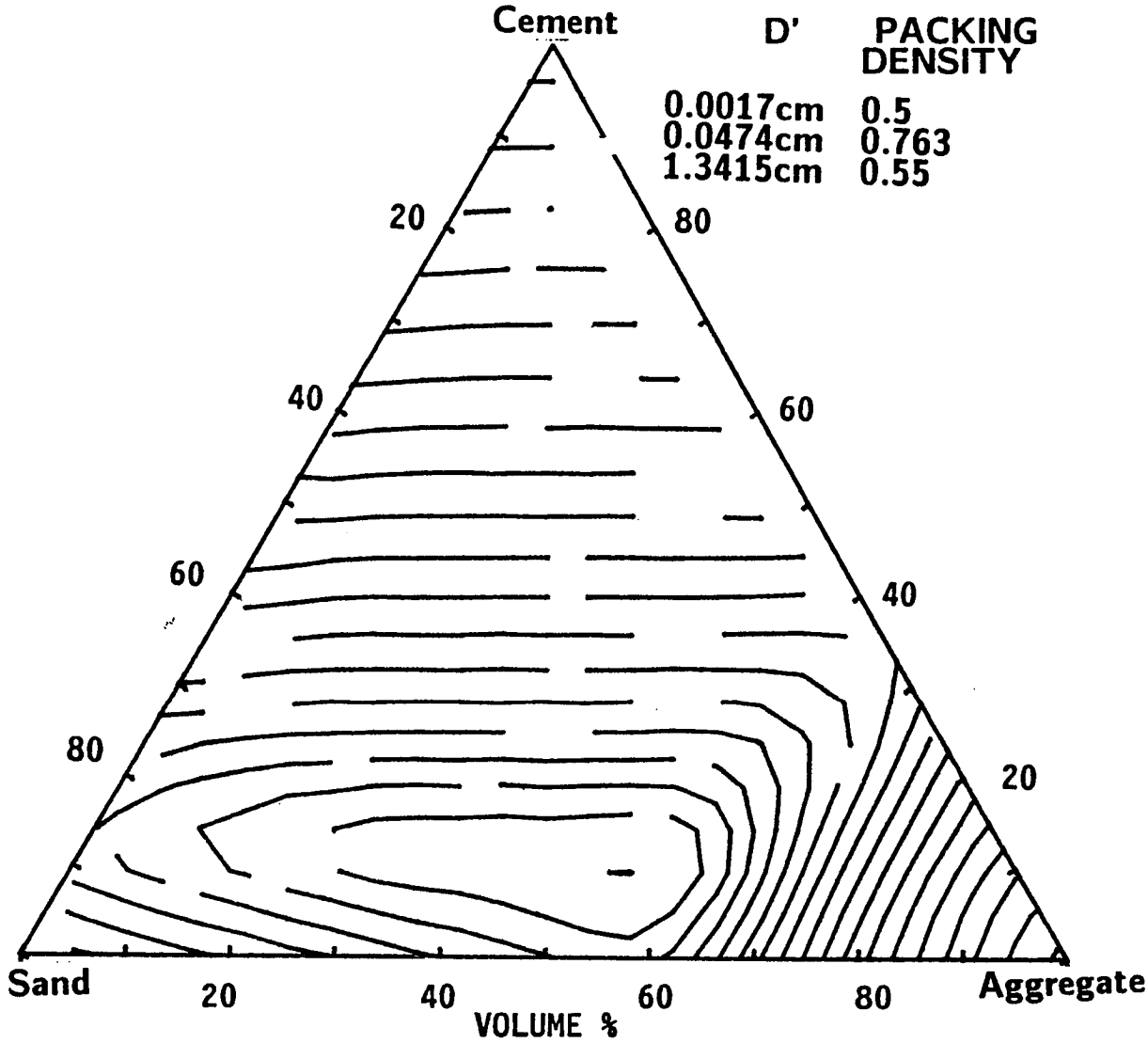

Figure 17. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, a sand with D' = 0.474 mm and #67 limestone aggregate.

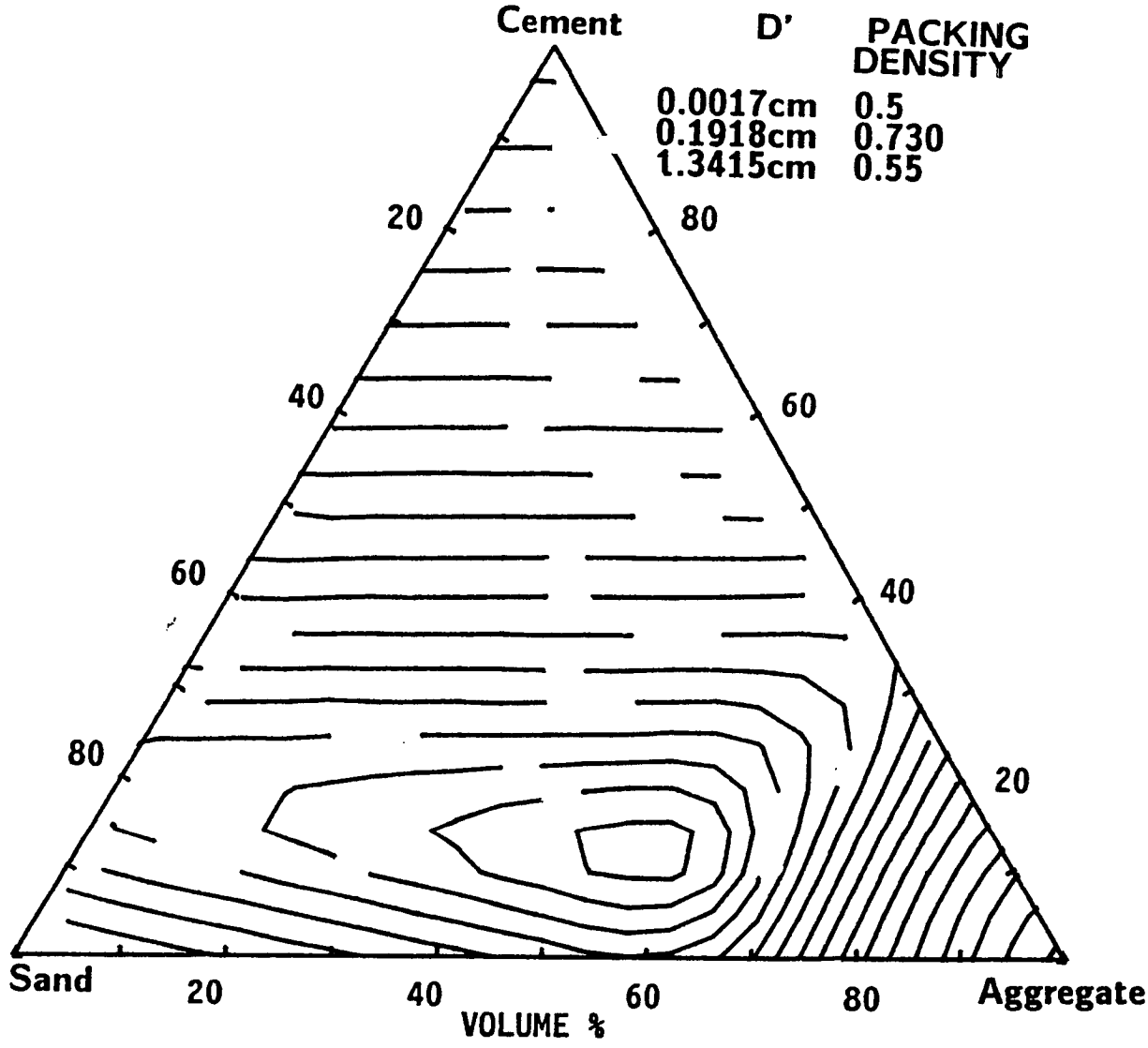

Figure 18. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand with D' = 1.918 mm and #67 limestone aggregate.

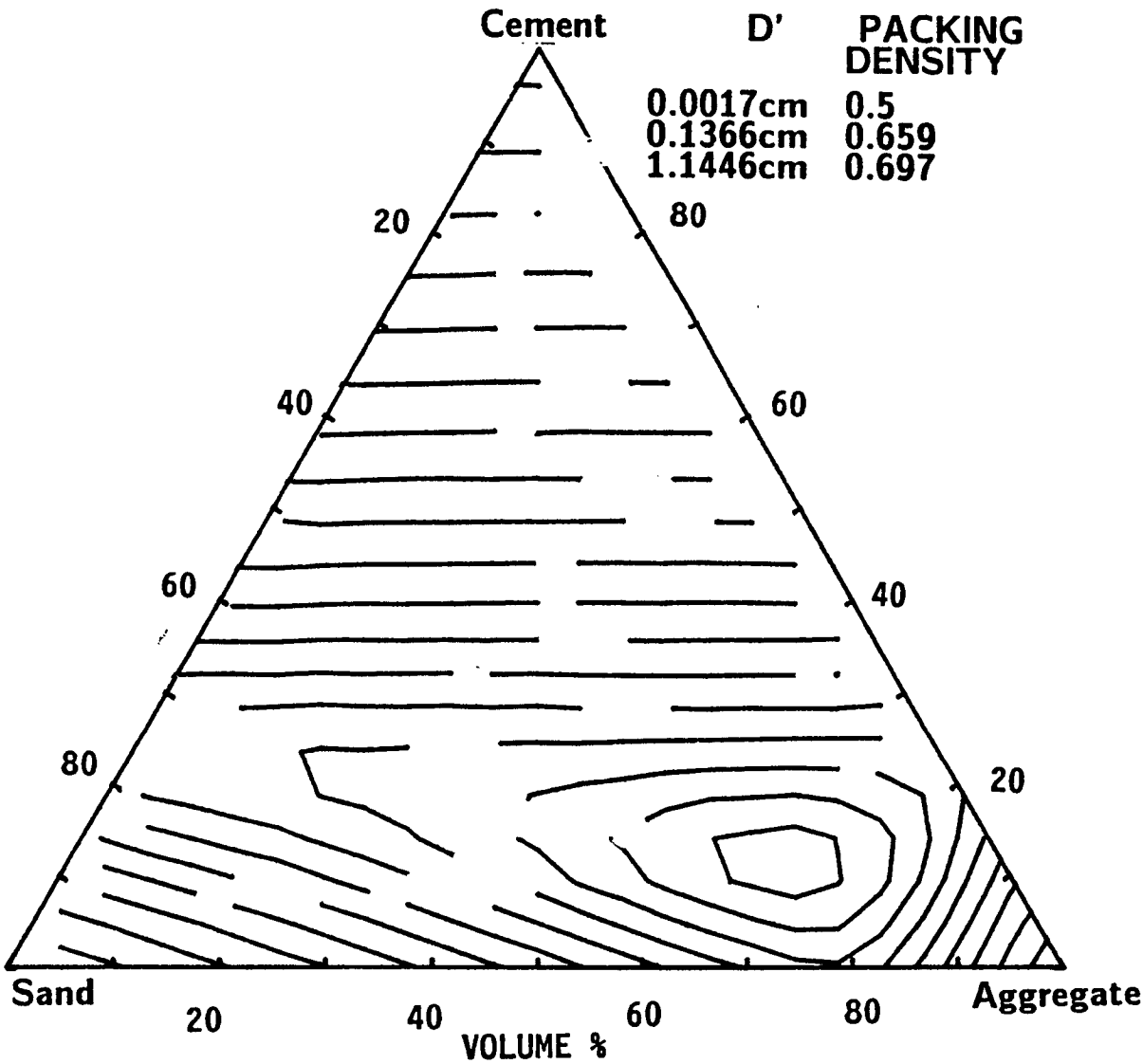

Figure 19. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #67 limestone aggregate with D' = 1.144 cm.

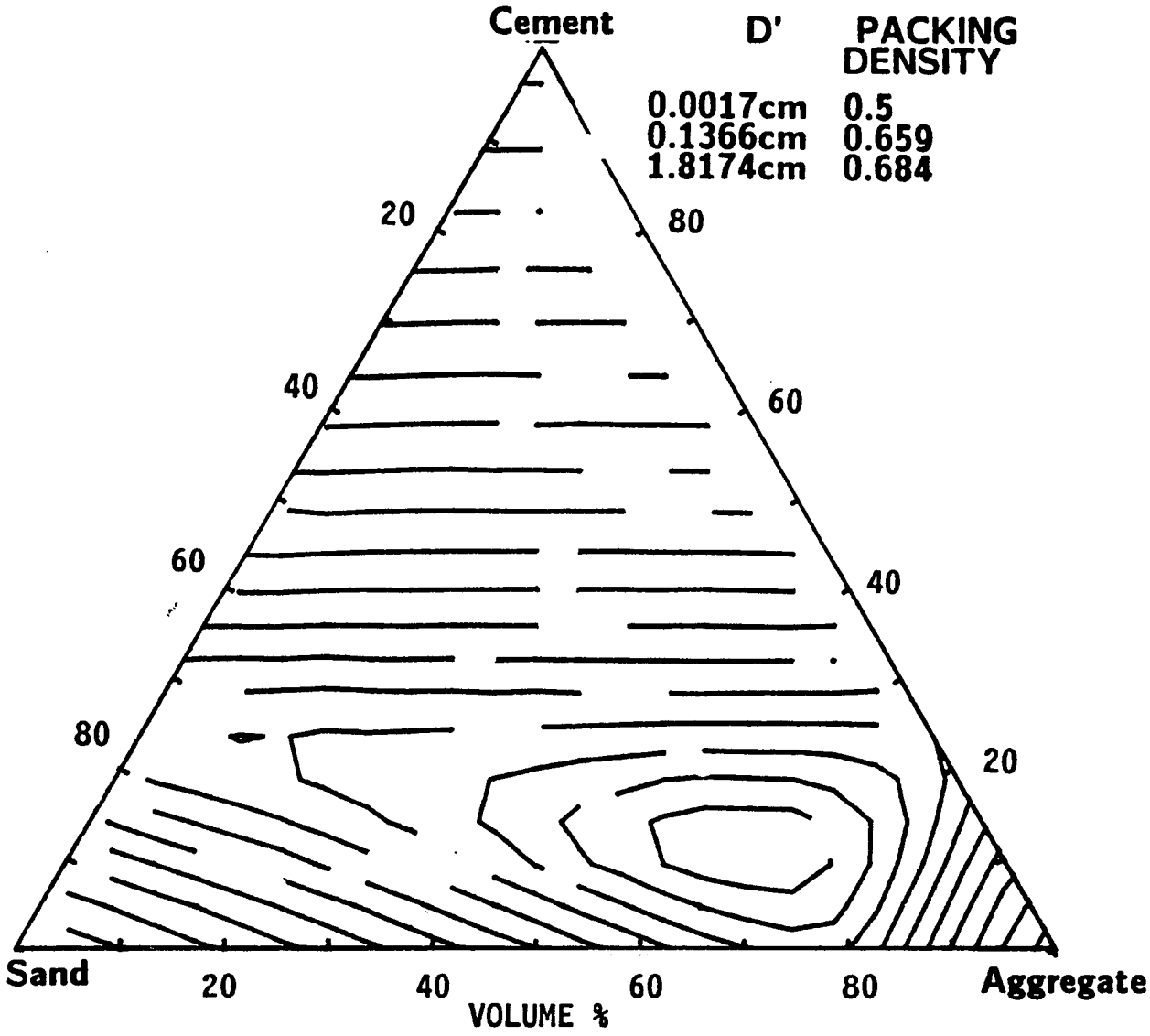

Figure 20. Plot of isodensity lines connecting points of the same packing density calculated for concrete formulations constructed from cement, sand and #67 limestone aggregate with D' = 1.817 cm.

APPENDIX IA

Part A. Experimental Determination of Packing Densities for Cements and Mineral Admixtures

1. Zero the Mitutoyo Digmatic Analyzer which is mounted on a MSC granite surface stand (Model #0651903) by using the height of the assembled die as the zero point.

2. Prepare 50 grams of material in its desired ratio of components.

3. Put material through riffler three times to ensure an even distribution of your material.

4. Put material in a glass beaker and poke several holes in material to allow for even drying.

5. Dry material in drying oven at 100°C for at least two hours.

6. Weight out 10±.05 grams of material, record this height.

7. Pour the 10 grams through a funnel into the 1" (2.54 cm) diameter Tungsten Carbide bushing with the bottom plate already in place. Make sure that the surface of the material is as level as possible. If the material completely fills the die, remove all of the material and begin again using only 5 grams of material.

8. Insert the 220 gram Tungsten Carbide piston into the top of the bushing. Be careful not to force the piston down onto the surface of the material but allow it to rest on the surface.

9. Turn on the vibrating table to speed 4.

10. Place die on the table for 4 minutes and then measure the height of the die again with the Digmatic Indicator. (Measurement should be in mm.) Increase the speed of the table to 5 and put the die back onto the table.

11. Vibrate at speed 5 for 2 minutes, take height measurement and increase speed to 6.

12. Vibrate at speed 6 for 2 minutes, take height measurement and increase speed to 7.

13. Vibrate at speed 7 for one half minute, take measurement and decrease speed to 4.

14. Vibrate at speed 4 for one minute and take final measurement.

15. Repeat steps 6-14 for two more samples.

16. Calculate density in grams per cubic centimeter using:

$$\text{Density} = \frac{m}{v} = \frac{\text{mass of sample (in grams)}}{(3.14)(1.21\text{ cm})^2\ \text{(final height of die in cm.)}}$$

$\pi r^2 h$ = vol.

Part B. Experimental Determination for Packing Densities for Aggregates

Packing densities of the aggregates were determined using an adaptation to ASTM C-29-87 "STANDARD TEST METHOD FOR UNIT WEIGHT AND VOIDS IN AGGREGATE."

A five gallon container was carefully calibrated and filled to approximately 75% capacity. The aggregates were rodded according to the ASTM procedure. Water was added to completely cover the aggregate and the container placed on vibrating table at setting 4 for approximately 1-2 minutes; setting 5 through 7 for similar times.

At the termination of this procedure, the water in excess of the top surface of the aggregate was removed. The resulting voidage in the container was determined by measuring the amount of water that remained in the container. Note: prewetted aggregate should be used for this procedure to insure that surfaces are at saturation.

PART II

Packing Handbook: Numeric Data

INTRODUCTION TO THE PACKING HANDBOOK

Considering the packing model, a typical ternary packing diagram of concrete will appear as shown in Figure 21. In the figure is seen the area of maximum packing and a vertical line of constant sand to coarse aggregate volume ratio equal to the ratio of maximum binary packing of the two components.

The vertical line indicates the concrete compositions with the optimal workability at a fixed cement content and water-to-cement ratio. Because of the improved workability along this line, mixtures also have the capacity to be cast with the lowest water-to-cement ratio, and the line therefore represents the optimal mixtures for the materials used.

The strength of the concrete therefore should be optimized along the vertical line, decreasing or increasing the cement content with just enough water added for the desired workability.

For some concrete mixtures with low mortar cohesion, separation may occur to the right of the vertical line and bleeding may occur at higher cement contents. This may, however, be avoided by designing a mortar of high internal cohesion, in which case it will be found that the optimal mixture composition will be found along the vertical line.

On this background it is apparent that the design of the optimal highway concrete may be reduced to the problem of first finding the optimal volume ratio of the sand to the coarse aggregate and then to find the lowest possible cement content, that with the necessary water content for the desired workability will give the desired strength.

For that purpose it has been decided to prepare a series of tables presented in a "Packing Handbook," that for a large variety of sand and coarse aggregates may be used to find the optimal volume ratio of sand to coarse aggregate.

The following discussion will describe how the handbook is designed and illustrative examples are given to proportion concrete using the handbook.

DESIGN OF THE CONCRETE HANDBOOK

Considering normal sand and coarse aggregate materials these may be found to present variations of D' within the following size intervals:

Sand	0-4 mm
Coarse aggregate	7-30 mm

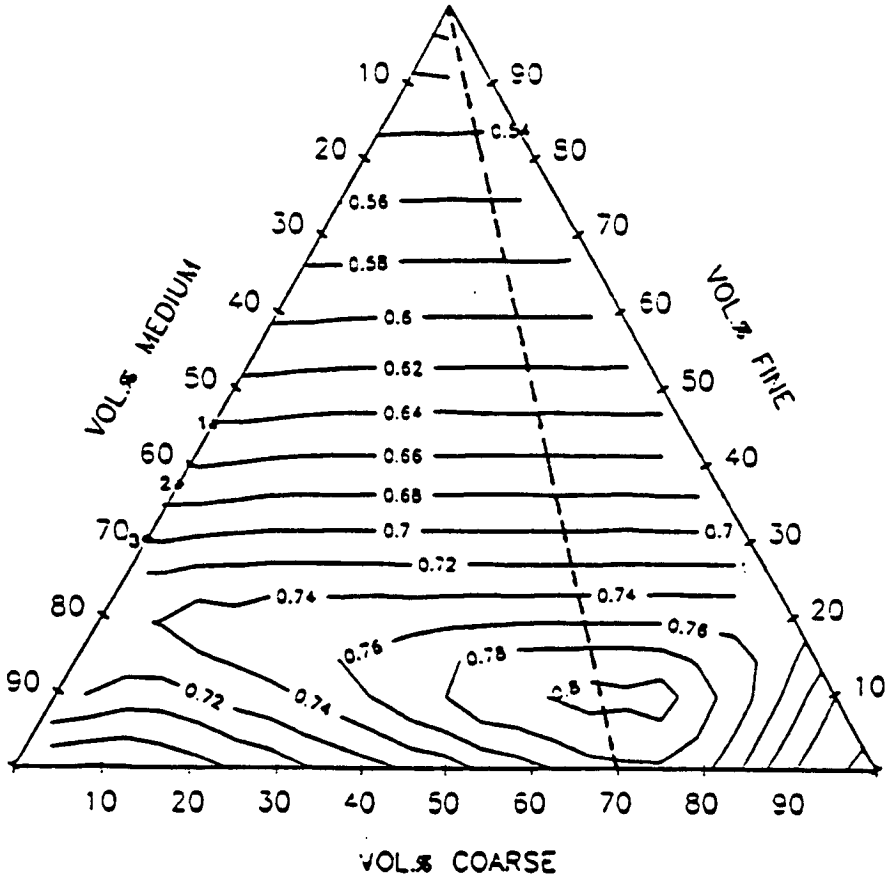

Figure 21. Typical ternary packing diagram of cement, sand and coarse aggregate. Within the diagram is drawn the vertical line along which the optimal workability may be found.

with packing densities, ϕ_0, within the following intervals:

Sand	0.5-0.7
Coarse aggregate	0.5-0.7

These intervals cover very large variations but may be found to represent all existing highway materials.

Based on the above variations, the packing handbook has been designed considering all binary combinations of sand and coarse aggregate, which have been calculated by the use of the packing model.

For the calculations, the diameter of the sand was varied in intervals of 0.5 mm and the diameter of the coarse aggregate in intervals of 1.0 mm, while the packing densities of both components were varied in intervals of 0.05. The total number of combinations then is 4,800. For each combination the binary packing density was calculated by increasing the volume % of the coarse aggregate in steps of 2%, thereby estimating the volume % of coarse aggregate for the maximum binary packing from a total number of calculations of 91,200.

The calculations have been summarized in tabular form in Appendix II.A of this report and typically appear as illustrated from Figure 22. As can be seen from the figure, the data are sorted into 6 columns: four columns of possible experimental input data and two columns of corresponding output data. As input data are used, the characteristic diameter, d', and the packing density, PHI,0, of both the sand and the coarse aggregate.

Because the input data are presented in relatively coarse intervals, the actual data for the materials should be rounded off to the nearest possible interval.

The tables give the optimal volume % (precision ±5%) of coarse aggregate to be used in the binary mixture of sand and coarse aggregate. As a help in choosing between different types of aggregates, the corresponding binary packing density is also shown as output.

INSTRUCTIONS IN THE USE OF THE PACKING HANDBOOK

To find the optimal proportion of sand and coarse aggregate for a given type of concrete, the following procedures should be followed:

1. Determine d' from Rosin-Rammler plottings of the grading curves of the sand and coarse aggregate.
2. Determine the packing density of the sand and coarse aggregate.
3. Choose the d' of the sand and move to the field in the table for the correct d'-interval.
4. Choose the d' of the coarse aggregate and move to the field in the table for the correct d'-intervals of both the sand and the coarse aggregate.

SAND		COARSE AGGREGATE		VOLUME %	MAXIMUM
d'	PHI,0	d'	PHI,0	COARSE AGGREGATE	DENSITY
1.5	0.50	13.0	0.55	74.0	0.70
1.5	0.55	13.0	0.55	72.0	0.71
1.5	0.60	13.0	0.55	70.0	0.73
1.5	0.65	13.0	0.55	68.0	0.74
1.5	0.70	13.0	0.55	66.0	0.76

Figure 22. Example of the packing handbook.

5. Find the packing density of the coarse aggregate and move to the field in the table containing the correct d'-intervals for both materials, and the packing density of the coarse aggregate.
6. Considering the packing density of the sand, finally move to the line containing the correct 4 input parameters.
7. From this line, read the corresponding volume % of the coarse aggregate to be used in the binary mixture of sand and coarse aggregate.

EXAMPLE OF USE

Consider the concrete specifications according to PADOT specification 704.1(b), illustrated in Table 1. For the type AA concrete to be used for paving will be used sand and coarse aggregate as specified by PADOT 703.2 and 703.2, with the typical input parameters:

	Sand (mm)	Coarse Aggregate
d'	1.37	13.4
PHI,0	0.66	0.55

The packing diagram and the compositional area recommended by PADOT are shown in Figure 23.

Following the above procedures, the experimental values first are rounded off:

	Sand (mm)	Coarse Aggregate
d'	1.5	13.0
PHI,0	0.65	0.55

Using the packing tables for the four input parameters, it is found that the binary mixture of sand and coarse aggregate has to consist of 68.0 volume % of the coarse aggregate. This result is seen to correlate well with the results of Figure 22, from which it can be seen that the vertical line representing the optimal binary packing of sand and coarse aggregate will pass through the area of maximum ternary packing.

Table 1. Variations allowed by the PADOT specification704.1 (b).

CLASS OF CONCRETE	USE	CEMENT FACTOR (Bags/C.Y) Min.	Max.	MAXIMUM WATER CEMENT RATIO (lbs/lbs)	SLUMP RANGE (INCHES)
AAA	BRIDGE DECK	6.75	8.00	0.43	1-3
AA	PAVING	6.25	8.00	0.47	1-3
AA	Structures and Misc.	6.25	8.00	0.47	1-3
A		6.00	8.00	0.50	1-3
C		4.20	7.00	0.66	2-6
H.E.S.		8.00	9.00	0.40	1-3

CLASS OF CONCRETE	MINIMUM MIX DESIGN COMPRESSIVE STRENGTH (PSI) days			PROPORTIONS COARSE AGGREGATE SOLID VOLUME (Cu. Ft/Cu. Yd)
	1	7	28	
AAA	-----	3600	4500	-------
AA	-----	3000	3750	9.93-13.10
AA	-----	3000	3750	9.93-13.10
A	-----	2750	3300	10.18-13.43
C	-----	1500	2000	11.45-15.10
H.E.S.	3000	-----	3750	9.10-12.00

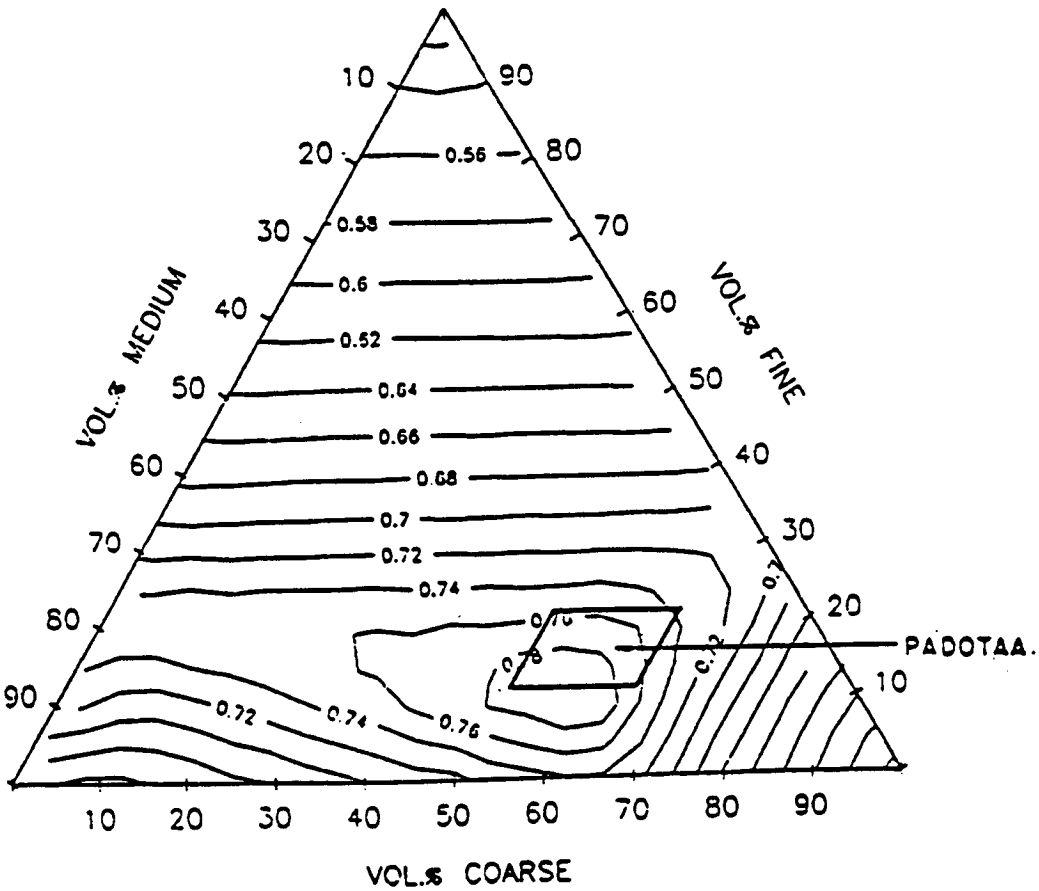

Figure 23. Concrete composition using the received size of fine and coarse aggregate and specification limits as allowed by PADOT.

RESTRICTIONS IN THE USE OF THE PACKING HANDBOOK

The packing handbook was designed to address the proper selection of dry concrete components and as such does **not** directly address the behavior of the concrete system. However, indirectly we have presented the general behavior of formulations that occur to the extremes, both left and right, of the optimum workability with fixed cement content and W/C. If concrete formulations are desired which utilize the technique of replacement of sand by the equivalent volume of entrained air, minor effects upon the loci of optimum workability at fixed cement content and W/C can be addressed. The loci are displaced toward the sand apex of the ternary diagram into a region of the packing diagrams which is typically less prone to changes in packing densities even with fairly significant compositional changes (of the dry components). As has been stated, within this region formulations are prone to segregation and bleeding. Data presented in Table 2 suggests that a reference formulation with a sand to coarse aggregate ratio of 0.6 and a W/C of 0.45 with no entrained air possesses unusable rheological properties exhibiting a very high (unmeasurable) plastic viscosity and a zero slump. These data support the long-held observation that entrained air, from two different agents in this case, has a comparable effect as a plasticizer. Here, even with a sand to coarse aggregate ratio of 0.48 and a constant W/C of 0.45 and constant cement content, acceptable plastic viscosities are achieved as well as comparable slump values. Further, in the practice of air compensating sand/aggregate formulations, maximizing of the densities of the formulations is achieved and thus represents areas of future optimization of this handbook.

The packing tables cover all combinations of sand and coarse aggregate within broad intervals. The tables may be used for estimation of the optimal volume ratio of sand and coarse aggregate using one type of sand and one type of coarse aggregate, which will be adequate in the design of concrete for most highways. For some types of high quality concrete, it may be important to combine cement, slag, fly ash and silica fume into one binder and several size fractions of sand and coarse aggregate into one type of sand or aggregate. As an illustration, the ternary packing of three types of coarse aggregate can be seen from Figure 24 and the packing of cement, silica fume and fly ash can be seen from Figure 25.

Table 2. Rheological properties of air entrained concretes.

SAMPLE	FORMULATIONS (VOL%)					AIR	SLUMP	UNIT WT	Y STRESS	PL VISCOSITY
	cement	sand	agg	w/c	s'plast	%	(in)	(lb/cuft)	(Nm)	(Nm.s)
S89-1	15.79	30.76	53.44	0.47	----	1.5	3.25	148.35	2.87	0.77
S89-1A	15.79	30.76	53.44	0.45	----	6.7	2.25	138.91	3.10	0.61
ref. w/o entrainment	15.53	31.90	52.96	0.45	----	0.0	0.00	---	very high	very high
ref. w/o entrainment	15.53	31.90	52.96	0.45	0.5%	1.0	2.00	151.10	3.53	0.99
ref. w/ AIR	16.66	26.96	56.38	0.45	----	6.0	2.38	143.70	3.16	1.18
ref. w/ MICROAIR	16.66	26.96	56.38	0.45	----	6.1	2.25	143.70	3.36	1.85

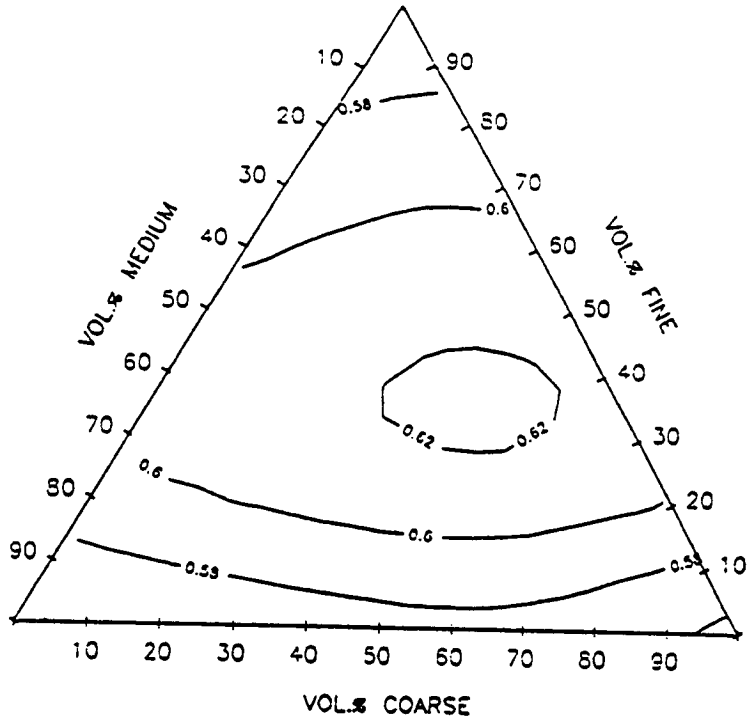

Figure 24. Ternary diagram showing the packing density for all possible combinations of the three types of aggregate: coarse aggregate 2/8 mm, 8/16 mm and 16/32 mm.

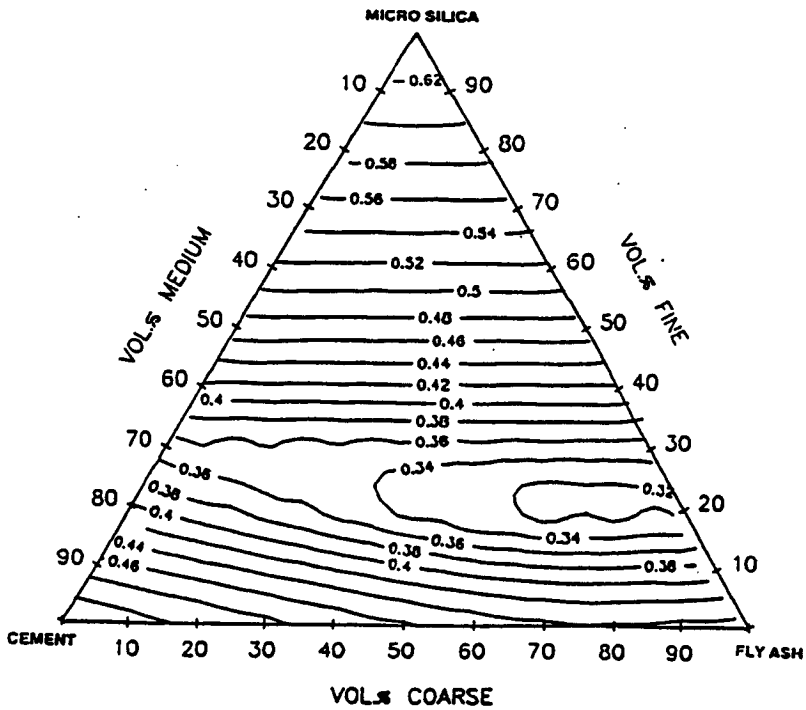

Figure 25. Ternary diagram showing the packing density for all possible combinations of the three types of binder: cement, microsilica and fly ash.

REFERENCES

R.B. Aims and P. Le Goff, Powder Technology 1, 281-290 (1967/68).

W. Toufar, M. Born and E. Klose, Freiberger Forschungsheft A 559, VEB Deutscher Verlag Fuer Grundstoffindustrie (1967).

W. Toufar, E. Klose and M. Born, Aufbereitungs-technik 11, 603-608 (1977).

D.J. Cumberland and R.J. Crawford, Handbook of Powder Technology, Elsevier, New York, pp 90-92 (1988).

S.H. Kosmatka and W.C. Panavese, Design and Control of Concrete Mixtures, 13th Ed., Portland Cement Association, pp. 90-91 (1988).

J.D. McIntosh, Concrete Mix Design (2nd Ed., 1966), Cement and Concrete Association (UK), 52 Grosvenor Gardens, London SWI (Table I, p. 12).

Commonwealth of Pennsylvania, Department of Transportation, Specification, Harrisburg, PA, Publ. 408 (1987).

G.C. Bye, Portland Cement: Composition, Production and Properties, Pergamon Press, New York (1983).

SHRP 201, Third Quarterly Report (1989).

Appendix IIA

Packing Tables

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	7.0	0.50	68.0	0.69
0.5	0.55	7.0	0.50	66.0	0.71
0.5	0.60	7.0	0.50	64.0	0.72
0.5	0.65	7.0	0.50	62.0	0.74
0.5	0.70	7.0	0.50	60.0	0.76
0.5	0.50	7.0	0.55	72.0	0.71
0.5	0.55	7.0	0.55	70.0	0.72
0.5	0.60	7.0	0.55	68.0	0.74
0.5	0.65	7.0	0.55	66.0	0.75
0.5	0.70	7.0	0.55	64.0	0.76
0.5	0.50	7.0	0.60	76.0	0.72
0.5	0.55	7.0	0.60	74.0	0.73
0.5	0.60	7.0	0.60	72.0	0.75
0.5	0.65	7.0	0.60	72.0	0.76
0.5	0.70	7.0	0.60	70.0	0.78
0.5	0.50	7.0	0.65	80.0	0.74
0.5	0.55	7.0	0.65	78.0	0.75
0.5	0.60	7.0	0.65	78.0	0.76
0.5	0.65	7.0	0.65	76.0	0.77
0.5	0.70	7.0	0.65	74.0	0.78
0.5	0.50	7.0	0.70	84.0	0.76
0.5	0.55	7.0	0.70	82.0	0.76
0.5	0.60	7.0	0.70	82.0	0.78
0.5	0.65	7.0	0.70	80.0	0.78
0.5	0.70	7.0	0.70	80.0	0.79
0.5	0.50	8.0	0.50	68.0	0.69
0.5	0.55	8.0	0.50	66.0	0.71
0.5	0.60	8.0	0.50	64.0	0.72
0.5	0.65	8.0	0.50	62.0	0.74
0.5	0.70	8.0	0.50	60.0	0.76
0.5	0.50	8.0	0.55	72.0	0.71
0.5	0.55	8.0	0.55	70.0	0.72
0.5	0.60	8.0	0.55	68.0	0.74
0.5	0.65	8.0	0.55	66.0	0.75
0.5	0.70	8.0	0.55	64.0	0.77
0.5	0.50	8.0	0.60	76.0	0.72
0.5	0.55	8.0	0.60	74.0	0.74
0.5	0.60	8.0	0.60	72.0	0.75
0.5	0.65	8.0	0.60	72.0	0.76
0.5	0.70	8.0	0.60	70.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	8.0	0.65	80.0	0.74
0.5	0.55	8.0	0.65	78.0	0.75
0.5	0.60	8.0	0.65	78.0	0.76
0.5	0.65	8.0	0.65	76.0	0.78
0.5	0.70	8.0	0.65	74.0	0.79
0.5	0.50	8.0	0.70	84.0	0.76
0.5	0.55	8.0	0.70	82.0	0.77
0.5	0.60	8.0	0.70	82.0	0.78
0.5	0.65	8.0	0.70	80.0	0.79
0.5	0.70	8.0	0.70	78.0	0.80
0.5	0.50	9.0	0.50	68.0	0.69
0.5	0.55	9.0	0.50	66.0	0.71
0.5	0.60	9.0	0.50	64.0	0.72
0.5	0.65	9.0	0.50	62.0	0.74
0.5	0.70	9.0	0.50	60.0	0.76
0.5	0.50	9.0	0.55	72.0	0.71
0.5	0.55	9.0	0.55	70.0	0.72
0.5	0.60	9.0	0.55	68.0	0.74
0.5	0.65	9.0	0.55	66.0	0.75
0.5	0.70	9.0	0.55	64.0	0.77
0.5	0.50	9.0	0.60	76.0	0.73
0.5	0.55	9.0	0.60	74.0	0.74
0.5	0.60	9.0	0.60	72.0	0.75
0.5	0.65	9.0	0.60	70.0	0.76
0.5	0.70	9.0	0.60	70.0	0.78
0.5	0.50	9.0	0.65	80.0	0.74
0.5	0.55	9.0	0.65	78.0	0.75
0.5	0.60	9.0	0.65	76.0	0.76
0.5	0.65	9.0	0.65	76.0	0.78
0.5	0.70	9.0	0.65	74.0	0.79
0.5	0.50	9.0	0.70	84.0	0.76
0.5	0.55	9.0	0.70	82.0	0.77
0.5	0.60	9.0	0.70	82.0	0.78
0.5	0.65	9.0	0.70	80.0	0.79
0.5	0.70	9.0	0.70	78.0	0.80
0.5	0.50	10.0	0.50	68.0	0.69
0.5	0.55	10.0	0.50	66.0	0.71
0.5	0.60	10.0	0.50	64.0	0.72
0.5	0.65	10.0	0.50	62.0	0.74
0.5	0.70	10.0	0.50	60.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	10.0	0.55	72.0	0.71
0.5	0.55	10.0	0.55	70.0	0.73
0.5	0.60	10.0	0.55	68.0	0.74
0.5	0.65	10.0	0.55	66.0	0.76
0.5	0.70	10.0	0.55	64.0	0.77
0.5	0.50	10.0	0.60	76.0	0.73
0.5	0.55	10.0	0.60	74.0	0.74
0.5	0.60	10.0	0.60	72.0	0.75
0.5	0.65	10.0	0.60	70.0	0.77
0.5	0.70	10.0	0.60	70.0	0.78
0.5	0.50	10.0	0.65	80.0	0.74
0.5	0.55	10.0	0.65	78.0	0.76
0.5	0.60	10.0	0.65	76.0	0.77
0.5	0.65	10.0	0.65	76.0	0.78
0.5	0.70	10.0	0.65	74.0	0.79
0.5	0.50	10.0	0.70	84.0	0.76
0.5	0.55	10.0	0.70	82.0	0.77
0.5	0.60	10.0	0.70	80.0	0.78
0.5	0.65	10.0	0.70	80.0	0.79
0.5	0.70	10.0	0.70	78.0	0.80
0.5	0.50	11.0	0.50	68.0	0.69
0.5	0.55	11.0	0.50	66.0	0.71
0.5	0.60	11.0	0.50	62.0	0.73
0.5	0.65	11.0	0.50	60.0	0.74
0.5	0.70	11.0	0.50	60.0	0.76
0.5	0.50	11.0	0.55	72.0	0.71
0.5	0.55	11.0	0.55	70.0	0.73
0.5	0.60	11.0	0.55	68.0	0.74
0.5	0.65	11.0	0.55	66.0	0.76
0.5	0.70	11.0	0.55	64.0	0.77
0.5	0.50	11.0	0.60	76.0	0.73
0.5	0.55	11.0	0.60	74.0	0.74
0.5	0.60	11.0	0.60	72.0	0.75
0.5	0.65	11.0	0.60	70.0	0.77
0.5	0.70	11.0	0.60	68.0	0.78
0.5	0.50	11.0	0.65	80.0	0.75
0.5	0.55	11.0	0.65	78.0	0.76
0.5	0.60	11.0	0.65	76.0	0.77
0.5	0.65	11.0	0.65	76.0	0.78
0.5	0.70	11.0	0.65	74.0	0.79

SAND		COARSE AGGREGATE		VOLUME %	MAXIMUM
d'	PHI,0	d'	PHI,0	COARSE AGGREGATE	DENSITY
0.5	0.50	11.0	0.70	84.0	0.76
0.5	0.55	11.0	0.70	82.0	0.77
0.5	0.60	11.0	0.70	80.0	0.78
0.5	0.65	11.0	0.70	80.0	0.79
0.5	0.70	11.0	0.70	78.0	0.80
0.5	0.50	12.0	0.50	68.0	0.69
0.5	0.55	12.0	0.50	64.0	0.71
0.5	0.60	12.0	0.50	62.0	0.73
0.5	0.65	12.0	0.50	60.0	0.74
0.5	0.70	12.0	0.50	60.0	0.76
0.5	0.50	12.0	0.55	72.0	0.71
0.5	0.55	12.0	0.55	70.0	0.73
0.5	0.60	12.0	0.55	68.0	0.74
0.5	0.65	12.0	0.55	66.0	0.76
0.5	0.70	12.0	0.55	64.0	0.77
0.5	0.50	12.0	0.60	76.0	0.73
0.5	0.55	12.0	0.60	74.0	0.74
0.5	0.60	12.0	0.60	72.0	0.76
0.5	0.65	12.0	0.60	70.0	0.77
0.5	0.70	12.0	0.60	68.0	0.78
0.5	0.50	12.0	0.65	80.0	0.75
0.5	0.55	12.0	0.65	78.0	0.76
0.5	0.60	12.0	0.65	76.0	0.77
0.5	0.65	12.0	0.65	74.0	0.78
0.5	0.70	12.0	0.65	74.0	0.79
0.5	0.50	12.0	0.70	84.0	0.76
0.5	0.55	12.0	0.70	82.0	0.77
0.5	0.60	12.0	0.70	80.0	0.78
0.5	0.65	12.0	0.70	80.0	0.79
0.5	0.70	12.0	0.70	78.0	0.80
0.5	0.50	13.0	0.50	68.0	0.69
0.5	0.55	13.0	0.50	64.0	0.71
0.5	0.60	13.0	0.50	62.0	0.73
0.5	0.65	13.0	0.50	60.0	0.74
0.5	0.70	13.0	0.50	60.0	0.76
0.5	0.50	13.0	0.55	72.0	0.71
0.5	0.55	13.0	0.55	70.0	0.73
0.5	0.60	13.0	0.55	68.0	0.74
0.5	0.65	13.0	0.55	66.0	0.76
0.5	0.70	13.0	0.55	64.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	13.0	0.60	76.0	0.73
0.5	0.55	13.0	0.60	74.0	0.74
0.5	0.60	13.0	0.60	72.0	0.76
0.5	0.65	13.0	0.60	70.0	0.77
0.5	0.70	13.0	0.60	68.0	0.78
0.5	0.50	13.0	0.65	80.0	0.75
0.5	0.55	13.0	0.65	78.0	0.76
0.5	0.60	13.0	0.65	76.0	0.77
0.5	0.65	13.0	0.65	74.0	0.78
0.5	0.70	13.0	0.65	74.0	0.80
0.5	0.50	13.0	0.70	84.0	0.76
0.5	0.55	13.0	0.70	82.0	0.77
0.5	0.60	13.0	0.70	80.0	0.78
0.5	0.65	13.0	0.70	80.0	0.79
0.5	0.70	13.0	0.70	78.0	0.80
0.5	0.50	14.0	0.50	68.0	0.69
0.5	0.55	14.0	0.50	64.0	0.71
0.5	0.60	14.0	0.50	62.0	0.73
0.5	0.65	14.0	0.50	60.0	0.75
0.5	0.70	14.0	0.50	58.0	0.76
0.5	0.50	14.0	0.55	72.0	0.71
0.5	0.55	14.0	0.55	70.0	0.73
0.5	0.60	14.0	0.55	68.0	0.74
0.5	0.65	14.0	0.55	66.0	0.76
0.5	0.70	14.0	0.55	64.0	0.78
0.5	0.50	14.0	0.60	76.0	0.73
0.5	0.55	14.0	0.60	74.0	0.74
0.5	0.60	14.0	0.60	72.0	0.76
0.5	0.65	14.0	0.60	70.0	0.77
0.5	0.70	14.0	0.60	68.0	0.78
0.5	0.50	14.0	0.65	80.0	0.75
0.5	0.55	14.0	0.65	78.0	0.76
0.5	0.60	14.0	0.65	76.0	0.77
0.5	0.65	14.0	0.65	74.0	0.78
0.5	0.70	14.0	0.65	74.0	0.80
0.5	0.50	14.0	0.70	84.0	0.76
0.5	0.55	14.0	0.70	82.0	0.78
0.5	0.60	14.0	0.70	80.0	0.78
0.5	0.65	14.0	0.70	80.0	0.79
0.5	0.70	14.0	0.70	78.0	0.81

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	15.0	0.50	66.0	0.69
0.5	0.55	15.0	0.50	64.0	0.71
0.5	0.60	15.0	0.50	62.0	0.73
0.5	0.65	15.0	0.50	60.0	0.75
0.5	0.70	15.0	0.50	58.0	0.76
0.5	0.50	15.0	0.55	72.0	0.71
0.5	0.55	15.0	0.55	70.0	0.73
0.5	0.60	15.0	0.55	68.0	0.74
0.5	0.65	15.0	0.55	66.0	0.76
0.5	0.70	15.0	0.55	64.0	0.78
0.5	0.50	15.0	0.60	76.0	0.73
0.5	0.55	15.0	0.60	74.0	0.75
0.5	0.60	15.0	0.60	72.0	0.76
0.5	0.65	15.0	0.60	70.0	0.77
0.5	0.70	15.0	0.60	68.0	0.78
0.5	0.50	15.0	0.65	80.0	0.75
0.5	0.55	15.0	0.65	78.0	0.76
0.5	0.60	15.0	0.65	76.0	0.77
0.5	0.65	15.0	0.65	74.0	0.78
0.5	0.70	15.0	0.65	74.0	0.80
0.5	0.50	15.0	0.70	84.0	0.76
0.5	0.55	15.0	0.70	82.0	0.78
0.5	0.60	15.0	0.70	80.0	0.78
0.5	0.65	15.0	0.70	78.0	0.79
0.5	0.70	15.0	0.70	78.0	0.81
0.5	0.50	16.0	0.50	66.0	0.69
0.5	0.55	16.0	0.50	64.0	0.71
0.5	0.60	16.0	0.50	62.0	0.73
0.5	0.65	16.0	0.50	60.0	0.75
0.5	0.70	16.0	0.50	58.0	0.76
0.5	0.50	16.0	0.55	72.0	0.71
0.5	0.55	16.0	0.55	70.0	0.73
0.5	0.60	16.0	0.55	68.0	0.74
0.5	0.65	16.0	0.55	66.0	0.76
0.5	0.70	16.0	0.55	64.0	0.78
0.5	0.50	16.0	0.60	76.0	0.73
0.5	0.55	16.0	0.60	74.0	0.75
0.5	0.60	16.0	0.60	72.0	0.76
0.5	0.65	16.0	0.60	70.0	0.77
0.5	0.70	16.0	0.60	68.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	16.0	0.65	80.0	0.75
0.5	0.55	16.0	0.65	78.0	0.76
0.5	0.60	16.0	0.65	76.0	0.77
0.5	0.65	16.0	0.65	74.0	0.78
0.5	0.70	16.0	0.65	74.0	0.80
0.5	0.50	16.0	0.70	84.0	0.76
0.5	0.55	16.0	0.70	82.0	0.78
0.5	0.60	16.0	0.70	80.0	0.79
0.5	0.65	16.0	0.70	78.0	0.79
0.5	0.70	16.0	0.70	78.0	0.81
0.5	0.50	17.0	0.50	66.0	0.69
0.5	0.55	17.0	0.50	64.0	0.71
0.5	0.60	17.0	0.50	62.0	0.73
0.5	0.65	17.0	0.50	60.0	0.75
0.5	0.70	17.0	0.50	58.0	0.76
0.5	0.50	17.0	0.55	72.0	0.71
0.5	0.55	17.0	0.55	70.0	0.73
0.5	0.60	17.0	0.55	68.0	0.74
0.5	0.65	17.0	0.55	66.0	0.76
0.5	0.70	17.0	0.55	64.0	0.78
0.5	0.50	17.0	0.60	76.0	0.73
0.5	0.55	17.0	0.60	74.0	0.75
0.5	0.60	17.0	0.60	72.0	0.76
0.5	0.65	17.0	0.60	70.0	0.77
0.5	0.70	17.0	0.60	68.0	0.79
0.5	0.50	17.0	0.65	80.0	0.75
0.5	0.55	17.0	0.65	78.0	0.76
0.5	0.60	17.0	0.65	76.0	0.77
0.5	0.65	17.0	0.65	74.0	0.78
0.5	0.70	17.0	0.65	74.0	0.80
0.5	0.50	17.0	0.70	84.0	0.76
0.5	0.55	17.0	0.70	82.0	0.78
0.5	0.60	17.0	0.70	80.0	0.79
0.5	0.65	17.0	0.70	78.0	0.79
0.5	0.70	17.0	0.70	78.0	0.81
0.5	0.50	18.0	0.50	66.0	0.69
0.5	0.55	18.0	0.50	64.0	0.71
0.5	0.60	18.0	0.50	62.0	0.73
0.5	0.65	18.0	0.50	60.0	0.75
0.5	0.70	18.0	0.50	58.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	18.0	0.55	72.0	0.71
0.5	0.55	18.0	0.55	70.0	0.73
0.5	0.60	18.0	0.55	68.0	0.74
0.5	0.65	18.0	0.55	66.0	0.76
0.5	0.70	18.0	0.55	64.0	0.78
0.5	0.50	18.0	0.60	76.0	0.73
0.5	0.55	18.0	0.60	74.0	0.75
0.5	0.60	18.0	0.60	72.0	0.76
0.5	0.65	18.0	0.60	70.0	0.77
0.5	0.70	18.0	0.60	68.0	0.79
0.5	0.50	18.0	0.65	80.0	0.75
0.5	0.55	18.0	0.65	78.0	0.76
0.5	0.60	18.0	0.65	76.0	0.77
0.5	0.65	18.0	0.65	74.0	0.78
0.5	0.70	18.0	0.65	72.0	0.80
0.5	0.50	18.0	0.70	84.0	0.76
0.5	0.55	18.0	0.70	82.0	0.78
0.5	0.60	18.0	0.70	80.0	0.79
0.5	0.65	18.0	0.70	78.0	0.80
0.5	0.70	18.0	0.70	78.0	0.81
0.5	0.50	19.0	0.50	66.0	0.69
0.5	0.55	19.0	0.50	64.0	0.71
0.5	0.60	19.0	0.50	62.0	0.73
0.5	0.65	19.0	0.50	60.0	0.75
0.5	0.70	19.0	0.50	58.0	0.77
0.5	0.50	19.0	0.55	72.0	0.71
0.5	0.55	19.0	0.55	70.0	0.73
0.5	0.60	19.0	0.55	68.0	0.74
0.5	0.65	19.0	0.55	66.0	0.76
0.5	0.70	19.0	0.55	64.0	0.78
0.5	0.50	19.0	0.60	76.0	0.73
0.5	0.55	19.0	0.60	74.0	0.75
0.5	0.60	19.0	0.60	72.0	0.76
0.5	0.65	19.0	0.60	70.0	0.77
0.5	0.70	19.0	0.60	68.0	0.79
0.5	0.50	19.0	0.65	80.0	0.75
0.5	0.55	19.0	0.65	78.0	0.76
0.5	0.60	19.0	0.65	76.0	0.77
0.5	0.65	19.0	0.65	74.0	0.78
0.5	0.70	19.0	0.65	72.0	0.80

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	19.0	0.70	82.0	0.76
0.5	0.55	19.0	0.70	82.0	0.78
0.5	0.60	19.0	0.70	80.0	0.79
0.5	0.65	19.0	0.70	78.0	0.80
0.5	0.70	19.0	0.70	78.0	0.81
0.5	0.50	20.0	0.50	66.0	0.69
0.5	0.55	20.0	0.50	64.0	0.71
0.5	0.60	20.0	0.50	62.0	0.73
0.5	0.65	20.0	0.50	60.0	0.75
0.5	0.70	20.0	0.50	58.0	0.77
0.5	0.50	20.0	0.55	72.0	0.71
0.5	0.55	20.0	0.55	70.0	0.73
0.5	0.60	20.0	0.55	68.0	0.74
0.5	0.65	20.0	0.55	66.0	0.76
0.5	0.70	20.0	0.55	64.0	0.78
0.5	0.50	20.0	0.60	76.0	0.73
0.5	0.55	20.0	0.60	74.0	0.75
0.5	0.60	20.0	0.60	72.0	0.76
0.5	0.65	20.0	0.60	70.0	0.77
0.5	0.70	20.0	0.60	68.0	0.79
0.5	0.50	20.0	0.65	80.0	0.75
0.5	0.55	20.0	0.65	78.0	0.76
0.5	0.60	20.0	0.65	76.0	0.77
0.5	0.65	20.0	0.65	74.0	0.79
0.5	0.70	20.0	0.65	72.0	0.80
0.5	0.50	20.0	0.70	82.0	0.76
0.5	0.55	20.0	0.70	82.0	0.78
0.5	0.60	20.0	0.70	80.0	0.79
0.5	0.65	20.0	0.70	78.0	0.80
0.5	0.70	20.0	0.70	78.0	0.81
0.5	0.50	21.0	0.50	66.0	0.69
0.5	0.55	21.0	0.50	64.0	0.71
0.5	0.60	21.0	0.50	62.0	0.73
0.5	0.65	21.0	0.50	60.0	0.75
0.5	0.70	21.0	0.50	58.0	0.77
0.5	0.50	21.0	0.55	72.0	0.71
0.5	0.55	21.0	0.55	70.0	0.73
0.5	0.60	21.0	0.55	68.0	0.74
0.5	0.65	21.0	0.55	66.0	0.76
0.5	0.70	21.0	0.55	64.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	21.0	0.60	76.0	0.73
0.5	0.55	21.0	0.60	74.0	0.75
0.5	0.60	21.0	0.60	72.0	0.76
0.5	0.65	21.0	0.60	70.0	0.77
0.5	0.70	21.0	0.60	68.0	0.79
0.5	0.50	21.0	0.65	80.0	0.75
0.5	0.55	21.0	0.65	78.0	0.76
0.5	0.60	21.0	0.65	76.0	0.77
0.5	0.65	21.0	0.65	74.0	0.79
0.5	0.70	21.0	0.65	72.0	0.80
0.5	0.50	21.0	0.70	82.0	0.76
0.5	0.55	21.0	0.70	82.0	0.78
0.5	0.60	21.0	0.70	80.0	0.79
0.5	0.65	21.0	0.70	78.0	0.80
0.5	0.70	21.0	0.70	78.0	0.81
0.5	0.50	22.0	0.50	66.0	0.69
0.5	0.55	22.0	0.50	64.0	0.71
0.5	0.60	22.0	0.50	62.0	0.73
0.5	0.65	22.0	0.50	60.0	0.75
0.5	0.70	22.0	0.50	58.0	0.77
0.5	0.50	22.0	0.55	72.0	0.71
0.5	0.55	22.0	0.55	70.0	0.73
0.5	0.60	22.0	0.55	68.0	0.74
0.5	0.65	22.0	0.55	66.0	0.76
0.5	0.70	22.0	0.55	64.0	0.78
0.5	0.50	22.0	0.60	76.0	0.73
0.5	0.55	22.0	0.60	74.0	0.75
0.5	0.60	22.0	0.60	72.0	0.76
0.5	0.65	22.0	0.60	70.0	0.77
0.5	0.70	22.0	0.60	68.0	0.79
0.5	0.50	22.0	0.65	80.0	0.75
0.5	0.55	22.0	0.65	78.0	0.76
0.5	0.60	22.0	0.65	76.0	0.78
0.5	0.65	22.0	0.65	74.0	0.79
0.5	0.70	22.0	0.65	72.0	0.80
0.5	0.50	22.0	0.70	82.0	0.76
0.5	0.55	22.0	0.70	82.0	0.78
0.5	0.60	22.0	0.70	80.0	0.79
0.5	0.65	22.0	0.70	78.0	0.80
0.5	0.70	22.0	0.70	78.0	0.81

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	23.0	0.50	66.0	0.69
0.5	0.55	23.0	0.50	64.0	0.71
0.5	0.60	23.0	0.50	62.0	0.73
0.5	0.65	23.0	0.50	60.0	0.75
0.5	0.70	23.0	0.50	58.0	0.77
0.5	0.50	23.0	0.55	72.0	0.71
0.5	0.55	23.0	0.55	70.0	0.73
0.5	0.60	23.0	0.55	68.0	0.74
0.5	0.65	23.0	0.55	66.0	0.76
0.5	0.70	23.0	0.55	64.0	0.78
0.5	0.50	23.0	0.60	76.0	0.73
0.5	0.55	23.0	0.60	74.0	0.75
0.5	0.60	23.0	0.60	72.0	0.76
0.5	0.65	23.0	0.60	70.0	0.78
0.5	0.70	23.0	0.60	68.0	0.79
0.5	0.50	23.0	0.65	80.0	0.75
0.5	0.55	23.0	0.65	78.0	0.76
0.5	0.60	23.0	0.65	76.0	0.78
0.5	0.65	23.0	0.65	74.0	0.79
0.5	0.70	23.0	0.65	72.0	0.80
0.5	0.50	23.0	0.70	82.0	0.76
0.5	0.55	23.0	0.70	82.0	0.78
0.5	0.60	23.0	0.70	80.0	0.79
0.5	0.65	23.0	0.70	78.0	0.80
0.5	0.70	23.0	0.70	78.0	0.81
0.5	0.50	24.0	0.50	66.0	0.69
0.5	0.55	24.0	0.50	64.0	0.71
0.5	0.60	24.0	0.50	62.0	0.73
0.5	0.65	24.0	0.50	60.0	0.75
0.5	0.70	24.0	0.50	58.0	0.77
0.5	0.50	24.0	0.55	72.0	0.71
0.5	0.55	24.0	0.55	70.0	0.73
0.5	0.60	24.0	0.55	68.0	0.74
0.5	0.65	24.0	0.55	66.0	0.76
0.5	0.70	24.0	0.55	64.0	0.78
0.5	0.50	24.0	0.60	76.0	0.73
0.5	0.55	24.0	0.60	74.0	0.75
0.5	0.60	24.0	0.60	72.0	0.76
0.5	0.65	24.0	0.60	70.0	0.78
0.5	0.70	24.0	0.60	68.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	24.0	0.65	80.0	0.75
0.5	0.55	24.0	0.65	78.0	0.76
0.5	0.60	24.0	0.65	76.0	0.78
0.5	0.65	24.0	0.65	74.0	0.79
0.5	0.70	24.0	0.65	72.0	0.80
0.5	0.50	24.0	0.70	82.0	0.76
0.5	0.55	24.0	0.70	82.0	0.78
0.5	0.60	24.0	0.70	80.0	0.79
0.5	0.65	24.0	0.70	78.0	0.80
0.5	0.70	24.0	0.70	78.0	0.81
0.5	0.50	25.0	0.50	66.0	0.69
0.5	0.55	25.0	0.50	64.0	0.71
0.5	0.60	25.0	0.50	62.0	0.73
0.5	0.65	25.0	0.50	60.0	0.75
0.5	0.70	25.0	0.50	58.0	0.77
0.5	0.50	25.0	0.55	72.0	0.71
0.5	0.55	25.0	0.55	70.0	0.73
0.5	0.60	25.0	0.55	68.0	0.74
0.5	0.65	25.0	0.55	66.0	0.76
0.5	0.70	25.0	0.55	64.0	0.78
0.5	0.50	25.0	0.60	76.0	0.73
0.5	0.55	25.0	0.60	74.0	0.75
0.5	0.60	25.0	0.60	72.0	0.76
0.5	0.65	25.0	0.60	70.0	0.78
0.5	0.70	25.0	0.60	68.0	0.79
0.5	0.50	25.0	0.65	80.0	0.75
0.5	0.55	25.0	0.65	78.0	0.76
0.5	0.60	25.0	0.65	76.0	0.78
0.5	0.65	25.0	0.65	74.0	0.79
0.5	0.70	25.0	0.65	72.0	0.80
0.5	0.50	25.0	0.70	82.0	0.77
0.5	0.55	25.0	0.70	82.0	0.78
0.5	0.60	25.0	0.70	80.0	0.79
0.5	0.65	25.0	0.70	78.0	0.80
0.5	0.70	25.0	0.70	78.0	0.81
0.5	0.50	26.0	0.50	66.0	0.69
0.5	0.55	26.0	0.50	64.0	0.71
0.5	0.60	26.0	0.50	62.0	0.73
0.5	0.65	26.0	0.50	60.0	0.75
0.5	0.70	26.0	0.50	58.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	26.0	0.55	72.0	0.71
0.5	0.55	26.0	0.55	70.0	0.73
0.5	0.60	26.0	0.55	68.0	0.74
0.5	0.65	26.0	0.55	66.0	0.76
0.5	0.70	26.0	0.55	64.0	0.78
0.5	0.50	26.0	0.60	76.0	0.73
0.5	0.55	26.0	0.60	74.0	0.75
0.5	0.60	26.0	0.60	72.0	0.76
0.5	0.65	26.0	0.60	70.0	0.78
0.5	0.70	26.0	0.60	68.0	0.79
0.5	0.50	26.0	0.65	80.0	0.75
0.5	0.55	26.0	0.65	78.0	0.76
0.5	0.60	26.0	0.65	76.0	0.78
0.5	0.65	26.0	0.65	74.0	0.79
0.5	0.70	26.0	0.65	72.0	0.80
0.5	0.50	26.0	0.70	82.0	0.77
0.5	0.55	26.0	0.70	82.0	0.78
0.5	0.60	26.0	0.70	80.0	0.79
0.5	0.65	26.0	0.70	78.0	0.80
0.5	0.70	26.0	0.70	78.0	0.81
0.5	0.50	27.0	0.50	66.0	0.70
0.5	0.55	27.0	0.50	64.0	0.71
0.5	0.60	27.0	0.50	62.0	0.73
0.5	0.65	27.0	0.50	60.0	0.75
0.5	0.70	27.0	0.50	58.0	0.77
0.5	0.50	27.0	0.55	72.0	0.71
0.5	0.55	27.0	0.55	70.0	0.73
0.5	0.60	27.0	0.55	68.0	0.74
0.5	0.65	27.0	0.55	66.0	0.76
0.5	0.70	27.0	0.55	64.0	0.78
0.5	0.50	27.0	0.60	76.0	0.73
0.5	0.55	27.0	0.60	74.0	0.75
0.5	0.60	27.0	0.60	72.0	0.76
0.5	0.65	27.0	0.60	70.0	0.78
0.5	0.70	27.0	0.60	68.0	0.79
0.5	0.50	27.0	0.65	80.0	0.75
0.5	0.55	27.0	0.65	78.0	0.76
0.5	0.60	27.0	0.65	76.0	0.78
0.5	0.65	27.0	0.65	74.0	0.79
0.5	0.70	27.0	0.65	72.0	0.80

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	27.0	0.70	82.0	0.77
0.5	0.55	27.0	0.70	82.0	0.78
0.5	0.60	27.0	0.70	80.0	0.79
0.5	0.65	27.0	0.70	78.0	0.80
0.5	0.70	27.0	0.70	78.0	0.81
0.5	0.50	28.0	0.50	66.0	0.70
0.5	0.55	28.0	0.50	64.0	0.71
0.5	0.60	28.0	0.50	62.0	0.73
0.5	0.65	28.0	0.50	60.0	0.75
0.5	0.70	28.0	0.50	58.0	0.77
0.5	0.50	28.0	0.55	72.0	0.71
0.5	0.55	28.0	0.55	70.0	0.73
0.5	0.60	28.0	0.55	68.0	0.74
0.5	0.65	28.0	0.55	66.0	0.76
0.5	0.70	28.0	0.55	64.0	0.78
0.5	0.50	28.0	0.60	76.0	0.73
0.5	0.55	28.0	0.60	74.0	0.75
0.5	0.60	28.0	0.60	72.0	0.76
0.5	0.65	28.0	0.60	70.0	0.78
0.5	0.70	28.0	0.60	68.0	0.79
0.5	0.50	28.0	0.65	80.0	0.75
0.5	0.55	28.0	0.65	78.0	0.76
0.5	0.60	28.0	0.65	76.0	0.78
0.5	0.65	28.0	0.65	74.0	0.79
0.5	0.70	28.0	0.65	72.0	0.80
0.5	0.50	28.0	0.70	82.0	0.77
0.5	0.55	28.0	0.70	82.0	0.78
0.5	0.60	28.0	0.70	80.0	0.79
0.5	0.65	28.0	0.70	78.0	0.80
0.5	0.70	28.0	0.70	78.0	0.81
0.5	0.50	29.0	0.50	66.0	0.70
0.5	0.55	29.0	0.50	64.0	0.71
0.5	0.60	29.0	0.50	62.0	0.73
0.5	0.65	29.0	0.50	60.0	0.75
0.5	0.70	29.0	0.50	58.0	0.77
0.5	0.50	29.0	0.55	72.0	0.71
0.5	0.55	29.0	0.55	68.0	0.73
0.5	0.60	29.0	0.55	68.0	0.74
0.5	0.65	29.0	0.55	66.0	0.76
0.5	0.70	29.0	0.55	64.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
0.5	0.50	29.0	0.60	76.0	0.73
0.5	0.55	29.0	0.60	74.0	0.75
0.5	0.60	29.0	0.60	72.0	0.76
0.5	0.65	29.0	0.60	70.0	0.78
0.5	0.70	29.0	0.60	68.0	0.79
0.5	0.50	29.0	0.65	80.0	0.75
0.5	0.55	29.0	0.65	78.0	0.76
0.5	0.60	29.0	0.65	76.0	0.78
0.5	0.65	29.0	0.65	74.0	0.79
0.5	0.70	29.0	0.65	72.0	0.80
0.5	0.50	29.0	0.70	82.0	0.77
0.5	0.55	29.0	0.70	82.0	0.78
0.5	0.60	29.0	0.70	80.0	0.79
0.5	0.65	29.0	0.70	78.0	0.80
0.5	0.70	29.0	0.70	78.0	0.81
0.5	0.50	30.0	0.50	66.0	0.70
0.5	0.55	30.0	0.50	64.0	0.71
0.5	0.60	30.0	0.50	62.0	0.73
0.5	0.65	30.0	0.50	60.0	0.75
0.5	0.70	30.0	0.50	58.0	0.77
0.5	0.50	30.0	0.55	72.0	0.71
0.5	0.55	30.0	0.55	68.0	0.73
0.5	0.60	30.0	0.55	68.0	0.74
0.5	0.65	30.0	0.55	66.0	0.76
0.5	0.70	30.0	0.55	64.0	0.78
0.5	0.50	30.0	0.60	76.0	0.73
0.5	0.55	30.0	0.60	74.0	0.75
0.5	0.60	30.0	0.60	72.0	0.76
0.5	0.65	30.0	0.60	70.0	0.78
0.5	0.70	30.0	0.60	68.0	0.79
0.5	0.50	30.0	0.65	80.0	0.75
0.5	0.55	30.0	0.65	78.0	0.76
0.5	0.60	30.0	0.65	76.0	0.78
0.5	0.65	30.0	0.65	74.0	0.79
0.5	0.70	30.0	0.65	72.0	0.80
0.5	0.50	30.0	0.70	82.0	0.77
0.5	0.55	30.0	0.70	82.0	0.78
0.5	0.60	30.0	0.70	80.0	0.79
0.5	0.65	30.0	0.70	78.0	0.80
0.5	0.70	30.0	0.70	76.0	0.81

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	7.0	0.50	70.0	0.68
1.0	0.55	7.0	0.50	68.0	0.69
1.0	0.60	7.0	0.50	66.0	0.71
1.0	0.65	7.0	0.50	64.0	0.72
1.0	0.70	7.0	0.50	62.0	0.74
1.0	0.50	7.0	0.55	74.0	0.69
1.0	0.55	7.0	0.55	72.0	0.71
1.0	0.60	7.0	0.55	70.0	0.72
1.0	0.65	7.0	0.55	68.0	0.73
1.0	0.70	7.0	0.55	66.0	0.75
1.0	0.50	7.0	0.60	78.0	0.71
1.0	0.55	7.0	0.60	76.0	0.72
1.0	0.60	7.0	0.60	76.0	0.73
1.0	0.65	7.0	0.60	74.0	0.75
1.0	0.70	7.0	0.60	72.0	0.76
1.0	0.50	7.0	0.65	82.0	0.72
1.0	0.55	7.0	0.65	82.0	0.73
1.0	0.60	7.0	0.65	80.0	0.74
1.0	0.65	7.0	0.65	78.0	0.75
1.0	0.70	7.0	0.65	78.0	0.76
1.0	0.50	7.0	0.70	86.0	0.74
1.0	0.55	7.0	0.70	86.0	0.75
1.0	0.60	7.0	0.70	84.0	0.76
1.0	0.65	7.0	0.70	84.0	0.76
1.0	0.70	7.0	0.70	82.0	0.77
1.0	0.50	8.0	0.50	68.0	0.68
1.0	0.55	8.0	0.50	66.0	0.69
1.0	0.60	8.0	0.50	64.0	0.71
1.0	0.65	8.0	0.50	62.0	0.73
1.0	0.70	8.0	0.50	60.0	0.74
1.0	0.50	8.0	0.55	74.0	0.70
1.0	0.55	8.0	0.55	72.0	0.71
1.0	0.60	8.0	0.55	70.0	0.73
1.0	0.65	8.0	0.55	68.0	0.74
1.0	0.70	8.0	0.55	66.0	0.75
1.0	0.50	8.0	0.60	78.0	0.71
1.0	0.55	8.0	0.60	76.0	0.72
1.0	0.60	8.0	0.60	74.0	0.74
1.0	0.65	8.0	0.60	72.0	0.75
1.0	0.70	8.0	0.60	72.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	8.0	0.65	82.0	0.73
1.0	0.55	8.0	0.65	80.0	0.74
1.0	0.60	8.0	0.65	80.0	0.75
1.0	0.65	8.0	0.65	78.0	0.76
1.0	0.70	8.0	0.65	76.0	0.77
1.0	0.50	8.0	0.70	86.0	0.74
1.0	0.55	8.0	0.70	84.0	0.75
1.0	0.60	8.0	0.70	84.0	0.76
1.0	0.65	8.0	0.70	82.0	0.77
1.0	0.70	8.0	0.70	82.0	0.78
1.0	0.50	9.0	0.50	68.0	0.68
1.0	0.55	9.0	0.50	66.0	0.70
1.0	0.60	9.0	0.50	64.0	0.71
1.0	0.65	9.0	0.50	62.0	0.73
1.0	0.70	9.0	0.50	60.0	0.75
1.0	0.50	9.0	0.55	74.0	0.70
1.0	0.55	9.0	0.55	72.0	0.71
1.0	0.60	9.0	0.55	70.0	0.73
1.0	0.65	9.0	0.55	68.0	0.74
1.0	0.70	9.0	0.55	66.0	0.76
1.0	0.50	9.0	0.60	78.0	0.72
1.0	0.55	9.0	0.60	76.0	0.73
1.0	0.60	9.0	0.60	74.0	0.74
1.0	0.65	9.0	0.60	72.0	0.75
1.0	0.70	9.0	0.60	70.0	0.76
1.0	0.50	9.0	0.65	82.0	0.73
1.0	0.55	9.0	0.65	80.0	0.74
1.0	0.60	9.0	0.65	78.0	0.75
1.0	0.65	9.0	0.65	78.0	0.76
1.0	0.70	9.0	0.65	76.0	0.77
1.0	0.50	9.0	0.70	86.0	0.75
1.0	0.55	9.0	0.70	84.0	0.76
1.0	0.60	9.0	0.70	84.0	0.76
1.0	0.65	9.0	0.70	82.0	0.77
1.0	0.70	9.0	0.70	80.0	0.78
1.0	0.50	10.0	0.50	68.0	0.68
1.0	0.55	10.0	0.50	66.0	0.70
1.0	0.60	10.0	0.50	64.0	0.72
1.0	0.65	10.0	0.50	62.0	0.73
1.0	0.70	10.0	0.50	60.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	10.0	0.55	72.0	0.70
1.0	0.55	10.0	0.55	70.0	0.71
1.0	0.60	10.0	0.55	70.0	0.73
1.0	0.65	10.0	0.55	68.0	0.74
1.0	0.70	10.0	0.55	66.0	0.76
1.0	0.50	10.0	0.60	78.0	0.72
1.0	0.55	10.0	0.60	76.0	0.73
1.0	0.60	10.0	0.60	74.0	0.74
1.0	0.65	10.0	0.60	72.0	0.75
1.0	0.70	10.0	0.60	70.0	0.77
1.0	0.50	10.0	0.65	82.0	0.73
1.0	0.55	10.0	0.65	80.0	0.75
1.0	0.60	10.0	0.65	78.0	0.75
1.0	0.65	10.0	0.65	76.0	0.76
1.0	0.70	10.0	0.65	76.0	0.78
1.0	0.50	10.0	0.70	86.0	0.75
1.0	0.55	10.0	0.70	84.0	0.76
1.0	0.60	10.0	0.70	82.0	0.77
1.0	0.65	10.0	0.70	82.0	0.78
1.0	0.70	10.0	0.70	80.0	0.78
1.0	0.50	11.0	0.50	68.0	0.69
1.0	0.55	11.0	0.50	66.0	0.70
1.0	0.60	11.0	0.50	64.0	0.72
1.0	0.65	11.0	0.50	62.0	0.74
1.0	0.70	11.0	0.50	60.0	0.75
1.0	0.50	11.0	0.55	72.0	0.70
1.0	0.55	11.0	0.55	70.0	0.71
1.0	0.60	11.0	0.55	68.0	0.73
1.0	0.65	11.0	0.55	68.0	0.74
1.0	0.70	11.0	0.55	66.0	0.76
1.0	0.50	11.0	0.60	78.0	0.72
1.0	0.55	11.0	0.60	76.0	0.73
1.0	0.60	11.0	0.60	74.0	0.75
1.0	0.65	11.0	0.60	72.0	0.76
1.0	0.70	11.0	0.60	70.0	0.77
1.0	0.50	11.0	0.65	82.0	0.73
1.0	0.55	11.0	0.65	80.0	0.75
1.0	0.60	11.0	0.65	78.0	0.76
1.0	0.65	11.0	0.65	76.0	0.77
1.0	0.70	11.0	0.65	76.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	11.0	0.70	86.0	0.75
1.0	0.55	11.0	0.70	84.0	0.76
1.0	0.60	11.0	0.70	82.0	0.77
1.0	0.65	11.0	0.70	82.0	0.78
1.0	0.70	11.0	0.70	80.0	0.79
1.0	0.50	12.0	0.50	68.0	0.69
1.0	0.55	12.0	0.50	66.0	0.70
1.0	0.60	12.0	0.50	64.0	0.72
1.0	0.65	12.0	0.50	62.0	0.74
1.0	0.70	12.0	0.50	60.0	0.75
1.0	0.50	12.0	0.55	72.0	0.70
1.0	0.55	12.0	0.55	70.0	0.72
1.0	0.60	12.0	0.55	68.0	0.73
1.0	0.65	12.0	0.55	66.0	0.75
1.0	0.70	12.0	0.55	66.0	0.76
1.0	0.50	12.0	0.60	76.0	0.72
1.0	0.55	12.0	0.60	76.0	0.73
1.0	0.60	12.0	0.60	74.0	0.75
1.0	0.65	12.0	0.60	72.0	0.76
1.0	0.70	12.0	0.60	70.0	0.77
1.0	0.50	12.0	0.65	80.0	0.73
1.0	0.55	12.0	0.65	80.0	0.75
1.0	0.60	12.0	0.65	78.0	0.76
1.0	0.65	12.0	0.65	76.0	0.77
1.0	0.70	12.0	0.65	74.0	0.78
1.0	0.50	12.0	0.70	84.0	0.75
1.0	0.55	12.0	0.70	84.0	0.76
1.0	0.60	12.0	0.70	82.0	0.77
1.0	0.65	12.0	0.70	80.0	0.78
1.0	0.70	12.0	0.70	80.0	0.79
1.0	0.50	13.0	0.50	68.0	0.69
1.0	0.55	13.0	0.50	66.0	0.71
1.0	0.60	13.0	0.50	64.0	0.72
1.0	0.65	13.0	0.50	62.0	0.74
1.0	0.70	13.0	0.50	60.0	0.76
1.0	0.50	13.0	0.55	72.0	0.70
1.0	0.55	13.0	0.55	70.0	0.72
1.0	0.60	13.0	0.55	68.0	0.73
1.0	0.65	13.0	0.55	66.0	0.75
1.0	0.70	13.0	0.55	64.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	13.0	0.60	76.0	0.72
1.0	0.55	13.0	0.60	74.0	0.73
1.0	0.60	13.0	0.60	74.0	0.75
1.0	0.65	13.0	0.60	72.0	0.76
1.0	0.70	13.0	0.60	70.0	0.77
1.0	0.50	13.0	0.65	80.0	0.74
1.0	0.55	13.0	0.65	80.0	0.75
1.0	0.60	13.0	0.65	78.0	0.76
1.0	0.65	13.0	0.65	76.0	0.77
1.0	0.70	13.0	0.65	74.0	0.78
1.0	0.50	13.0	0.70	84.0	0.75
1.0	0.55	13.0	0.70	84.0	0.76
1.0	0.60	13.0	0.70	82.0	0.77
1.0	0.65	13.0	0.70	80.0	0.78
1.0	0.70	13.0	0.70	80.0	0.79
1.0	0.50	14.0	0.50	68.0	0.69
1.0	0.55	14.0	0.50	66.0	0.71
1.0	0.60	14.0	0.50	64.0	0.72
1.0	0.65	14.0	0.50	62.0	0.74
1.0	0.70	14.0	0.50	60.0	0.76
1.0	0.50	14.0	0.55	72.0	0.71
1.0	0.55	14.0	0.55	70.0	0.72
1.0	0.60	14.0	0.55	68.0	0.74
1.0	0.65	14.0	0.55	66.0	0.75
1.0	0.70	14.0	0.55	64.0	0.76
1.0	0.50	14.0	0.60	76.0	0.72
1.0	0.55	14.0	0.60	74.0	0.73
1.0	0.60	14.0	0.60	72.0	0.75
1.0	0.65	14.0	0.60	72.0	0.76
1.0	0.70	14.0	0.60	70.0	0.78
1.0	0.50	14.0	0.65	80.0	0.74
1.0	0.55	14.0	0.65	78.0	0.75
1.0	0.60	14.0	0.65	78.0	0.76
1.0	0.65	14.0	0.65	76.0	0.77
1.0	0.70	14.0	0.65	74.0	0.78
1.0	0.50	14.0	0.70	84.0	0.76
1.0	0.55	14.0	0.70	82.0	0.76
1.0	0.60	14.0	0.70	82.0	0.78
1.0	0.65	14.0	0.70	80.0	0.78
1.0	0.70	14.0	0.70	80.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	15.0	0.50	68.0	0.69
1.0	0.55	15.0	0.50	66.0	0.71
1.0	0.60	15.0	0.50	64.0	0.72
1.0	0.65	15.0	0.50	62.0	0.74
1.0	0.70	15.0	0.50	60.0	0.76
1.0	0.50	15.0	0.55	72.0	0.71
1.0	0.55	15.0	0.55	70.0	0.72
1.0	0.60	15.0	0.55	68.0	0.74
1.0	0.65	15.0	0.55	66.0	0.75
1.0	0.70	15.0	0.55	64.0	0.77
1.0	0.50	15.0	0.60	76.0	0.72
1.0	0.55	15.0	0.60	74.0	0.74
1.0	0.60	15.0	0.60	72.0	0.75
1.0	0.65	15.0	0.60	72.0	0.76
1.0	0.70	15.0	0.60	70.0	0.78
1.0	0.50	15.0	0.65	80.0	0.74
1.0	0.55	15.0	0.65	78.0	0.75
1.0	0.60	15.0	0.65	78.0	0.76
1.0	0.65	15.0	0.65	76.0	0.78
1.0	0.70	15.0	0.65	74.0	0.79
1.0	0.50	15.0	0.70	84.0	0.76
1.0	0.55	15.0	0.70	82.0	0.76
1.0	0.60	15.0	0.70	82.0	0.78
1.0	0.65	15.0	0.70	80.0	0.79
1.0	0.70	15.0	0.70	78.0	0.79
1.0	0.50	16.0	0.50	68.0	0.69
1.0	0.55	16.0	0.50	66.0	0.71
1.0	0.60	16.0	0.50	64.0	0.72
1.0	0.65	16.0	0.50	62.0	0.74
1.0	0.70	16.0	0.50	60.0	0.76
1.0	0.50	16.0	0.55	72.0	0.71
1.0	0.55	16.0	0.55	70.0	0.72
1.0	0.60	16.0	0.55	68.0	0.74
1.0	0.65	16.0	0.55	66.0	0.75
1.0	0.70	16.0	0.55	64.0	0.77
1.0	0.50	16.0	0.60	76.0	0.72
1.0	0.55	16.0	0.60	74.0	0.74
1.0	0.60	16.0	0.60	72.0	0.75
1.0	0.65	16.0	0.60	72.0	0.76
1.0	0.70	16.0	0.60	70.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	16.0	0.65	80.0	0.74
1.0	0.55	16.0	0.65	78.0	0.75
1.0	0.60	16.0	0.65	78.0	0.76
1.0	0.65	16.0	0.65	76.0	0.78
1.0	0.70	16.0	0.65	74.0	0.79
1.0	0.50	16.0	0.70	84.0	0.76
1.0	0.55	16.0	0.70	82.0	0.77
1.0	0.60	16.0	0.70	82.0	0.78
1.0	0.65	16.0	0.70	80.0	0.79
1.0	0.70	16.0	0.70	78.0	0.80
1.0	0.50	17.0	0.50	68.0	0.69
1.0	0.55	17.0	0.50	66.0	0.71
1.0	0.60	17.0	0.50	64.0	0.72
1.0	0.65	17.0	0.50	62.0	0.74
1.0	0.70	17.0	0.50	60.0	0.76
1.0	0.50	17.0	0.55	72.0	0.71
1.0	0.55	17.0	0.55	70.0	0.72
1.0	0.60	17.0	0.55	68.0	0.74
1.0	0.65	17.0	0.55	66.0	0.75
1.0	0.70	17.0	0.55	64.0	0.77
1.0	0.50	17.0	0.60	76.0	0.72
1.0	0.55	17.0	0.60	74.0	0.74
1.0	0.60	17.0	0.60	72.0	0.75
1.0	0.65	17.0	0.60	70.0	0.76
1.0	0.70	17.0	0.60	70.0	0.78
1.0	0.50	17.0	0.65	80.0	0.74
1.0	0.55	17.0	0.65	78.0	0.75
1.0	0.60	17.0	0.65	78.0	0.76
1.0	0.65	17.0	0.65	76.0	0.78
1.0	0.70	17.0	0.65	74.0	0.79
1.0	0.50	17.0	0.70	84.0	0.76
1.0	0.55	17.0	0.70	82.0	0.77
1.0	0.60	17.0	0.70	82.0	0.78
1.0	0.65	17.0	0.70	80.0	0.79
1.0	0.70	17.0	0.70	78.0	0.80
1.0	0.50	18.0	0.50	68.0	0.69
1.0	0.55	18.0	0.50	66.0	0.71
1.0	0.60	18.0	0.50	64.0	0.72
1.0	0.65	18.0	0.50	62.0	0.74
1.0	0.70	18.0	0.50	60.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	18.0	0.55	72.0	0.71
1.0	0.55	18.0	0.55	70.0	0.72
1.0	0.60	18.0	0.55	68.0	0.74
1.0	0.65	18.0	0.55	66.0	0.75
1.0	0.70	18.0	0.55	64.0	0.77
1.0	0.50	18.0	0.60	76.0	0.73
1.0	0.55	18.0	0.60	74.0	0.74
1.0	0.60	18.0	0.60	72.0	0.75
1.0	0.65	18.0	0.60	70.0	0.76
1.0	0.70	18.0	0.60	70.0	0.78
1.0	0.50	18.0	0.65	80.0	0.74
1.0	0.55	18.0	0.65	78.0	0.75
1.0	0.60	18.0	0.65	76.0	0.76
1.0	0.65	18.0	0.65	76.0	0.78
1.0	0.70	18.0	0.65	74.0	0.79
1.0	0.50	18.0	0.70	84.0	0.76
1.0	0.55	18.0	0.70	82.0	0.77
1.0	0.60	18.0	0.70	82.0	0.78
1.0	0.65	18.0	0.70	80.0	0.79
1.0	0.70	18.0	0.70	78.0	0.80
1.0	0.50	19.0	0.50	68.0	0.69
1.0	0.55	19.0	0.50	66.0	0.71
1.0	0.60	19.0	0.50	64.0	0.72
1.0	0.65	19.0	0.50	62.0	0.74
1.0	0.70	19.0	0.50	60.0	0.76
1.0	0.50	19.0	0.55	72.0	0.71
1.0	0.55	19.0	0.55	70.0	0.73
1.0	0.60	19.0	0.55	68.0	0.74
1.0	0.65	19.0	0.55	66.0	0.76
1.0	0.70	19.0	0.55	64.0	0.77
1.0	0.50	19.0	0.60	76.0	0.73
1.0	0.55	19.0	0.60	74.0	0.74
1.0	0.60	19.0	0.60	72.0	0.75
1.0	0.65	19.0	0.60	70.0	0.77
1.0	0.70	19.0	0.60	70.0	0.78
1.0	0.50	19.0	0.65	80.0	0.74
1.0	0.55	19.0	0.65	78.0	0.75
1.0	0.60	19.0	0.65	76.0	0.76
1.0	0.65	19.0	0.65	76.0	0.78
1.0	0.70	19.0	0.65	74.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	19.0	0.70	84.0	0.76
1.0	0.55	19.0	0.70	82.0	0.77
1.0	0.60	19.0	0.70	80.0	0.78
1.0	0.65	19.0	0.70	80.0	0.79
1.0	0.70	19.0	0.70	78.0	0.80
1.0	0.50	20.0	0.50	68.0	0.69
1.0	0.55	20.0	0.50	66.0	0.71
1.0	0.60	20.0	0.50	64.0	0.72
1.0	0.65	20.0	0.50	62.0	0.74
1.0	0.70	20.0	0.50	60.0	0.76
1.0	0.50	20.0	0.55	72.0	0.71
1.0	0.55	20.0	0.55	70.0	0.73
1.0	0.60	20.0	0.55	68.0	0.74
1.0	0.65	20.0	0.55	66.0	0.76
1.0	0.70	20.0	0.55	64.0	0.77
1.0	0.50	20.0	0.60	76.0	0.73
1.0	0.55	20.0	0.60	74.0	0.74
1.0	0.60	20.0	0.60	72.0	0.75
1.0	0.65	20.0	0.60	70.0	0.77
1.0	0.70	20.0	0.60	70.0	0.78
1.0	0.50	20.0	0.65	80.0	0.74
1.0	0.55	20.0	0.65	78.0	0.76
1.0	0.60	20.0	0.65	76.0	0.77
1.0	0.65	20.0	0.65	76.0	0.78
1.0	0.70	20.0	0.65	74.0	0.79
1.0	0.50	20.0	0.70	84.0	0.76
1.0	0.55	20.0	0.70	82.0	0.77
1.0	0.60	20.0	0.70	80.0	0.78
1.0	0.65	20.0	0.70	80.0	0.79
1.0	0.70	20.0	0.70	78.0	0.80
1.0	0.50	21.0	0.50	68.0	0.69
1.0	0.55	21.0	0.50	66.0	0.71
1.0	0.60	21.0	0.50	62.0	0.72
1.0	0.65	21.0	0.50	62.0	0.74
1.0	0.70	21.0	0.50	60.0	0.76
1.0	0.50	21.0	0.55	72.0	0.71
1.0	0.55	21.0	0.55	70.0	0.73
1.0	0.60	21.0	0.55	68.0	0.74
1.0	0.65	21.0	0.55	66.0	0.76
1.0	0.70	21.0	0.55	64.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	21.0	0.60	76.0	0.73
1.0	0.55	21.0	0.60	74.0	0.74
1.0	0.60	21.0	0.60	72.0	0.75
1.0	0.65	21.0	0.60	70.0	0.77
1.0	0.70	21.0	0.60	68.0	0.78
1.0	0.50	21.0	0.65	80.0	0.75
1.0	0.55	21.0	0.65	78.0	0.76
1.0	0.60	21.0	0.65	76.0	0.77
1.0	0.65	21.0	0.65	76.0	0.78
1.0	0.70	21.0	0.65	74.0	0.79
1.0	0.50	21.0	0.70	84.0	0.76
1.0	0.55	21.0	0.70	82.0	0.77
1.0	0.60	21.0	0.70	80.0	0.78
1.0	0.65	21.0	0.70	80.0	0.79
1.0	0.70	21.0	0.70	78.0	0.80
1.0	0.50	22.0	0.50	68.0	0.69
1.0	0.55	22.0	0.50	66.0	0.71
1.0	0.60	22.0	0.50	62.0	0.73
1.0	0.65	22.0	0.50	60.0	0.74
1.0	0.70	22.0	0.50	60.0	0.76
1.0	0.50	22.0	0.55	72.0	0.71
1.0	0.55	22.0	0.55	70.0	0.73
1.0	0.60	22.0	0.55	68.0	0.74
1.0	0.65	22.0	0.55	66.0	0.76
1.0	0.70	22.0	0.55	64.0	0.77
1.0	0.50	22.0	0.60	76.0	0.73
1.0	0.55	22.0	0.60	74.0	0.74
1.0	0.60	22.0	0.60	72.0	0.75
1.0	0.65	22.0	0.60	70.0	0.77
1.0	0.70	22.0	0.60	68.0	0.78
1.0	0.50	22.0	0.65	80.0	0.75
1.0	0.55	22.0	0.65	78.0	0.76
1.0	0.60	22.0	0.65	76.0	0.77
1.0	0.65	22.0	0.65	76.0	0.78
1.0	0.70	22.0	0.65	74.0	0.79
1.0	0.50	22.0	0.70	84.0	0.76
1.0	0.55	22.0	0.70	82.0	0.77
1.0	0.60	22.0	0.70	80.0	0.78
1.0	0.65	22.0	0.70	80.0	0.79
1.0	0.70	22.0	0.70	78.0	0.80

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	23.0	0.50	68.0	0.69
1.0	0.55	23.0	0.50	64.0	0.71
1.0	0.60	23.0	0.50	62.0	0.73
1.0	0.65	23.0	0.50	60.0	0.74
1.0	0.70	23.0	0.50	60.0	0.76
1.0	0.50	23.0	0.55	72.0	0.71
1.0	0.55	23.0	0.55	70.0	0.73
1.0	0.60	23.0	0.55	68.0	0.74
1.0	0.65	23.0	0.55	66.0	0.76
1.0	0.70	23.0	0.55	64.0	0.77
1.0	0.50	23.0	0.60	76.0	0.73
1.0	0.55	23.0	0.60	74.0	0.74
1.0	0.60	23.0	0.60	72.0	0.76
1.0	0.65	23.0	0.60	70.0	0.77
1.0	0.70	23.0	0.60	68.0	0.78
1.0	0.50	23.0	0.65	80.0	0.75
1.0	0.55	23.0	0.65	78.0	0.76
1.0	0.60	23.0	0.65	76.0	0.77
1.0	0.65	23.0	0.65	74.0	0.78
1.0	0.70	23.0	0.65	74.0	0.79
1.0	0.50	23.0	0.70	84.0	0.76
1.0	0.55	23.0	0.70	82.0	0.77
1.0	0.60	23.0	0.70	80.0	0.78
1.0	0.65	23.0	0.70	80.0	0.79
1.0	0.70	23.0	0.70	78.0	0.80
1.0	0.50	24.0	0.50	68.0	0.69
1.0	0.55	24.0	0.50	64.0	0.71
1.0	0.60	24.0	0.50	62.0	0.73
1.0	0.65	24.0	0.50	60.0	0.74
1.0	0.70	24.0	0.50	60.0	0.76
1.0	0.50	24.0	0.55	72.0	0.71
1.0	0.55	24.0	0.55	70.0	0.73
1.0	0.60	24.0	0.55	68.0	0.74
1.0	0.65	24.0	0.55	66.0	0.76
1.0	0.70	24.0	0.55	64.0	0.77
1.0	0.50	24.0	0.60	76.0	0.73
1.0	0.55	24.0	0.60	74.0	0.74
1.0	0.60	24.0	0.60	72.0	0.76
1.0	0.65	24.0	0.60	70.0	0.77
1.0	0.70	24.0	0.60	68.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	24.0	0.65	80.0	0.75
1.0	0.55	24.0	0.65	78.0	0.76
1.0	0.60	24.0	0.65	76.0	0.77
1.0	0.65	24.0	0.65	74.0	0.78
1.0	0.70	24.0	0.65	74.0	0.79
1.0	0.50	24.0	0.70	84.0	0.76
1.0	0.55	24.0	0.70	82.0	0.77
1.0	0.60	24.0	0.70	80.0	0.78
1.0	0.65	24.0	0.70	80.0	0.79
1.0	0.70	24.0	0.70	78.0	0.80
1.0	0.50	25.0	0.50	68.0	0.69
1.0	0.55	25.0	0.50	64.0	0.71
1.0	0.60	25.0	0.50	62.0	0.73
1.0	0.65	25.0	0.50	60.0	0.74
1.0	0.70	25.0	0.50	60.0	0.76
1.0	0.50	25.0	0.55	72.0	0.71
1.0	0.55	25.0	0.55	70.0	0.73
1.0	0.60	25.0	0.55	68.0	0.74
1.0	0.65	25.0	0.55	66.0	0.76
1.0	0.70	25.0	0.55	64.0	0.77
1.0	0.50	25.0	0.60	76.0	0.73
1.0	0.55	25.0	0.60	74.0	0.74
1.0	0.60	25.0	0.60	72.0	0.76
1.0	0.65	25.0	0.60	70.0	0.77
1.0	0.70	25.0	0.60	68.0	0.78
1.0	0.50	25.0	0.65	80.0	0.75
1.0	0.55	25.0	0.65	78.0	0.76
1.0	0.60	25.0	0.65	76.0	0.77
1.0	0.65	25.0	0.65	74.0	0.78
1.0	0.70	25.0	0.65	74.0	0.80
1.0	0.50	25.0	0.70	84.0	0.76
1.0	0.55	25.0	0.70	82.0	0.77
1.0	0.60	25.0	0.70	80.0	0.78
1.0	0.65	25.0	0.70	80.0	0.79
1.0	0.70	25.0	0.70	78.0	0.80
1.0	0.50	26.0	0.50	68.0	0.69
1.0	0.55	26.0	0.50	64.0	0.71
1.0	0.60	26.0	0.50	62.0	0.73
1.0	0.65	26.0	0.50	60.0	0.74
1.0	0.70	26.0	0.50	60.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	26.0	0.55	72.0	0.71
1.0	0.55	26.0	0.55	70.0	0.73
1.0	0.60	26.0	0.55	68.0	0.74
1.0	0.65	26.0	0.55	66.0	0.76
1.0	0.70	26.0	0.55	64.0	0.77
1.0	0.50	26.0	0.60	76.0	0.73
1.0	0.55	26.0	0.60	74.0	0.74
1.0	0.60	26.0	0.60	72.0	0.76
1.0	0.65	26.0	0.60	70.0	0.77
1.0	0.70	26.0	0.60	68.0	0.78
1.0	0.50	26.0	0.65	80.0	0.75
1.0	0.55	26.0	0.65	78.0	0.76
1.0	0.60	26.0	0.65	76.0	0.77
1.0	0.65	26.0	0.65	74.0	0.78
1.0	0.70	26.0	0.65	74.0	0.80
1.0	0.50	26.0	0.70	84.0	0.76
1.0	0.55	26.0	0.70	82.0	0.77
1.0	0.60	26.0	0.70	80.0	0.78
1.0	0.65	26.0	0.70	80.0	0.79
1.0	0.70	26.0	0.70	78.0	0.80
1.0	0.50	27.0	0.50	68.0	0.69
1.0	0.55	27.0	0.50	64.0	0.71
1.0	0.60	27.0	0.50	62.0	0.73
1.0	0.65	27.0	0.50	60.0	0.75
1.0	0.70	27.0	0.50	58.0	0.76
1.0	0.50	27.0	0.55	72.0	0.71
1.0	0.55	27.0	0.55	70.0	0.73
1.0	0.60	27.0	0.55	68.0	0.74
1.0	0.65	27.0	0.55	66.0	0.76
1.0	0.70	27.0	0.55	64.0	0.77
1.0	0.50	27.0	0.60	76.0	0.73
1.0	0.55	27.0	0.60	74.0	0.74
1.0	0.60	27.0	0.60	72.0	0.76
1.0	0.65	27.0	0.60	70.0	0.77
1.0	0.70	27.0	0.60	68.0	0.78
1.0	0.50	27.0	0.65	80.0	0.75
1.0	0.55	27.0	0.65	78.0	0.76
1.0	0.60	27.0	0.65	76.0	0.77
1.0	0.65	27.0	0.65	74.0	0.78
1.0	0.70	27.0	0.65	74.0	0.80

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	27.0	0.70	84.0	0.76
1.0	0.55	27.0	0.70	82.0	0.78
1.0	0.60	27.0	0.70	80.0	0.78
1.0	0.65	27.0	0.70	80.0	0.79
1.0	0.70	27.0	0.70	78.0	0.81
1.0	0.50	28.0	0.50	68.0	0.69
1.0	0.55	28.0	0.50	64.0	0.71
1.0	0.60	28.0	0.50	62.0	0.73
1.0	0.65	28.0	0.50	60.0	0.75
1.0	0.70	28.0	0.50	58.0	0.76
1.0	0.50	28.0	0.55	72.0	0.71
1.0	0.55	28.0	0.55	70.0	0.73
1.0	0.60	28.0	0.55	68.0	0.74
1.0	0.65	28.0	0.55	66.0	0.76
1.0	0.70	28.0	0.55	64.0	0.78
1.0	0.50	28.0	0.60	76.0	0.73
1.0	0.55	28.0	0.60	74.0	0.74
1.0	0.60	28.0	0.60	72.0	0.76
1.0	0.65	28.0	0.60	70.0	0.77
1.0	0.70	28.0	0.60	68.0	0.78
1.0	0.50	28.0	0.65	80.0	0.75
1.0	0.55	28.0	0.65	78.0	0.76
1.0	0.60	28.0	0.65	76.0	0.77
1.0	0.65	28.0	0.65	74.0	0.78
1.0	0.70	28.0	0.65	74.0	0.80
1.0	0.50	28.0	0.70	84.0	0.76
1.0	0.55	28.0	0.70	82.0	0.78
1.0	0.60	28.0	0.70	80.0	0.78
1.0	0.65	28.0	0.70	80.0	0.79
1.0	0.70	28.0	0.70	78.0	0.81
1.0	0.50	29.0	0.50	68.0	0.69
1.0	0.55	29.0	0.50	64.0	0.71
1.0	0.60	29.0	0.50	62.0	0.73
1.0	0.65	29.0	0.50	60.0	0.75
1.0	0.70	29.0	0.50	58.0	0.76
1.0	0.50	29.0	0.55	72.0	0.71
1.0	0.55	29.0	0.55	70.0	0.73
1.0	0.60	29.0	0.55	68.0	0.74
1.0	0.65	29.0	0.55	66.0	0.76
1.0	0.70	29.0	0.55	64.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.0	0.50	29.0	0.60	76.0	0.73
1.0	0.55	29.0	0.60	74.0	0.75
1.0	0.60	29.0	0.60	72.0	0.76
1.0	0.65	29.0	0.60	70.0	0.77
1.0	0.70	29.0	0.60	68.0	0.78
1.0	0.50	29.0	0.65	80.0	0.75
1.0	0.55	29.0	0.65	78.0	0.76
1.0	0.60	29.0	0.65	76.0	0.77
1.0	0.65	29.0	0.65	74.0	0.78
1.0	0.70	29.0	0.65	74.0	0.80
1.0	0.50	29.0	0.70	84.0	0.76
1.0	0.55	29.0	0.70	82.0	0.78
1.0	0.60	29.0	0.70	80.0	0.78
1.0	0.65	29.0	0.70	78.0	0.79
1.0	0.70	29.0	0.70	78.0	0.81
1.0	0.50	30.0	0.50	66.0	0.69
1.0	0.55	30.0	0.50	64.0	0.71
1.0	0.60	30.0	0.50	62.0	0.73
1.0	0.65	30.0	0.50	60.0	0.75
1.0	0.70	30.0	0.50	58.0	0.76
1.0	0.50	30.0	0.55	72.0	0.71
1.0	0.55	30.0	0.55	70.0	0.73
1.0	0.60	30.0	0.55	68.0	0.74
1.0	0.65	30.0	0.55	66.0	0.76
1.0	0.70	30.0	0.55	64.0	0.78
1.0	0.50	30.0	0.60	76.0	0.73
1.0	0.55	30.0	0.60	74.0	0.75
1.0	0.60	30.0	0.60	72.0	0.76
1.0	0.65	30.0	0.60	70.0	0.77
1.0	0.70	30.0	0.60	68.0	0.78
1.0	0.50	30.0	0.65	80.0	0.75
1.0	0.55	30.0	0.65	78.0	0.76
1.0	0.60	30.0	0.65	76.0	0.77
1.0	0.65	30.0	0.65	74.0	0.78
1.0	0.70	30.0	0.65	74.0	0.80
1.0	0.50	30.0	0.70	84.0	0.76
1.0	0.55	30.0	0.70	82.0	0.78
1.0	0.60	30.0	0.70	80.0	0.78
1.0	0.65	30.0	0.70	78.0	0.79
1.0	0.70	30.0	0.70	78.0	0.81

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	7.0	0.50	60.0	0.59
1.5	0.55	7.0	0.50	54.0	0.60
1.5	0.60	7.0	0.50	46.0	0.62
1.5	0.65	7.0	0.50	38.0	0.65
1.5	0.70	7.0	0.50	26.0	0.70
1.5	0.50	7.0	0.55	68.0	0.61
1.5	0.55	7.0	0.55	62.0	0.62
1.5	0.60	7.0	0.55	56.0	0.64
1.5	0.65	7.0	0.55	48.0	0.66
1.5	0.70	7.0	0.55	38.0	0.70
1.5	0.50	7.0	0.60	74.0	0.63
1.5	0.55	7.0	0.60	70.0	0.65
1.5	0.60	7.0	0.60	64.0	0.66
1.5	0.65	7.0	0.60	58.0	0.68
1.5	0.70	7.0	0.60	50.0	0.70
1.5	0.50	7.0	0.65	80.0	0.66
1.5	0.55	7.0	0.65	76.0	0.67
1.5	0.60	7.0	0.65	72.0	0.68
1.5	0.65	7.0	0.65	66.0	0.70
1.5	0.70	7.0	0.65	60.0	0.71
1.5	0.50	7.0	0.70	84.0	0.70
1.5	0.55	7.0	0.70	82.0	0.70
1.5	0.60	7.0	0.70	78.0	0.71
1.5	0.65	7.0	0.70	74.0	0.72
1.5	0.70	7.0	0.70	68.0	0.73
1.5	0.50	8.0	0.50	70.0	0.67
1.5	0.55	8.0	0.50	68.0	0.69
1.5	0.60	8.0	0.50	66.0	0.70
1.5	0.65	8.0	0.50	64.0	0.72
1.5	0.70	8.0	0.50	62.0	0.73
1.5	0.50	8.0	0.55	76.0	0.68
1.5	0.55	8.0	0.55	74.0	0.70
1.5	0.60	8.0	0.55	72.0	0.71
1.5	0.65	8.0	0.55	70.0	0.72
1.5	0.70	8.0	0.55	68.0	0.74
1.5	0.50	8.0	0.60	80.0	0.70
1.5	0.55	8.0	0.60	78.0	0.71
1.5	0.60	8.0	0.60	76.0	0.72
1.5	0.65	8.0	0.60	74.0	0.73
1.5	0.70	8.0	0.60	74.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	8.0	0.65	84.0	0.72
1.5	0.55	8.0	0.65	82.0	0.72
1.5	0.60	8.0	0.65	82.0	0.73
1.5	0.65	8.0	0.65	80.0	0.74
1.5	0.70	8.0	0.65	78.0	0.75
1.5	0.50	8.0	0.70	88.0	0.73
1.5	0.55	8.0	0.70	88.0	0.74
1.5	0.60	8.0	0.70	86.0	0.74
1.5	0.65	8.0	0.70	84.0	0.75
1.5	0.70	8.0	0.70	84.0	0.76
1.5	0.50	9.0	0.50	70.0	0.67
1.5	0.55	9.0	0.50	68.0	0.69
1.5	0.60	9.0	0.50	66.0	0.71
1.5	0.65	9.0	0.50	64.0	0.72
1.5	0.70	9.0	0.50	62.0	0.74
1.5	0.50	9.0	0.55	74.0	0.69
1.5	0.55	9.0	0.55	72.0	0.70
1.5	0.60	9.0	0.55	70.0	0.71
1.5	0.65	9.0	0.55	70.0	0.73
1.5	0.70	9.0	0.55	68.0	0.74
1.5	0.50	9.0	0.60	80.0	0.70
1.5	0.55	9.0	0.60	78.0	0.72
1.5	0.60	9.0	0.60	76.0	0.73
1.5	0.65	9.0	0.60	74.0	0.74
1.5	0.70	9.0	0.60	72.0	0.75
1.5	0.50	9.0	0.65	84.0	0.72
1.5	0.55	9.0	0.65	82.0	0.73
1.5	0.60	9.0	0.65	80.0	0.74
1.5	0.65	9.0	0.65	80.0	0.75
1.5	0.70	9.0	0.65	78.0	0.76
1.5	0.50	9.0	0.70	88.0	0.74
1.5	0.55	9.0	0.70	86.0	0.74
1.5	0.60	9.0	0.70	86.0	0.75
1.5	0.65	9.0	0.70	84.0	0.76
1.5	0.70	9.0	0.70	84.0	0.76
1.5	0.50	10.0	0.50	70.0	0.68
1.5	0.55	10.0	0.50	68.0	0.69
1.5	0.60	10.0	0.50	66.0	0.71
1.5	0.65	10.0	0.50	64.0	0.72
1.5	0.70	10.0	0.50	62.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	10.0	0.55	74.0	0.69
1.5	0.55	10.0	0.55	72.0	0.71
1.5	0.60	10.0	0.55	70.0	0.72
1.5	0.65	10.0	0.55	68.0	0.73
1.5	0.70	10.0	0.55	66.0	0.75
1.5	0.50	10.0	0.60	78.0	0.71
1.5	0.55	10.0	0.60	76.0	0.72
1.5	0.60	10.0	0.60	76.0	0.73
1.5	0.65	10.0	0.60	74.0	0.74
1.5	0.70	10.0	0.60	72.0	0.75
1.5	0.50	10.0	0.65	82.0	0.72
1.5	0.55	10.0	0.65	82.0	0.73
1.5	0.60	10.0	0.65	80.0	0.74
1.5	0.65	10.0	0.65	78.0	0.75
1.5	0.70	10.0	0.65	78.0	0.76
1.5	0.50	10.0	0.70	86.0	0.74
1.5	0.55	10.0	0.70	86.0	0.75
1.5	0.60	10.0	0.70	84.0	0.75
1.5	0.65	10.0	0.70	84.0	0.76
1.5	0.70	10.0	0.70	82.0	0.77
1.5	0.50	11.0	0.50	70.0	0.68
1.5	0.55	11.0	0.50	66.0	0.69
1.5	0.60	11.0	0.50	64.0	0.71
1.5	0.65	11.0	0.50	64.0	0.72
1.5	0.70	11.0	0.50	62.0	0.74
1.5	0.50	11.0	0.55	74.0	0.70
1.5	0.55	11.0	0.55	72.0	0.71
1.5	0.60	11.0	0.55	70.0	0.72
1.5	0.65	11.0	0.55	68.0	0.74
1.5	0.70	11.0	0.55	66.0	0.75
1.5	0.50	11.0	0.60	78.0	0.71
1.5	0.55	11.0	0.60	76.0	0.72
1.5	0.60	11.0	0.60	74.0	0.73
1.5	0.65	11.0	0.60	74.0	0.75
1.5	0.70	11.0	0.60	72.0	0.76
1.5	0.50	11.0	0.65	82.0	0.72
1.5	0.55	11.0	0.65	82.0	0.73
1.5	0.60	11.0	0.65	80.0	0.75
1.5	0.65	11.0	0.65	78.0	0.76
1.5	0.70	11.0	0.65	76.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	11.0	0.70	86.0	0.74
1.5	0.55	11.0	0.70	86.0	0.75
1.5	0.60	11.0	0.70	84.0	0.76
1.5	0.65	11.0	0.70	82.0	0.76
1.5	0.70	11.0	0.70	82.0	0.77
1.5	0.50	12.0	0.50	68.0	0.68
1.5	0.55	12.0	0.50	66.0	0.69
1.5	0.60	12.0	0.50	64.0	0.71
1.5	0.65	12.0	0.50	62.0	0.73
1.5	0.70	12.0	0.50	60.0	0.74
1.5	0.50	12.0	0.55	74.0	0.70
1.5	0.55	12.0	0.55	72.0	0.71
1.5	0.60	12.0	0.55	70.0	0.73
1.5	0.65	12.0	0.55	68.0	0.74
1.5	0.70	12.0	0.55	66.0	0.75
1.5	0.50	12.0	0.60	78.0	0.71
1.5	0.55	12.0	0.60	76.0	0.72
1.5	0.60	12.0	0.60	74.0	0.74
1.5	0.65	12.0	0.60	72.0	0.75
1.5	0.70	12.0	0.60	72.0	0.76
1.5	0.50	12.0	0.65	82.0	0.73
1.5	0.55	12.0	0.65	80.0	0.74
1.5	0.60	12.0	0.65	80.0	0.75
1.5	0.65	12.0	0.65	78.0	0.76
1.5	0.70	12.0	0.65	76.0	0.77
1.5	0.50	12.0	0.70	86.0	0.74
1.5	0.55	12.0	0.70	84.0	0.75
1.5	0.60	12.0	0.70	84.0	0.76
1.5	0.65	12.0	0.70	82.0	0.77
1.5	0.70	12.0	0.70	82.0	0.78
1.5	0.50	13.0	0.50	68.0	0.68
1.5	0.55	13.0	0.50	66.0	0.70
1.5	0.60	13.0	0.50	64.0	0.71
1.5	0.65	13.0	0.50	62.0	0.73
1.5	0.70	13.0	0.50	60.0	0.75
1.5	0.50	13.0	0.55	74.0	0.70
1.5	0.55	13.0	0.55	72.0	0.71
1.5	0.60	13.0	0.55	70.0	0.73
1.5	0.65	13.0	0.55	68.0	0.74
1.5	0.70	13.0	0.55	66.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	13.0	0.60	78.0	0.72
1.5	0.55	13.0	0.60	76.0	0.73
1.5	0.60	13.0	0.60	74.0	0.74
1.5	0.65	13.0	0.60	72.0	0.75
1.5	0.70	13.0	0.60	72.0	0.76
1.5	0.50	13.0	0.65	82.0	0.73
1.5	0.55	13.0	0.65	80.0	0.74
1.5	0.60	13.0	0.65	78.0	0.75
1.5	0.65	13.0	0.65	78.0	0.76
1.5	0.70	13.0	0.65	76.0	0.77
1.5	0.50	13.0	0.70	86.0	0.75
1.5	0.55	13.0	0.70	84.0	0.75
1.5	0.60	13.0	0.70	84.0	0.76
1.5	0.65	13.0	0.70	82.0	0.77
1.5	0.70	13.0	0.70	80.0	0.78
1.5	0.50	14.0	0.50	68.0	0.68
1.5	0.55	14.0	0.50	66.0	0.70
1.5	0.60	14.0	0.50	64.0	0.72
1.5	0.65	14.0	0.50	62.0	0.73
1.5	0.70	14.0	0.50	60.0	0.75
1.5	0.50	14.0	0.55	74.0	0.70
1.5	0.55	14.0	0.55	72.0	0.71
1.5	0.60	14.0	0.55	70.0	0.73
1.5	0.65	14.0	0.55	68.0	0.74
1.5	0.70	14.0	0.55	66.0	0.76
1.5	0.50	14.0	0.60	78.0	0.72
1.5	0.55	14.0	0.60	76.0	0.73
1.5	0.60	14.0	0.60	74.0	0.74
1.5	0.65	14.0	0.60	72.0	0.75
1.5	0.70	14.0	0.60	70.0	0.76
1.5	0.50	14.0	0.65	82.0	0.73
1.5	0.55	14.0	0.65	80.0	0.74
1.5	0.60	14.0	0.65	78.0	0.75
1.5	0.65	14.0	0.65	78.0	0.76
1.5	0.70	14.0	0.65	76.0	0.77
1.5	0.50	14.0	0.70	86.0	0.75
1.5	0.55	14.0	0.70	84.0	0.76
1.5	0.60	14.0	0.70	82.0	0.76
1.5	0.65	14.0	0.70	82.0	0.77
1.5	0.70	14.0	0.70	80.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	15.0	0.50	68.0	0.68
1.5	0.55	15.0	0.50	66.0	0.70
1.5	0.60	15.0	0.50	64.0	0.72
1.5	0.65	15.0	0.50	62.0	0.73
1.5	0.70	15.0	0.50	60.0	0.75
1.5	0.50	15.0	0.55	72.0	0.70
1.5	0.55	15.0	0.55	70.0	0.71
1.5	0.60	15.0	0.55	70.0	0.73
1.5	0.65	15.0	0.55	68.0	0.74
1.5	0.70	15.0	0.55	66.0	0.76
1.5	0.50	15.0	0.60	78.0	0.72
1.5	0.55	15.0	0.60	76.0	0.73
1.5	0.60	15.0	0.60	74.0	0.74
1.5	0.65	15.0	0.60	72.0	0.75
1.5	0.70	15.0	0.60	70.0	0.77
1.5	0.50	15.0	0.65	82.0	0.73
1.5	0.55	15.0	0.65	80.0	0.75
1.5	0.60	15.0	0.65	78.0	0.75
1.5	0.65	15.0	0.65	76.0	0.76
1.5	0.70	15.0	0.65	76.0	0.78
1.5	0.50	15.0	0.70	86.0	0.75
1.5	0.55	15.0	0.70	84.0	0.76
1.5	0.60	15.0	0.70	82.0	0.77
1.5	0.65	15.0	0.70	82.0	0.78
1.5	0.70	15.0	0.70	80.0	0.78
1.5	0.50	16.0	0.50	68.0	0.68
1.5	0.55	16.0	0.50	66.0	0.70
1.5	0.60	16.0	0.50	64.0	0.72
1.5	0.65	16.0	0.50	62.0	0.74
1.5	0.70	16.0	0.50	60.0	0.75
1.5	0.50	16.0	0.55	72.0	0.70
1.5	0.55	16.0	0.55	70.0	0.71
1.5	0.60	16.0	0.55	68.0	0.73
1.5	0.65	16.0	0.55	68.0	0.74
1.5	0.70	16.0	0.55	66.0	0.76
1.5	0.50	16.0	0.60	78.0	0.72
1.5	0.55	16.0	0.60	76.0	0.73
1.5	0.60	16.0	0.60	74.0	0.75
1.5	0.65	16.0	0.60	72.0	0.76
1.5	0.70	16.0	0.60	70.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	16.0	0.65	82.0	0.73
1.5	0.55	16.0	0.65	80.0	0.75
1.5	0.60	16.0	0.65	78.0	0.76
1.5	0.65	16.0	0.65	76.0	0.77
1.5	0.70	16.0	0.65	76.0	0.78
1.5	0.50	16.0	0.70	86.0	0.75
1.5	0.55	16.0	0.70	84.0	0.76
1.5	0.60	16.0	0.70	82.0	0.77
1.5	0.65	16.0	0.70	82.0	0.78
1.5	0.70	16.0	0.70	80.0	0.79
1.5	0.50	17.0	0.50	68.0	0.69
1.5	0.55	17.0	0.50	66.0	0.70
1.5	0.60	17.0	0.50	64.0	0.72
1.5	0.65	17.0	0.50	62.0	0.74
1.5	0.70	17.0	0.50	60.0	0.75
1.5	0.50	17.0	0.55	72.0	0.70
1.5	0.55	17.0	0.55	70.0	0.72
1.5	0.60	17.0	0.55	68.0	0.73
1.5	0.65	17.0	0.55	66.0	0.75
1.5	0.70	17.0	0.55	66.0	0.76
1.5	0.50	17.0	0.60	78.0	0.72
1.5	0.55	17.0	0.60	76.0	0.73
1.5	0.60	17.0	0.60	74.0	0.75
1.5	0.65	17.0	0.60	72.0	0.76
1.5	0.70	17.0	0.60	70.0	0.77
1.5	0.50	17.0	0.65	82.0	0.73
1.5	0.55	17.0	0.65	80.0	0.75
1.5	0.60	17.0	0.65	78.0	0.76
1.5	0.65	17.0	0.65	76.0	0.77
1.5	0.70	17.0	0.65	76.0	0.78
1.5	0.50	17.0	0.70	84.0	0.75
1.5	0.55	17.0	0.70	84.0	0.76
1.5	0.60	17.0	0.70	82.0	0.77
1.5	0.65	17.0	0.70	80.0	0.78
1.5	0.70	17.0	0.70	80.0	0.79
1.5	0.50	18.0	0.50	68.0	0.69
1.5	0.55	18.0	0.50	66.0	0.70
1.5	0.60	18.0	0.50	64.0	0.72
1.5	0.65	18.0	0.50	62.0	0.74
1.5	0.70	18.0	0.50	60.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	18.0	0.55	72.0	0.70
1.5	0.55	18.0	0.55	70.0	0.72
1.5	0.60	18.0	0.55	68.0	0.73
1.5	0.65	18.0	0.55	66.0	0.75
1.5	0.70	18.0	0.55	66.0	0.76
1.5	0.50	18.0	0.60	76.0	0.72
1.5	0.55	18.0	0.60	76.0	0.73
1.5	0.60	18.0	0.60	74.0	0.75
1.5	0.65	18.0	0.60	72.0	0.76
1.5	0.70	18.0	0.60	70.0	0.77
1.5	0.50	18.0	0.65	80.0	0.73
1.5	0.55	18.0	0.65	80.0	0.75
1.5	0.60	18.0	0.65	78.0	0.76
1.5	0.65	18.0	0.65	76.0	0.77
1.5	0.70	18.0	0.65	74.0	0.78
1.5	0.50	18.0	0.70	84.0	0.75
1.5	0.55	18.0	0.70	84.0	0.76
1.5	0.60	18.0	0.70	82.0	0.77
1.5	0.65	18.0	0.70	80.0	0.78
1.5	0.70	18.0	0.70	80.0	0.79
1.5	0.50	19.0	0.50	68.0	0.69
1.5	0.55	19.0	0.50	66.0	0.71
1.5	0.60	19.0	0.50	64.0	0.72
1.5	0.65	19.0	0.50	62.0	0.74
1.5	0.70	19.0	0.50	60.0	0.76
1.5	0.50	19.0	0.55	72.0	0.70
1.5	0.55	19.0	0.55	70.0	0.72
1.5	0.60	19.0	0.55	68.0	0.73
1.5	0.65	19.0	0.55	66.0	0.75
1.5	0.70	19.0	0.55	64.0	0.76
1.5	0.50	19.0	0.60	76.0	0.72
1.5	0.55	19.0	0.60	74.0	0.73
1.5	0.60	19.0	0.60	74.0	0.75
1.5	0.65	19.0	0.60	72.0	0.76
1.5	0.70	19.0	0.60	70.0	0.77
1.5	0.50	19.0	0.65	80.0	0.74
1.5	0.55	19.0	0.65	80.0	0.75
1.5	0.60	19.0	0.65	78.0	0.76
1.5	0.65	19.0	0.65	76.0	0.77
1.5	0.70	19.0	0.65	74.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	19.0	0.70	84.0	0.75
1.5	0.55	19.0	0.70	84.0	0.76
1.5	0.60	19.0	0.70	82.0	0.77
1.5	0.65	19.0	0.70	80.0	0.78
1.5	0.70	19.0	0.70	80.0	0.79
1.5	0.50	20.0	0.50	68.0	0.69
1.5	0.55	20.0	0.50	66.0	0.71
1.5	0.60	20.0	0.50	64.0	0.72
1.5	0.65	20.0	0.50	62.0	0.74
1.5	0.70	20.0	0.50	60.0	0.76
1.5	0.50	20.0	0.55	72.0	0.70
1.5	0.55	20.0	0.55	70.0	0.72
1.5	0.60	20.0	0.55	68.0	0.73
1.5	0.65	20.0	0.55	66.0	0.75
1.5	0.70	20.0	0.55	64.0	0.76
1.5	0.50	20.0	0.60	76.0	0.72
1.5	0.55	20.0	0.60	74.0	0.73
1.5	0.60	20.0	0.60	74.0	0.75
1.5	0.65	20.0	0.60	72.0	0.76
1.5	0.70	20.0	0.60	70.0	0.77
1.5	0.50	20.0	0.65	80.0	0.74
1.5	0.55	20.0	0.65	80.0	0.75
1.5	0.60	20.0	0.65	78.0	0.76
1.5	0.65	20.0	0.65	76.0	0.77
1.5	0.70	20.0	0.65	74.0	0.78
1.5	0.50	20.0	0.70	84.0	0.75
1.5	0.55	20.0	0.70	84.0	0.76
1.5	0.60	20.0	0.70	82.0	0.78
1.5	0.65	20.0	0.70	80.0	0.78
1.5	0.70	20.0	0.70	80.0	0.79
1.5	0.50	21.0	0.50	68.0	0.69
1.5	0.55	21.0	0.50	66.0	0.71
1.5	0.60	21.0	0.50	64.0	0.72
1.5	0.65	21.0	0.50	62.0	0.74
1.5	0.70	21.0	0.50	60.0	0.76
1.5	0.50	21.0	0.55	72.0	0.71
1.5	0.55	21.0	0.55	70.0	0.72
1.5	0.60	21.0	0.55	68.0	0.74
1.5	0.65	21.0	0.55	66.0	0.75
1.5	0.70	21.0	0.55	64.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	21.0	0.60	76.0	0.72
1.5	0.55	21.0	0.60	74.0	0.73
1.5	0.60	21.0	0.60	72.0	0.75
1.5	0.65	21.0	0.60	72.0	0.76
1.5	0.70	21.0	0.60	70.0	0.78
1.5	0.50	21.0	0.65	80.0	0.74
1.5	0.55	21.0	0.65	78.0	0.75
1.5	0.60	21.0	0.65	78.0	0.76
1.5	0.65	21.0	0.65	76.0	0.77
1.5	0.70	21.0	0.65	74.0	0.78
1.5	0.50	21.0	0.70	84.0	0.76
1.5	0.55	21.0	0.70	82.0	0.76
1.5	0.60	21.0	0.70	82.0	0.78
1.5	0.65	21.0	0.70	80.0	0.78
1.5	0.70	21.0	0.70	80.0	0.79
1.5	0.50	22.0	0.50	68.0	0.69
1.5	0.55	22.0	0.50	66.0	0.71
1.5	0.60	22.0	0.50	64.0	0.72
1.5	0.65	22.0	0.50	62.0	0.74
1.5	0.70	22.0	0.50	60.0	0.76
1.5	0.50	22.0	0.55	72.0	0.71
1.5	0.55	22.0	0.55	70.0	0.72
1.5	0.60	22.0	0.55	68.0	0.74
1.5	0.65	22.0	0.55	66.0	0.75
1.5	0.70	22.0	0.55	64.0	0.77
1.5	0.50	22.0	0.60	76.0	0.72
1.5	0.55	22.0	0.60	74.0	0.73
1.5	0.60	22.0	0.60	72.0	0.75
1.5	0.65	22.0	0.60	72.0	0.76
1.5	0.70	22.0	0.60	70.0	0.78
1.5	0.50	22.0	0.65	80.0	0.74
1.5	0.55	22.0	0.65	78.0	0.75
1.5	0.60	22.0	0.65	78.0	0.76
1.5	0.65	22.0	0.65	76.0	0.77
1.5	0.70	22.0	0.65	74.0	0.78
1.5	0.50	22.0	0.70	84.0	0.76
1.5	0.55	22.0	0.70	82.0	0.76
1.5	0.60	22.0	0.70	82.0	0.78
1.5	0.65	22.0	0.70	80.0	0.79
1.5	0.70	22.0	0.70	78.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	23.0	0.50	68.0	0.69
1.5	0.55	23.0	0.50	66.0	0.71
1.5	0.60	23.0	0.50	64.0	0.72
1.5	0.65	23.0	0.50	62.0	0.74
1.5	0.70	23.0	0.50	60.0	0.76
1.5	0.50	23.0	0.55	72.0	0.71
1.5	0.55	23.0	0.55	70.0	0.72
1.5	0.60	23.0	0.55	68.0	0.74
1.5	0.65	23.0	0.55	66.0	0.75
1.5	0.70	23.0	0.55	64.0	0.77
1.5	0.50	23.0	0.60	76.0	0.72
1.5	0.55	23.0	0.60	74.0	0.74
1.5	0.60	23.0	0.60	72.0	0.75
1.5	0.65	23.0	0.60	72.0	0.76
1.5	0.70	23.0	0.60	70.0	0.78
1.5	0.50	23.0	0.65	80.0	0.74
1.5	0.55	23.0	0.65	78.0	0.75
1.5	0.60	23.0	0.65	78.0	0.76
1.5	0.65	23.0	0.65	76.0	0.78
1.5	0.70	23.0	0.65	74.0	0.79
1.5	0.50	23.0	0.70	84.0	0.76
1.5	0.55	23.0	0.70	82.0	0.76
1.5	0.60	23.0	0.70	82.0	0.78
1.5	0.65	23.0	0.70	80.0	0.79
1.5	0.70	23.0	0.70	78.0	0.79
1.5	0.50	24.0	0.50	68.0	0.69
1.5	0.55	24.0	0.50	66.0	0.71
1.5	0.60	24.0	0.50	64.0	0.72
1.5	0.65	24.0	0.50	62.0	0.74
1.5	0.70	24.0	0.50	60.0	0.76
1.5	0.50	24.0	0.55	72.0	0.71
1.5	0.55	24.0	0.55	70.0	0.72
1.5	0.60	24.0	0.55	68.0	0.74
1.5	0.65	24.0	0.55	66.0	0.75
1.5	0.70	24.0	0.55	64.0	0.77
1.5	0.50	24.0	0.60	76.0	0.72
1.5	0.55	24.0	0.60	74.0	0.74
1.5	0.60	24.0	0.60	72.0	0.75
1.5	0.65	24.0	0.60	72.0	0.76
1.5	0.70	24.0	0.60	70.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	24.0	0.65	80.0	0.74
1.5	0.55	24.0	0.65	78.0	0.75
1.5	0.60	24.0	0.65	78.0	0.76
1.5	0.65	24.0	0.65	76.0	0.78
1.5	0.70	24.0	0.65	74.0	0.79
1.5	0.50	24.0	0.70	84.0	0.76
1.5	0.55	24.0	0.70	82.0	0.77
1.5	0.60	24.0	0.70	82.0	0.78
1.5	0.65	24.0	0.70	80.0	0.79
1.5	0.70	24.0	0.70	78.0	0.80
1.5	0.50	25.0	0.50	68.0	0.69
1.5	0.55	25.0	0.50	66.0	0.71
1.5	0.60	25.0	0.50	64.0	0.72
1.5	0.65	25.0	0.50	62.0	0.74
1.5	0.70	25.0	0.50	60.0	0.76
1.5	0.50	25.0	0.55	72.0	0.71
1.5	0.55	25.0	0.55	70.0	0.72
1.5	0.60	25.0	0.55	68.0	0.74
1.5	0.65	25.0	0.55	66.0	0.75
1.5	0.70	25.0	0.55	64.0	0.77
1.5	0.50	25.0	0.60	76.0	0.72
1.5	0.55	25.0	0.60	74.0	0.74
1.5	0.60	25.0	0.60	72.0	0.75
1.5	0.65	25.0	0.60	70.0	0.76
1.5	0.70	25.0	0.60	70.0	0.78
1.5	0.50	25.0	0.65	80.0	0.74
1.5	0.55	25.0	0.65	78.0	0.75
1.5	0.60	25.0	0.65	78.0	0.76
1.5	0.65	25.0	0.65	76.0	0.78
1.5	0.70	25.0	0.65	74.0	0.79
1.5	0.50	25.0	0.70	84.0	0.76
1.5	0.55	25.0	0.70	82.0	0.77
1.5	0.60	25.0	0.70	82.0	0.78
1.5	0.65	25.0	0.70	80.0	0.79
1.5	0.70	25.0	0.70	78.0	0.80
1.5	0.50	26.0	0.50	68.0	0.69
1.5	0.55	26.0	0.50	66.0	0.71
1.5	0.60	26.0	0.50	64.0	0.72
1.5	0.65	26.0	0.50	62.0	0.74
1.5	0.70	26.0	0.50	60.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	26.0	0.55	72.0	0.71
1.5	0.55	26.0	0.55	70.0	0.72
1.5	0.60	26.0	0.55	68.0	0.74
1.5	0.65	26.0	0.55	66.0	0.75
1.5	0.70	26.0	0.55	64.0	0.77
1.5	0.50	26.0	0.60	76.0	0.73
1.5	0.55	26.0	0.60	74.0	0.74
1.5	0.60	26.0	0.60	72.0	0.75
1.5	0.65	26.0	0.60	70.0	0.76
1.5	0.70	26.0	0.60	70.0	0.78
1.5	0.50	26.0	0.65	80.0	0.74
1.5	0.55	26.0	0.65	78.0	0.75
1.5	0.60	26.0	0.65	76.0	0.76
1.5	0.65	26.0	0.65	76.0	0.78
1.5	0.70	26.0	0.65	74.0	0.79
1.5	0.50	26.0	0.70	84.0	0.76
1.5	0.55	26.0	0.70	82.0	0.77
1.5	0.60	26.0	0.70	82.0	0.78
1.5	0.65	26.0	0.70	80.0	0.79
1.5	0.70	26.0	0.70	78.0	0.80
1.5	0.50	27.0	0.50	68.0	0.69
1.5	0.55	27.0	0.50	66.0	0.71
1.5	0.60	27.0	0.50	64.0	0.72
1.5	0.65	27.0	0.50	62.0	0.74
1.5	0.70	27.0	0.50	60.0	0.76
1.5	0.50	27.0	0.55	72.0	0.71
1.5	0.55	27.0	0.55	70.0	0.72
1.5	0.60	27.0	0.55	68.0	0.74
1.5	0.65	27.0	0.55	66.0	0.75
1.5	0.70	27.0	0.55	64.0	0.77
1.5	0.50	27.0	0.60	76.0	0.73
1.5	0.55	27.0	0.60	74.0	0.74
1.5	0.60	27.0	0.60	72.0	0.75
1.5	0.65	27.0	0.60	70.0	0.76
1.5	0.70	27.0	0.60	70.0	0.78
1.5	0.50	27.0	0.65	80.0	0.74
1.5	0.55	27.0	0.65	78.0	0.75
1.5	0.60	27.0	0.65	76.0	0.76
1.5	0.65	27.0	0.65	76.0	0.78
1.5	0.70	27.0	0.65	74.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	27.0	0.70	84.0	0.76
1.5	0.55	27.0	0.70	82.0	0.77
1.5	0.60	27.0	0.70	82.0	0.78
1.5	0.65	27.0	0.70	80.0	0.79
1.5	0.70	27.0	0.70	78.0	0.80
1.5	0.50	28.0	0.50	68.0	0.69
1.5	0.55	28.0	0.50	66.0	0.71
1.5	0.60	28.0	0.50	64.0	0.72
1.5	0.65	28.0	0.50	62.0	0.74
1.5	0.70	28.0	0.50	60.0	0.76
1.5	0.50	28.0	0.55	72.0	0.71
1.5	0.55	28.0	0.55	70.0	0.73
1.5	0.60	28.0	0.55	68.0	0.74
1.5	0.65	28.0	0.55	66.0	0.76
1.5	0.70	28.0	0.55	64.0	0.77
1.5	0.50	28.0	0.60	76.0	0.73
1.5	0.55	28.0	0.60	74.0	0.74
1.5	0.60	28.0	0.60	72.0	0.75
1.5	0.65	28.0	0.60	70.0	0.76
1.5	0.70	28.0	0.60	70.0	0.78
1.5	0.50	28.0	0.65	80.0	0.74
1.5	0.55	28.0	0.65	78.0	0.75
1.5	0.60	28.0	0.65	76.0	0.76
1.5	0.65	28.0	0.65	76.0	0.78
1.5	0.70	28.0	0.65	74.0	0.79
1.5	0.50	28.0	0.70	84.0	0.76
1.5	0.55	28.0	0.70	82.0	0.77
1.5	0.60	28.0	0.70	82.0	0.78
1.5	0.65	28.0	0.70	80.0	0.79
1.5	0.70	28.0	0.70	78.0	0.80
1.5	0.50	29.0	0.50	68.0	0.69
1.5	0.55	29.0	0.50	66.0	0.71
1.5	0.60	29.0	0.50	64.0	0.72
1.5	0.65	29.0	0.50	62.0	0.74
1.5	0.70	29.0	0.50	60.0	0.76
1.5	0.50	29.0	0.55	72.0	0.71
1.5	0.55	29.0	0.55	70.0	0.73
1.5	0.60	29.0	0.55	68.0	0.74
1.5	0.65	29.0	0.55	66.0	0.76
1.5	0.70	29.0	0.55	64.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
1.5	0.50	29.0	0.60	76.0	0.73
1.5	0.55	29.0	0.60	74.0	0.74
1.5	0.60	29.0	0.60	72.0	0.75
1.5	0.65	29.0	0.60	70.0	0.77
1.5	0.70	29.0	0.60	70.0	0.78
1.5	0.50	29.0	0.65	80.0	0.74
1.5	0.55	29.0	0.65	78.0	0.75
1.5	0.60	29.0	0.65	76.0	0.76
1.5	0.65	29.0	0.65	76.0	0.78
1.5	0.70	29.0	0.65	74.0	0.79
1.5	0.50	29.0	0.70	84.0	0.76
1.5	0.55	29.0	0.70	82.0	0.77
1.5	0.60	29.0	0.70	80.0	0.78
1.5	0.65	29.0	0.70	80.0	0.79
1.5	0.70	29.0	0.70	78.0	0.80
1.5	0.50	30.0	0.50	68.0	0.69
1.5	0.55	30.0	0.50	66.0	0.71
1.5	0.60	30.0	0.50	64.0	0.72
1.5	0.65	30.0	0.50	62.0	0.74
1.5	0.70	30.0	0.50	60.0	0.76
1.5	0.50	30.0	0.55	72.0	0.71
1.5	0.55	30.0	0.55	70.0	0.73
1.5	0.60	30.0	0.55	68.0	0.74
1.5	0.65	30.0	0.55	66.0	0.76
1.5	0.70	30.0	0.55	64.0	0.77
1.5	0.50	30.0	0.60	76.0	0.73
1.5	0.55	30.0	0.60	74.0	0.74
1.5	0.60	30.0	0.60	72.0	0.75
1.5	0.65	30.0	0.60	70.0	0.77
1.5	0.70	30.0	0.60	70.0	0.78
1.5	0.50	30.0	0.65	80.0	0.74
1.5	0.55	30.0	0.65	78.0	0.76
1.5	0.60	30.0	0.65	76.0	0.77
1.5	0.65	30.0	0.65	76.0	0.78
1.5	0.70	30.0	0.65	74.0	0.79
1.5	0.50	30.0	0.70	84.0	0.76
1.5	0.55	30.0	0.70	82.0	0.77
1.5	0.60	30.0	0.70	80.0	0.78
1.5	0.65	30.0	0.70	80.0	0.79
1.5	0.70	30.0	0.70	78.0	0.80

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	7.0	0.50	60.0	0.58
2.0	0.55	7.0	0.50	52.0	0.59
2.0	0.60	7.0	0.50	44.0	0.61
2.0	0.65	7.0	0.50	32.0	0.65
2.0	0.70	7.0	0.50	0.0	0.70
2.0	0.50	7.0	0.55	68.0	0.60
2.0	0.55	7.0	0.55	62.0	0.61
2.0	0.60	7.0	0.55	54.0	0.63
2.0	0.65	7.0	0.55	46.0	0.65
2.0	0.70	7.0	0.55	32.0	0.70
2.0	0.50	7.0	0.60	76.0	0.62
2.0	0.55	7.0	0.60	70.0	0.64
2.0	0.60	7.0	0.60	64.0	0.65
2.0	0.65	7.0	0.60	56.0	0.67
2.0	0.70	7.0	0.60	46.0	0.70
2.0	0.50	7.0	0.65	82.0	0.65
2.0	0.55	7.0	0.65	78.0	0.66
2.0	0.60	7.0	0.65	72.0	0.67
2.0	0.65	7.0	0.65	66.0	0.68
2.0	0.70	7.0	0.65	58.0	0.70
2.0	0.50	7.0	0.70	86.0	0.70
2.0	0.55	7.0	0.70	82.0	0.70
2.0	0.60	7.0	0.70	78.0	0.70
2.0	0.65	7.0	0.70	74.0	0.71
2.0	0.70	7.0	0.70	68.0	0.72
2.0	0.50	8.0	0.50	60.0	0.58
2.0	0.55	8.0	0.50	52.0	0.60
2.0	0.60	8.0	0.50	44.0	0.62
2.0	0.65	8.0	0.50	34.0	0.65
2.0	0.70	8.0	0.50	20.0	0.70
2.0	0.50	8.0	0.55	68.0	0.60
2.0	0.55	8.0	0.55	62.0	0.62
2.0	0.60	8.0	0.55	54.0	0.64
2.0	0.65	8.0	0.55	46.0	0.65
2.0	0.70	8.0	0.55	36.0	0.70
2.0	0.50	8.0	0.60	76.0	0.63
2.0	0.55	8.0	0.60	70.0	0.64
2.0	0.60	8.0	0.60	64.0	0.65
2.0	0.65	8.0	0.60	56.0	0.67
2.0	0.70	8.0	0.60	48.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	8.0	0.65	80.0	0.66
2.0	0.55	8.0	0.65	76.0	0.67
2.0	0.60	8.0	0.65	72.0	0.68
2.0	0.65	8.0	0.65	66.0	0.69
2.0	0.70	8.0	0.65	58.0	0.70
2.0	0.50	8.0	0.70	86.0	0.70
2.0	0.55	8.0	0.70	82.0	0.70
2.0	0.60	8.0	0.70	78.0	0.70
2.0	0.65	8.0	0.70	74.0	0.71
2.0	0.70	8.0	0.70	68.0	0.72
2.0	0.50	9.0	0.50	60.0	0.59
2.0	0.55	9.0	0.50	54.0	0.60
2.0	0.60	9.0	0.50	46.0	0.62
2.0	0.65	9.0	0.50	36.0	0.65
2.0	0.70	9.0	0.50	26.0	0.70
2.0	0.50	9.0	0.55	68.0	0.61
2.0	0.55	9.0	0.55	62.0	0.62
2.0	0.60	9.0	0.55	56.0	0.64
2.0	0.65	9.0	0.55	48.0	0.66
2.0	0.70	9.0	0.55	38.0	0.70
2.0	0.50	9.0	0.60	74.0	0.63
2.0	0.55	9.0	0.60	70.0	0.64
2.0	0.60	9.0	0.60	64.0	0.66
2.0	0.65	9.0	0.60	58.0	0.67
2.0	0.70	9.0	0.60	50.0	0.70
2.0	0.50	9.0	0.65	80.0	0.66
2.0	0.55	9.0	0.65	76.0	0.67
2.0	0.60	9.0	0.65	72.0	0.68
2.0	0.65	9.0	0.65	66.0	0.69
2.0	0.70	9.0	0.65	60.0	0.71
2.0	0.50	9.0	0.70	86.0	0.70
2.0	0.55	9.0	0.70	82.0	0.70
2.0	0.60	9.0	0.70	78.0	0.70
2.0	0.65	9.0	0.70	74.0	0.72
2.0	0.70	9.0	0.70	68.0	0.73
2.0	0.50	10.0	0.50	70.0	0.67
2.0	0.55	10.0	0.50	68.0	0.68
2.0	0.60	10.0	0.50	66.0	0.70
2.0	0.65	10.0	0.50	64.0	0.71
2.0	0.70	10.0	0.50	62.0	0.73

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	10.0	0.55	76.0	0.68
2.0	0.55	10.0	0.55	74.0	0.70
2.0	0.60	10.0	0.55	72.0	0.71
2.0	0.65	10.0	0.55	70.0	0.72
2.0	0.70	10.0	0.55	68.0	0.73
2.0	0.50	10.0	0.60	80.0	0.70
2.0	0.55	10.0	0.60	78.0	0.71
2.0	0.60	10.0	0.60	76.0	0.72
2.0	0.65	10.0	0.60	76.0	0.73
2.0	0.70	10.0	0.60	74.0	0.74
2.0	0.50	10.0	0.65	84.0	0.71
2.0	0.55	10.0	0.65	84.0	0.72
2.0	0.60	10.0	0.65	82.0	0.73
2.0	0.65	10.0	0.65	80.0	0.74
2.0	0.70	10.0	0.65	80.0	0.75
2.0	0.50	10.0	0.70	88.0	0.73
2.0	0.55	10.0	0.70	88.0	0.74
2.0	0.60	10.0	0.70	86.0	0.74
2.0	0.65	10.0	0.70	86.0	0.75
2.0	0.70	10.0	0.70	84.0	0.75
2.0	0.50	11.0	0.50	70.0	0.67
2.0	0.55	11.0	0.50	68.0	0.69
2.0	0.60	11.0	0.50	66.0	0.70
2.0	0.65	11.0	0.50	64.0	0.72
2.0	0.70	11.0	0.50	62.0	0.73
2.0	0.50	11.0	0.55	74.0	0.68
2.0	0.55	11.0	0.55	74.0	0.70
2.0	0.60	11.0	0.55	72.0	0.71
2.0	0.65	11.0	0.55	70.0	0.73
2.0	0.70	11.0	0.55	68.0	0.74
2.0	0.50	11.0	0.60	80.0	0.70
2.0	0.55	11.0	0.60	78.0	0.71
2.0	0.60	11.0	0.60	76.0	0.72
2.0	0.65	11.0	0.60	74.0	0.73
2.0	0.70	11.0	0.60	74.0	0.75
2.0	0.50	11.0	0.65	84.0	0.72
2.0	0.55	11.0	0.65	82.0	0.72
2.0	0.60	11.0	0.65	82.0	0.73
2.0	0.65	11.0	0.65	80.0	0.74
2.0	0.70	11.0	0.65	78.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	11.0	0.70	88.0	0.73
2.0	0.55	11.0	0.70	86.0	0.74
2.0	0.60	11.0	0.70	86.0	0.75
2.0	0.65	11.0	0.70	84.0	0.75
2.0	0.70	11.0	0.70	84.0	0.76
2.0	0.50	12.0	0.50	70.0	0.67
2.0	0.55	12.0	0.50	68.0	0.69
2.0	0.60	12.0	0.50	66.0	0.71
2.0	0.65	12.0	0.50	64.0	0.72
2.0	0.70	12.0	0.50	62.0	0.74
2.0	0.50	12.0	0.55	74.0	0.69
2.0	0.55	12.0	0.55	72.0	0.70
2.0	0.60	12.0	0.55	70.0	0.71
2.0	0.65	12.0	0.55	70.0	0.73
2.0	0.70	12.0	0.55	68.0	0.74
2.0	0.50	12.0	0.60	80.0	0.70
2.0	0.55	12.0	0.60	78.0	0.72
2.0	0.60	12.0	0.60	76.0	0.73
2.0	0.65	12.0	0.60	74.0	0.74
2.0	0.70	12.0	0.60	72.0	0.75
2.0	0.50	12.0	0.65	84.0	0.72
2.0	0.55	12.0	0.65	82.0	0.73
2.0	0.60	12.0	0.65	80.0	0.74
2.0	0.65	12.0	0.65	80.0	0.75
2.0	0.70	12.0	0.65	78.0	0.76
2.0	0.50	12.0	0.70	88.0	0.74
2.0	0.55	12.0	0.70	86.0	0.74
2.0	0.60	12.0	0.70	86.0	0.75
2.0	0.65	12.0	0.70	84.0	0.76
2.0	0.70	12.0	0.70	84.0	0.76
2.0	0.50	13.0	0.50	70.0	0.68
2.0	0.55	13.0	0.50	68.0	0.69
2.0	0.60	13.0	0.50	66.0	0.71
2.0	0.65	13.0	0.50	64.0	0.72
2.0	0.70	13.0	0.50	62.0	0.74
2.0	0.50	13.0	0.55	74.0	0.69
2.0	0.55	13.0	0.55	72.0	0.70
2.0	0.60	13.0	0.55	70.0	0.72
2.0	0.65	13.0	0.55	68.0	0.73
2.0	0.70	13.0	0.55	68.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	13.0	0.60	78.0	0.70
2.0	0.55	13.0	0.60	78.0	0.72
2.0	0.60	13.0	0.60	76.0	0.73
2.0	0.65	13.0	0.60	74.0	0.74
2.0	0.70	13.0	0.60	72.0	0.75
2.0	0.50	13.0	0.65	84.0	0.72
2.0	0.55	13.0	0.65	82.0	0.73
2.0	0.60	13.0	0.65	80.0	0.74
2.0	0.65	13.0	0.65	78.0	0.75
2.0	0.70	13.0	0.65	78.0	0.76
2.0	0.50	13.0	0.70	88.0	0.74
2.0	0.55	13.0	0.70	86.0	0.75
2.0	0.60	13.0	0.70	84.0	0.75
2.0	0.65	13.0	0.70	84.0	0.76
2.0	0.70	13.0	0.70	82.0	0.77
2.0	0.50	14.0	0.50	70.0	0.68
2.0	0.55	14.0	0.50	68.0	0.69
2.0	0.60	14.0	0.50	66.0	0.71
2.0	0.65	14.0	0.50	64.0	0.72
2.0	0.70	14.0	0.50	62.0	0.74
2.0	0.50	14.0	0.55	74.0	0.69
2.0	0.55	14.0	0.55	72.0	0.71
2.0	0.60	14.0	0.55	70.0	0.72
2.0	0.65	14.0	0.55	68.0	0.73
2.0	0.70	14.0	0.55	66.0	0.75
2.0	0.50	14.0	0.60	78.0	0.71
2.0	0.55	14.0	0.60	76.0	0.72
2.0	0.60	14.0	0.60	76.0	0.73
2.0	0.65	14.0	0.60	74.0	0.75
2.0	0.70	14.0	0.60	72.0	0.76
2.0	0.50	14.0	0.65	82.0	0.72
2.0	0.55	14.0	0.65	82.0	0.73
2.0	0.60	14.0	0.65	80.0	0.74
2.0	0.65	14.0	0.65	78.0	0.75
2.0	0.70	14.0	0.65	78.0	0.76
2.0	0.50	14.0	0.70	86.0	0.74
2.0	0.55	14.0	0.70	86.0	0.75
2.0	0.60	14.0	0.70	84.0	0.76
2.0	0.65	14.0	0.70	84.0	0.76
2.0	0.70	14.0	0.70	82.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	15.0	0.50	70.0	0.68
2.0	0.55	15.0	0.50	66.0	0.69
2.0	0.60	15.0	0.50	64.0	0.71
2.0	0.65	15.0	0.50	62.0	0.73
2.0	0.70	15.0	0.50	62.0	0.74
2.0	0.50	15.0	0.55	74.0	0.70
2.0	0.55	15.0	0.55	72.0	0.71
2.0	0.60	15.0	0.55	70.0	0.72
2.0	0.65	15.0	0.55	68.0	0.74
2.0	0.70	15.0	0.55	66.0	0.75
2.0	0.50	15.0	0.60	78.0	0.71
2.0	0.55	15.0	0.60	76.0	0.72
2.0	0.60	15.0	0.60	74.0	0.73
2.0	0.65	15.0	0.60	74.0	0.75
2.0	0.70	15.0	0.60	72.0	0.76
2.0	0.50	15.0	0.65	82.0	0.73
2.0	0.55	15.0	0.65	80.0	0.73
2.0	0.60	15.0	0.65	80.0	0.75
2.0	0.65	15.0	0.65	78.0	0.76
2.0	0.70	15.0	0.65	76.0	0.77
2.0	0.50	15.0	0.70	86.0	0.74
2.0	0.55	15.0	0.70	86.0	0.75
2.0	0.60	15.0	0.70	84.0	0.76
2.0	0.65	15.0	0.70	82.0	0.76
2.0	0.70	15.0	0.70	82.0	0.78
2.0	0.50	16.0	0.50	68.0	0.68
2.0	0.55	16.0	0.50	66.0	0.69
2.0	0.60	16.0	0.50	64.0	0.71
2.0	0.65	16.0	0.50	62.0	0.73
2.0	0.70	16.0	0.50	60.0	0.74
2.0	0.50	16.0	0.55	74.0	0.70
2.0	0.55	16.0	0.55	72.0	0.71
2.0	0.60	16.0	0.55	70.0	0.73
2.0	0.65	16.0	0.55	68.0	0.74
2.0	0.70	16.0	0.55	66.0	0.75
2.0	0.50	16.0	0.60	78.0	0.71
2.0	0.55	16.0	0.60	76.0	0.72
2.0	0.60	16.0	0.60	74.0	0.74
2.0	0.65	16.0	0.60	72.0	0.75
2.0	0.70	16.0	0.60	72.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	16.0	0.65	82.0	0.73
2.0	0.55	16.0	0.65	80.0	0.74
2.0	0.60	16.0	0.65	80.0	0.75
2.0	0.65	16.0	0.65	78.0	0.76
2.0	0.70	16.0	0.65	76.0	0.77
2.0	0.50	16.0	0.70	86.0	0.74
2.0	0.55	16.0	0.70	84.0	0.75
2.0	0.60	16.0	0.70	84.0	0.76
2.0	0.65	16.0	0.70	82.0	0.77
2.0	0.70	16.0	0.70	82.0	0.78
2.0	0.50	17.0	0.50	68.0	0.68
2.0	0.55	17.0	0.50	66.0	0.70
2.0	0.60	17.0	0.50	64.0	0.71
2.0	0.65	17.0	0.50	62.0	0.73
2.0	0.70	17.0	0.50	60.0	0.75
2.0	0.50	17.0	0.55	74.0	0.70
2.0	0.55	17.0	0.55	72.0	0.71
2.0	0.60	17.0	0.55	70.0	0.73
2.0	0.65	17.0	0.55	68.0	0.74
2.0	0.70	17.0	0.55	66.0	0.75
2.0	0.50	17.0	0.60	78.0	0.72
2.0	0.55	17.0	0.60	76.0	0.73
2.0	0.60	17.0	0.60	74.0	0.74
2.0	0.65	17.0	0.60	72.0	0.75
2.0	0.70	17.0	0.60	72.0	0.76
2.0	0.50	17.0	0.65	82.0	0.73
2.0	0.55	17.0	0.65	80.0	0.74
2.0	0.60	17.0	0.65	78.0	0.75
2.0	0.65	17.0	0.65	78.0	0.76
2.0	0.70	17.0	0.65	76.0	0.77
2.0	0.50	17.0	0.70	86.0	0.75
2.0	0.55	17.0	0.70	84.0	0.75
2.0	0.60	17.0	0.70	84.0	0.76
2.0	0.65	17.0	0.70	82.0	0.77
2.0	0.70	17.0	0.70	80.0	0.78
2.0	0.50	18.0	0.50	68.0	0.68
2.0	0.55	18.0	0.50	66.0	0.70
2.0	0.60	18.0	0.50	64.0	0.71
2.0	0.65	18.0	0.50	62.0	0.73
2.0	0.70	18.0	0.50	60.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	18.0	0.55	74.0	0.70
2.0	0.55	18.0	0.55	72.0	0.71
2.0	0.60	18.0	0.55	70.0	0.73
2.0	0.65	18.0	0.55	68.0	0.74
2.0	0.70	18.0	0.55	66.0	0.76
2.0	0.50	18.0	0.60	78.0	0.72
2.0	0.55	18.0	0.60	76.0	0.73
2.0	0.60	18.0	0.60	74.0	0.74
2.0	0.65	18.0	0.60	72.0	0.75
2.0	0.70	18.0	0.60	70.0	0.76
2.0	0.50	18.0	0.65	82.0	0.73
2.0	0.55	18.0	0.65	80.0	0.74
2.0	0.60	18.0	0.65	78.0	0.75
2.0	0.65	18.0	0.65	78.0	0.76
2.0	0.70	18.0	0.65	76.0	0.77
2.0	0.50	18.0	0.70	86.0	0.75
2.0	0.55	18.0	0.70	84.0	0.76
2.0	0.60	18.0	0.70	84.0	0.76
2.0	0.65	18.0	0.70	82.0	0.77
2.0	0.70	18.0	0.70	80.0	0.78
2.0	0.50	19.0	0.50	68.0	0.68
2.0	0.55	19.0	0.50	66.0	0.70
2.0	0.60	19.0	0.50	64.0	0.72
2.0	0.65	19.0	0.50	62.0	0.73
2.0	0.70	19.0	0.50	60.0	0.75
2.0	0.50	19.0	0.55	74.0	0.70
2.0	0.55	19.0	0.55	72.0	0.71
2.0	0.60	19.0	0.55	70.0	0.73
2.0	0.65	19.0	0.55	68.0	0.74
2.0	0.70	19.0	0.55	66.0	0.76
2.0	0.50	19.0	0.60	78.0	0.72
2.0	0.55	19.0	0.60	76.0	0.73
2.0	0.60	19.0	0.60	74.0	0.74
2.0	0.65	19.0	0.60	72.0	0.75
2.0	0.70	19.0	0.60	70.0	0.77
2.0	0.50	19.0	0.65	82.0	0.73
2.0	0.55	19.0	0.65	80.0	0.74
2.0	0.60	19.0	0.65	78.0	0.75
2.0	0.65	19.0	0.65	78.0	0.76
2.0	0.70	19.0	0.65	76.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	19.0	0.70	86.0	0.75
2.0	0.55	19.0	0.70	84.0	0.76
2.0	0.60	19.0	0.70	82.0	0.76
2.0	0.65	19.0	0.70	82.0	0.78
2.0	0.70	19.0	0.70	80.0	0.78
2.0	0.50	20.0	0.50	68.0	0.68
2.0	0.55	20.0	0.50	66.0	0.70
2.0	0.60	20.0	0.50	64.0	0.72
2.0	0.65	20.0	0.50	62.0	0.73
2.0	0.70	20.0	0.50	60.0	0.75
2.0	0.50	20.0	0.55	72.0	0.70
2.0	0.55	20.0	0.55	70.0	0.71
2.0	0.60	20.0	0.55	70.0	0.73
2.0	0.65	20.0	0.55	68.0	0.74
2.0	0.70	20.0	0.55	66.0	0.76
2.0	0.50	20.0	0.60	78.0	0.72
2.0	0.55	20.0	0.60	76.0	0.73
2.0	0.60	20.0	0.60	74.0	0.74
2.0	0.65	20.0	0.60	72.0	0.75
2.0	0.70	20.0	0.60	70.0	0.77
2.0	0.50	20.0	0.65	82.0	0.73
2.0	0.55	20.0	0.65	80.0	0.75
2.0	0.60	20.0	0.65	78.0	0.75
2.0	0.65	20.0	0.65	76.0	0.76
2.0	0.70	20.0	0.65	76.0	0.78
2.0	0.50	20.0	0.70	86.0	0.75
2.0	0.55	20.0	0.70	84.0	0.76
2.0	0.60	20.0	0.70	82.0	0.77
2.0	0.65	20.0	0.70	82.0	0.78
2.0	0.70	20.0	0.70	80.0	0.78
2.0	0.50	21.0	0.50	68.0	0.68
2.0	0.55	21.0	0.50	66.0	0.70
2.0	0.60	21.0	0.50	64.0	0.72
2.0	0.65	21.0	0.50	62.0	0.73
2.0	0.70	21.0	0.50	60.0	0.75
2.0	0.50	21.0	0.55	72.0	0.70
2.0	0.55	21.0	0.55	70.0	0.71
2.0	0.60	21.0	0.55	68.0	0.73
2.0	0.65	21.0	0.55	68.0	0.74
2.0	0.70	21.0	0.55	66.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	21.0	0.60	78.0	0.72
2.0	0.55	21.0	0.60	76.0	0.73
2.0	0.60	21.0	0.60	74.0	0.74
2.0	0.65	21.0	0.60	72.0	0.76
2.0	0.70	21.0	0.60	70.0	0.77
2.0	0.50	21.0	0.65	82.0	0.73
2.0	0.55	21.0	0.65	80.0	0.75
2.0	0.60	21.0	0.65	78.0	0.76
2.0	0.65	21.0	0.65	76.0	0.77
2.0	0.70	21.0	0.65	76.0	0.78
2.0	0.50	21.0	0.70	86.0	0.75
2.0	0.55	21.0	0.70	84.0	0.76
2.0	0.60	21.0	0.70	82.0	0.77
2.0	0.65	21.0	0.70	82.0	0.78
2.0	0.70	21.0	0.70	80.0	0.79
2.0	0.50	22.0	0.50	68.0	0.69
2.0	0.55	22.0	0.50	66.0	0.70
2.0	0.60	22.0	0.50	64.0	0.72
2.0	0.65	22.0	0.50	62.0	0.74
2.0	0.70	22.0	0.50	60.0	0.75
2.0	0.50	22.0	0.55	72.0	0.70
2.0	0.55	22.0	0.55	70.0	0.71
2.0	0.60	22.0	0.55	68.0	0.73
2.0	0.65	22.0	0.55	68.0	0.74
2.0	0.70	22.0	0.55	66.0	0.76
2.0	0.50	22.0	0.60	78.0	0.72
2.0	0.55	22.0	0.60	76.0	0.73
2.0	0.60	22.0	0.60	74.0	0.75
2.0	0.65	22.0	0.60	72.0	0.76
2.0	0.70	22.0	0.60	70.0	0.77
2.0	0.50	22.0	0.65	82.0	0.73
2.0	0.55	22.0	0.65	80.0	0.75
2.0	0.60	22.0	0.65	78.0	0.76
2.0	0.65	22.0	0.65	76.0	0.77
2.0	0.70	22.0	0.65	76.0	0.78
2.0	0.50	22.0	0.70	86.0	0.75
2.0	0.55	22.0	0.70	84.0	0.76
2.0	0.60	22.0	0.70	82.0	0.77
2.0	0.65	22.0	0.70	82.0	0.78
2.0	0.70	22.0	0.70	80.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	23.0	0.50	68.0	0.69
2.0	0.55	23.0	0.50	66.0	0.70
2.0	0.60	23.0	0.50	64.0	0.72
2.0	0.65	23.0	0.50	62.0	0.74
2.0	0.70	23.0	0.50	60.0	0.75
2.0	0.50	23.0	0.55	72.0	0.70
2.0	0.55	23.0	0.55	70.0	0.72
2.0	0.60	23.0	0.55	68.0	0.73
2.0	0.65	23.0	0.55	66.0	0.75
2.0	0.70	23.0	0.55	66.0	0.76
2.0	0.50	23.0	0.60	76.0	0.72
2.0	0.55	23.0	0.60	76.0	0.73
2.0	0.60	23.0	0.60	74.0	0.75
2.0	0.65	23.0	0.60	72.0	0.76
2.0	0.70	23.0	0.60	70.0	0.77
2.0	0.50	23.0	0.65	82.0	0.73
2.0	0.55	23.0	0.65	80.0	0.75
2.0	0.60	23.0	0.65	78.0	0.76
2.0	0.65	23.0	0.65	76.0	0.77
2.0	0.70	23.0	0.65	76.0	0.78
2.0	0.50	23.0	0.70	84.0	0.75
2.0	0.55	23.0	0.70	84.0	0.76
2.0	0.60	23.0	0.70	82.0	0.77
2.0	0.65	23.0	0.70	80.0	0.78
2.0	0.70	23.0	0.70	80.0	0.79
2.0	0.50	24.0	0.50	68.0	0.69
2.0	0.55	24.0	0.50	66.0	0.70
2.0	0.60	24.0	0.50	64.0	0.72
2.0	0.65	24.0	0.50	62.0	0.74
2.0	0.70	24.0	0.50	60.0	0.75
2.0	0.50	24.0	0.55	72.0	0.70
2.0	0.55	24.0	0.55	70.0	0.72
2.0	0.60	24.0	0.55	68.0	0.73
2.0	0.65	24.0	0.55	66.0	0.75
2.0	0.70	24.0	0.55	66.0	0.76
2.0	0.50	24.0	0.60	76.0	0.72
2.0	0.55	24.0	0.60	76.0	0.73
2.0	0.60	24.0	0.60	74.0	0.75
2.0	0.65	24.0	0.60	72.0	0.76
2.0	0.70	24.0	0.60	70.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	24.0	0.65	80.0	0.73
2.0	0.55	24.0	0.65	80.0	0.75
2.0	0.60	24.0	0.65	78.0	0.76
2.0	0.65	24.0	0.65	76.0	0.77
2.0	0.70	24.0	0.65	74.0	0.78
2.0	0.50	24.0	0.70	84.0	0.75
2.0	0.55	24.0	0.70	84.0	0.76
2.0	0.60	24.0	0.70	82.0	0.77
2.0	0.65	24.0	0.70	80.0	0.78
2.0	0.70	24.0	0.70	80.0	0.79
2.0	0.50	25.0	0.50	68.0	0.69
2.0	0.55	25.0	0.50	66.0	0.71
2.0	0.60	25.0	0.50	64.0	0.72
2.0	0.65	25.0	0.50	62.0	0.74
2.0	0.70	25.0	0.50	60.0	0.76
2.0	0.50	25.0	0.55	72.0	0.70
2.0	0.55	25.0	0.55	70.0	0.72
2.0	0.60	25.0	0.55	68.0	0.73
2.0	0.65	25.0	0.55	66.0	0.75
2.0	0.70	25.0	0.55	66.0	0.76
2.0	0.50	25.0	0.60	76.0	0.72
2.0	0.55	25.0	0.60	74.0	0.73
2.0	0.60	25.0	0.60	74.0	0.75
2.0	0.65	25.0	0.60	72.0	0.76
2.0	0.70	25.0	0.60	70.0	0.77
2.0	0.50	25.0	0.65	80.0	0.73
2.0	0.55	25.0	0.65	80.0	0.75
2.0	0.60	25.0	0.65	78.0	0.76
2.0	0.65	25.0	0.65	76.0	0.77
2.0	0.70	25.0	0.65	74.0	0.78
2.0	0.50	25.0	0.70	84.0	0.75
2.0	0.55	25.0	0.70	84.0	0.76
2.0	0.60	25.0	0.70	82.0	0.77
2.0	0.65	25.0	0.70	80.0	0.78
2.0	0.70	25.0	0.70	80.0	0.79
2.0	0.50	26.0	0.50	68.0	0.69
2.0	0.55	26.0	0.50	66.0	0.71
2.0	0.60	26.0	0.50	64.0	0.72
2.0	0.65	26.0	0.50	62.0	0.74
2.0	0.70	26.0	0.50	60.0	0.76

SAND		COARSE AGGREGATE		VOLUME %	MAXIMUM
d'	PHI,0	d'	PHI,0	COARSE AGGREGATE	DENSITY
2.0	0.50	26.0	0.55	72.0	0.70
2.0	0.55	26.0	0.55	70.0	0.72
2.0	0.60	26.0	0.55	68.0	0.73
2.0	0.65	26.0	0.55	66.0	0.75
2.0	0.70	26.0	0.55	64.0	0.76
2.0	0.50	26.0	0.60	76.0	0.72
2.0	0.55	26.0	0.60	74.0	0.73
2.0	0.60	26.0	0.60	74.0	0.75
2.0	0.65	26.0	0.60	72.0	0.76
2.0	0.70	26.0	0.60	70.0	0.77
2.0	0.50	26.0	0.65	80.0	0.74
2.0	0.55	26.0	0.65	80.0	0.75
2.0	0.60	26.0	0.65	78.0	0.76
2.0	0.65	26.0	0.65	76.0	0.77
2.0	0.70	26.0	0.65	74.0	0.78
2.0	0.50	26.0	0.70	84.0	0.75
2.0	0.55	26.0	0.70	84.0	0.76
2.0	0.60	26.0	0.70	82.0	0.77
2.0	0.65	26.0	0.70	80.0	0.78
2.0	0.70	26.0	0.70	80.0	0.79
2.0	0.50	27.0	0.50	68.0	0.69
2.0	0.55	27.0	0.50	66.0	0.71
2.0	0.60	27.0	0.50	64.0	0.72
2.0	0.65	27.0	0.50	62.0	0.74
2.0	0.70	27.0	0.50	60.0	0.76
2.0	0.50	27.0	0.55	72.0	0.70
2.0	0.55	27.0	0.55	70.0	0.72
2.0	0.60	27.0	0.55	68.0	0.73
2.0	0.65	27.0	0.55	66.0	0.75
2.0	0.70	27.0	0.55	64.0	0.76
2.0	0.50	27.0	0.60	76.0	0.72
2.0	0.55	27.0	0.60	74.0	0.73
2.0	0.60	27.0	0.60	74.0	0.75
2.0	0.65	27.0	0.60	72.0	0.76
2.0	0.70	27.0	0.60	70.0	0.78
2.0	0.50	27.0	0.65	80.0	0.74
2.0	0.55	27.0	0.65	80.0	0.75
2.0	0.60	27.0	0.65	78.0	0.76
2.0	0.65	27.0	0.65	76.0	0.77
2.0	0.70	27.0	0.65	74.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	27.0	0.70	84.0	0.75
2.0	0.55	27.0	0.70	84.0	0.76
2.0	0.60	27.0	0.70	82.0	0.78
2.0	0.65	27.0	0.70	80.0	0.78
2.0	0.70	27.0	0.70	80.0	0.79
2.0	0.50	28.0	0.50	68.0	0.69
2.0	0.55	28.0	0.50	66.0	0.71
2.0	0.60	28.0	0.50	64.0	0.72
2.0	0.65	28.0	0.50	62.0	0.74
2.0	0.70	28.0	0.50	60.0	0.76
2.0	0.50	28.0	0.55	72.0	0.71
2.0	0.55	28.0	0.55	70.0	0.72
2.0	0.60	28.0	0.55	68.0	0.74
2.0	0.65	28.0	0.55	66.0	0.75
2.0	0.70	28.0	0.55	64.0	0.76
2.0	0.50	28.0	0.60	76.0	0.72
2.0	0.55	28.0	0.60	74.0	0.73
2.0	0.60	28.0	0.60	72.0	0.75
2.0	0.65	28.0	0.60	72.0	0.76
2.0	0.70	28.0	0.60	70.0	0.78
2.0	0.50	28.0	0.65	80.0	0.74
2.0	0.55	28.0	0.65	78.0	0.75
2.0	0.60	28.0	0.65	78.0	0.76
2.0	0.65	28.0	0.65	76.0	0.77
2.0	0.70	28.0	0.65	74.0	0.78
2.0	0.50	28.0	0.70	84.0	0.76
2.0	0.55	28.0	0.70	82.0	0.76
2.0	0.60	28.0	0.70	82.0	0.78
2.0	0.65	28.0	0.70	80.0	0.78
2.0	0.70	28.0	0.70	80.0	0.79
2.0	0.50	29.0	0.50	68.0	0.69
2.0	0.55	29.0	0.50	66.0	0.71
2.0	0.60	29.0	0.50	64.0	0.72
2.0	0.65	29.0	0.50	62.0	0.74
2.0	0.70	29.0	0.50	60.0	0.76
2.0	0.50	29.0	0.55	72.0	0.71
2.0	0.55	29.0	0.55	70.0	0.72
2.0	0.60	29.0	0.55	68.0	0.74
2.0	0.65	29.0	0.55	66.0	0.75
2.0	0.70	29.0	0.55	64.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.0	0.50	29.0	0.60	76.0	0.72
2.0	0.55	29.0	0.60	74.0	0.73
2.0	0.60	29.0	0.60	72.0	0.75
2.0	0.65	29.0	0.60	72.0	0.76
2.0	0.70	29.0	0.60	70.0	0.78
2.0	0.50	29.0	0.65	80.0	0.74
2.0	0.55	29.0	0.65	78.0	0.75
2.0	0.60	29.0	0.65	78.0	0.76
2.0	0.65	29.0	0.65	76.0	0.77
2.0	0.70	29.0	0.65	74.0	0.78
2.0	0.50	29.0	0.70	84.0	0.76
2.0	0.55	29.0	0.70	82.0	0.76
2.0	0.60	29.0	0.70	82.0	0.78
2.0	0.65	29.0	0.70	80.0	0.78
2.0	0.70	29.0	0.70	78.0	0.79
2.0	0.50	30.0	0.50	68.0	0.69
2.0	0.55	30.0	0.50	66.0	0.71
2.0	0.60	30.0	0.50	64.0	0.72
2.0	0.65	30.0	0.50	62.0	0.74
2.0	0.70	30.0	0.50	60.0	0.76
2.0	0.50	30.0	0.55	72.0	0.71
2.0	0.55	30.0	0.55	70.0	0.72
2.0	0.60	30.0	0.55	68.0	0.74
2.0	0.65	30.0	0.55	66.0	0.75
2.0	0.70	30.0	0.55	64.0	0.77
2.0	0.50	30.0	0.60	76.0	0.72
2.0	0.55	30.0	0.60	74.0	0.74
2.0	0.60	30.0	0.60	72.0	0.75
2.0	0.65	30.0	0.60	72.0	0.76
2.0	0.70	30.0	0.60	70.0	0.78
2.0	0.50	30.0	0.65	80.0	0.74
2.0	0.55	30.0	0.65	78.0	0.75
2.0	0.60	30.0	0.65	78.0	0.76
2.0	0.65	30.0	0.65	76.0	0.78
2.0	0.70	30.0	0.65	74.0	0.79
2.0	0.50	30.0	0.70	84.0	0.76
2.0	0.55	30.0	0.70	82.0	0.76
2.0	0.60	30.0	0.70	82.0	0.78
2.0	0.65	30.0	0.70	80.0	0.79
2.0	0.70	30.0	0.70	78.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	7.0	0.50	60.0	0.57
2.5	0.55	7.0	0.50	50.0	0.58
2.5	0.60	7.0	0.50	40.0	0.61
2.5	0.65	7.0	0.50	18.0	0.65
2.5	0.70	7.0	0.50	0.0	0.70
2.5	0.50	7.0	0.55	70.0	0.59
2.5	0.55	7.0	0.55	62.0	0.60
2.5	0.60	7.0	0.55	52.0	0.62
2.5	0.65	7.0	0.55	42.0	0.65
2.5	0.70	7.0	0.55	0.0	0.70
2.5	0.50	7.0	0.60	76.0	0.62
2.5	0.55	7.0	0.60	70.0	0.63
2.5	0.60	7.0	0.60	64.0	0.64
2.5	0.65	7.0	0.60	54.0	0.66
2.5	0.70	7.0	0.60	42.0	0.70
2.5	0.50	7.0	0.65	82.0	0.65
2.5	0.55	7.0	0.65	78.0	0.65
2.5	0.60	7.0	0.65	72.0	0.66
2.5	0.65	7.0	0.65	66.0	0.68
2.5	0.70	7.0	0.65	56.0	0.70
2.5	0.50	7.0	0.70	88.0	0.70
2.5	0.55	7.0	0.70	84.0	0.70
2.5	0.60	7.0	0.70	80.0	0.70
2.5	0.65	7.0	0.70	74.0	0.70
2.5	0.70	7.0	0.70	68.0	0.71
2.5	0.50	8.0	0.50	60.0	0.57
2.5	0.55	8.0	0.50	52.0	0.59
2.5	0.60	8.0	0.50	42.0	0.61
2.5	0.65	8.0	0.50	28.0	0.65
2.5	0.70	8.0	0.50	0.0	0.70
2.5	0.50	8.0	0.55	68.0	0.60
2.5	0.55	8.0	0.55	62.0	0.61
2.5	0.60	8.0	0.55	54.0	0.63
2.5	0.65	8.0	0.55	44.0	0.65
2.5	0.70	8.0	0.55	28.0	0.70
2.5	0.50	8.0	0.60	76.0	0.62
2.5	0.55	8.0	0.60	70.0	0.63
2.5	0.60	8.0	0.60	64.0	0.65
2.5	0.65	8.0	0.60	56.0	0.66
2.5	0.70	8.0	0.60	46.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	8.0	0.65	82.0	0.65
2.5	0.55	8.0	0.65	78.0	0.66
2.5	0.60	8.0	0.65	72.0	0.67
2.5	0.65	8.0	0.65	66.0	0.68
2.5	0.70	8.0	0.65	58.0	0.70
2.5	0.50	8.0	0.70	86.0	0.70
2.5	0.55	8.0	0.70	84.0	0.70
2.5	0.60	8.0	0.70	80.0	0.70
2.5	0.65	8.0	0.70	74.0	0.70
2.5	0.70	8.0	0.70	68.0	0.72
2.5	0.50	9.0	0.50	60.0	0.58
2.5	0.55	9.0	0.50	52.0	0.59
2.5	0.60	9.0	0.50	44.0	0.61
2.5	0.65	9.0	0.50	32.0	0.65
2.5	0.70	9.0	0.50	0.0	0.70
2.5	0.50	9.0	0.55	68.0	0.60
2.5	0.55	9.0	0.55	62.0	0.61
2.5	0.60	9.0	0.55	54.0	0.63
2.5	0.65	9.0	0.55	46.0	0.65
2.5	0.70	9.0	0.55	34.0	0.70
2.5	0.50	9.0	0.60	76.0	0.62
2.5	0.55	9.0	0.60	70.0	0.64
2.5	0.60	9.0	0.60	64.0	0.65
2.5	0.65	9.0	0.60	56.0	0.67
2.5	0.70	9.0	0.60	48.0	0.70
2.5	0.50	9.0	0.65	82.0	0.65
2.5	0.55	9.0	0.65	76.0	0.66
2.5	0.60	9.0	0.65	72.0	0.67
2.5	0.65	9.0	0.65	66.0	0.69
2.5	0.70	9.0	0.65	58.0	0.70
2.5	0.50	9.0	0.70	86.0	0.70
2.5	0.55	9.0	0.70	82.0	0.70
2.5	0.60	9.0	0.70	78.0	0.70
2.5	0.65	9.0	0.70	74.0	0.71
2.5	0.70	9.0	0.70	68.0	0.72
2.5	0.50	10.0	0.50	60.0	0.58
2.5	0.55	10.0	0.50	52.0	0.60
2.5	0.60	10.0	0.50	44.0	0.62
2.5	0.65	10.0	0.50	34.0	0.65
2.5	0.70	10.0	0.50	20.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	10.0	0.55	68.0	0.60
2.5	0.55	10.0	0.55	62.0	0.62
2.5	0.60	10.0	0.55	54.0	0.64
2.5	0.65	10.0	0.55	46.0	0.65
2.5	0.70	10.0	0.55	36.0	0.70
2.5	0.50	10.0	0.60	76.0	0.63
2.5	0.55	10.0	0.60	70.0	0.64
2.5	0.60	10.0	0.60	64.0	0.65
2.5	0.65	10.0	0.60	56.0	0.67
2.5	0.70	10.0	0.60	48.0	0.70
2.5	0.50	10.0	0.65	80.0	0.66
2.5	0.55	10.0	0.65	76.0	0.67
2.5	0.60	10.0	0.65	72.0	0.68
2.5	0.65	10.0	0.65	66.0	0.69
2.5	0.70	10.0	0.65	58.0	0.70
2.5	0.50	10.0	0.70	86.0	0.70
2.5	0.55	10.0	0.70	82.0	0.70
2.5	0.60	10.0	0.70	78.0	0.70
2.5	0.65	10.0	0.70	74.0	0.71
2.5	0.70	10.0	0.70	68.0	0.72
2.5	0.50	11.0	0.50	60.0	0.58
2.5	0.55	11.0	0.50	54.0	0.60
2.5	0.60	11.0	0.50	46.0	0.62
2.5	0.65	11.0	0.50	36.0	0.65
2.5	0.70	11.0	0.50	24.0	0.70
2.5	0.50	11.0	0.55	68.0	0.61
2.5	0.55	11.0	0.55	62.0	0.62
2.5	0.60	11.0	0.55	56.0	0.64
2.5	0.65	11.0	0.55	48.0	0.66
2.5	0.70	11.0	0.55	38.0	0.70
2.5	0.50	11.0	0.60	74.0	0.63
2.5	0.55	11.0	0.60	70.0	0.64
2.5	0.60	11.0	0.60	64.0	0.66
2.5	0.65	11.0	0.60	58.0	0.67
2.5	0.70	11.0	0.60	50.0	0.70
2.5	0.50	11.0	0.65	80.0	0.66
2.5	0.55	11.0	0.65	76.0	0.67
2.5	0.60	11.0	0.65	72.0	0.68
2.5	0.65	11.0	0.65	66.0	0.69
2.5	0.70	11.0	0.65	60.0	0.71

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	11.0	0.70	86.0	0.70
2.5	0.55	11.0	0.70	82.0	0.70
2.5	0.60	11.0	0.70	78.0	0.70
2.5	0.65	11.0	0.70	74.0	0.71
2.5	0.70	11.0	0.70	68.0	0.73
2.5	0.50	12.0	0.50	60.0	0.59
2.5	0.55	12.0	0.50	54.0	0.61
2.5	0.60	12.0	0.50	46.0	0.63
2.5	0.65	12.0	0.50	38.0	0.65
2.5	0.70	12.0	0.50	28.0	0.70
2.5	0.50	12.0	0.55	68.0	0.61
2.5	0.55	12.0	0.55	62.0	0.63
2.5	0.60	12.0	0.55	56.0	0.64
2.5	0.65	12.0	0.55	48.0	0.66
2.5	0.70	12.0	0.55	40.0	0.70
2.5	0.50	12.0	0.60	74.0	0.63
2.5	0.55	12.0	0.60	70.0	0.65
2.5	0.60	12.0	0.60	64.0	0.66
2.5	0.65	12.0	0.60	58.0	0.68
2.5	0.70	12.0	0.60	50.0	0.70
2.5	0.50	12.0	0.65	80.0	0.66
2.5	0.55	12.0	0.65	76.0	0.67
2.5	0.60	12.0	0.65	72.0	0.68
2.5	0.65	12.0	0.65	66.0	0.70
2.5	0.70	12.0	0.65	60.0	0.71
2.5	0.50	12.0	0.70	84.0	0.70
2.5	0.55	12.0	0.70	82.0	0.70
2.5	0.60	12.0	0.70	78.0	0.71
2.5	0.65	12.0	0.70	74.0	0.72
2.5	0.70	12.0	0.70	68.0	0.73
2.5	0.50	13.0	0.50	70.0	0.67
2.5	0.55	13.0	0.50	68.0	0.68
2.5	0.60	13.0	0.50	66.0	0.70
2.5	0.65	13.0	0.50	64.0	0.71
2.5	0.70	13.0	0.50	62.0	0.73
2.5	0.50	13.0	0.55	76.0	0.68
2.5	0.55	13.0	0.55	74.0	0.70
2.5	0.60	13.0	0.55	72.0	0.71
2.5	0.65	13.0	0.55	70.0	0.72
2.5	0.70	13.0	0.55	68.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	13.0	0.60	80.0	0.70
2.5	0.55	13.0	0.60	78.0	0.71
2.5	0.60	13.0	0.60	76.0	0.72
2.5	0.65	13.0	0.60	76.0	0.73
2.5	0.70	13.0	0.60	74.0	0.74
2.5	0.50	13.0	0.65	84.0	0.71
2.5	0.55	13.0	0.65	82.0	0.72
2.5	0.60	13.0	0.65	82.0	0.73
2.5	0.65	13.0	0.65	80.0	0.74
2.5	0.70	13.0	0.65	78.0	0.75
2.5	0.50	13.0	0.70	88.0	0.73
2.5	0.55	13.0	0.70	88.0	0.74
2.5	0.60	13.0	0.70	86.0	0.74
2.5	0.65	13.0	0.70	86.0	0.75
2.5	0.70	13.0	0.70	84.0	0.76
2.5	0.50	14.0	0.50	70.0	0.67
2.5	0.55	14.0	0.50	68.0	0.69
2.5	0.60	14.0	0.50	66.0	0.70
2.5	0.65	14.0	0.50	64.0	0.72
2.5	0.70	14.0	0.50	62.0	0.73
2.5	0.50	14.0	0.55	74.0	0.68
2.5	0.55	14.0	0.55	72.0	0.70
2.5	0.60	14.0	0.55	72.0	0.71
2.5	0.65	14.0	0.55	70.0	0.73
2.5	0.70	14.0	0.55	68.0	0.74
2.5	0.50	14.0	0.60	80.0	0.70
2.5	0.55	14.0	0.60	78.0	0.71
2.5	0.60	14.0	0.60	76.0	0.72
2.5	0.65	14.0	0.60	74.0	0.73
2.5	0.70	14.0	0.60	74.0	0.75
2.5	0.50	14.0	0.65	84.0	0.72
2.5	0.55	14.0	0.65	82.0	0.73
2.5	0.60	14.0	0.65	82.0	0.73
2.5	0.65	14.0	0.65	80.0	0.74
2.5	0.70	14.0	0.65	78.0	0.75
2.5	0.50	14.0	0.70	88.0	0.73
2.5	0.55	14.0	0.70	86.0	0.74
2.5	0.60	14.0	0.70	86.0	0.75
2.5	0.65	14.0	0.70	84.0	0.75
2.5	0.70	14.0	0.70	84.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	15.0	0.50	70.0	0.67
2.5	0.55	15.0	0.50	68.0	0.69
2.5	0.60	15.0	0.50	66.0	0.71
2.5	0.65	15.0	0.50	64.0	0.72
2.5	0.70	15.0	0.50	62.0	0.74
2.5	0.50	15.0	0.55	74.0	0.69
2.5	0.55	15.0	0.55	72.0	0.70
2.5	0.60	15.0	0.55	70.0	0.71
2.5	0.65	15.0	0.55	70.0	0.73
2.5	0.70	15.0	0.55	68.0	0.74
2.5	0.50	15.0	0.60	80.0	0.70
2.5	0.55	15.0	0.60	78.0	0.72
2.5	0.60	15.0	0.60	76.0	0.73
2.5	0.65	15.0	0.60	74.0	0.74
2.5	0.70	15.0	0.60	72.0	0.75
2.5	0.50	15.0	0.65	84.0	0.72
2.5	0.55	15.0	0.65	82.0	0.73
2.5	0.60	15.0	0.65	80.0	0.74
2.5	0.65	15.0	0.65	80.0	0.75
2.5	0.70	15.0	0.65	78.0	0.76
2.5	0.50	15.0	0.70	88.0	0.74
2.5	0.55	15.0	0.70	86.0	0.74
2.5	0.60	15.0	0.70	86.0	0.75
2.5	0.65	15.0	0.70	84.0	0.76
2.5	0.70	15.0	0.70	84.0	0.76
2.5	0.50	16.0	0.50	70.0	0.68
2.5	0.55	16.0	0.50	68.0	0.69
2.5	0.60	16.0	0.50	66.0	0.71
2.5	0.65	16.0	0.50	64.0	0.72
2.5	0.70	16.0	0.50	62.0	0.74
2.5	0.50	16.0	0.55	74.0	0.69
2.5	0.55	16.0	0.55	72.0	0.70
2.5	0.60	16.0	0.55	70.0	0.72
2.5	0.65	16.0	0.55	68.0	0.73
2.5	0.70	16.0	0.55	68.0	0.74
2.5	0.50	16.0	0.60	78.0	0.70
2.5	0.55	16.0	0.60	78.0	0.72
2.5	0.60	16.0	0.60	76.0	0.73
2.5	0.65	16.0	0.60	74.0	0.74
2.5	0.70	16.0	0.60	72.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	16.0	0.65	84.0	0.72
2.5	0.55	16.0	0.65	82.0	0.73
2.5	0.60	16.0	0.65	80.0	0.74
2.5	0.65	16.0	0.65	78.0	0.75
2.5	0.70	16.0	0.65	78.0	0.76
2.5	0.50	16.0	0.70	88.0	0.74
2.5	0.55	16.0	0.70	86.0	0.75
2.5	0.60	16.0	0.70	84.0	0.75
2.5	0.65	16.0	0.70	84.0	0.76
2.5	0.70	16.0	0.70	82.0	0.77
2.5	0.50	17.0	0.50	70.0	0.68
2.5	0.55	17.0	0.50	68.0	0.69
2.5	0.60	17.0	0.50	66.0	0.71
2.5	0.65	17.0	0.50	64.0	0.72
2.5	0.70	17.0	0.50	62.0	0.74
2.5	0.50	17.0	0.55	74.0	0.69
2.5	0.55	17.0	0.55	72.0	0.71
2.5	0.60	17.0	0.55	70.0	0.72
2.5	0.65	17.0	0.55	68.0	0.73
2.5	0.70	17.0	0.55	66.0	0.75
2.5	0.50	17.0	0.60	78.0	0.71
2.5	0.55	17.0	0.60	76.0	0.72
2.5	0.60	17.0	0.60	76.0	0.73
2.5	0.65	17.0	0.60	74.0	0.74
2.5	0.70	17.0	0.60	72.0	0.75
2.5	0.50	17.0	0.65	82.0	0.72
2.5	0.55	17.0	0.65	82.0	0.73
2.5	0.60	17.0	0.65	80.0	0.74
2.5	0.65	17.0	0.65	78.0	0.75
2.5	0.70	17.0	0.65	78.0	0.76
2.5	0.50	17.0	0.70	86.0	0.74
2.5	0.55	17.0	0.70	86.0	0.75
2.5	0.60	17.0	0.70	84.0	0.75
2.5	0.65	17.0	0.70	84.0	0.76
2.5	0.70	17.0	0.70	82.0	0.77
2.5	0.50	18.0	0.50	70.0	0.68
2.5	0.55	18.0	0.50	68.0	0.69
2.5	0.60	18.0	0.50	66.0	0.71
2.5	0.65	18.0	0.50	64.0	0.72
2.5	0.70	18.0	0.50	62.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	18.0	0.55	74.0	0.69
2.5	0.55	18.0	0.55	72.0	0.71
2.5	0.60	18.0	0.55	70.0	0.72
2.5	0.65	18.0	0.55	68.0	0.74
2.5	0.70	18.0	0.55	66.0	0.75
2.5	0.50	18.0	0.60	78.0	0.71
2.5	0.55	18.0	0.60	76.0	0.72
2.5	0.60	18.0	0.60	74.0	0.73
2.5	0.65	18.0	0.60	74.0	0.75
2.5	0.70	18.0	0.60	72.0	0.76
2.5	0.50	18.0	0.65	82.0	0.72
2.5	0.55	18.0	0.65	82.0	0.73
2.5	0.60	18.0	0.65	80.0	0.75
2.5	0.65	18.0	0.65	78.0	0.75
2.5	0.70	18.0	0.65	76.0	0.76
2.5	0.50	18.0	0.70	86.0	0.74
2.5	0.55	18.0	0.70	86.0	0.75
2.5	0.60	18.0	0.70	84.0	0.76
2.5	0.65	18.0	0.70	82.0	0.76
2.5	0.70	18.0	0.70	82.0	0.77
2.5	0.50	19.0	0.50	70.0	0.68
2.5	0.55	19.0	0.50	66.0	0.69
2.5	0.60	19.0	0.50	64.0	0.71
2.5	0.65	19.0	0.50	62.0	0.73
2.5	0.70	19.0	0.50	62.0	0.74
2.5	0.50	19.0	0.55	74.0	0.70
2.5	0.55	19.0	0.55	72.0	0.71
2.5	0.60	19.0	0.55	70.0	0.72
2.5	0.65	19.0	0.55	68.0	0.74
2.5	0.70	19.0	0.55	66.0	0.75
2.5	0.50	19.0	0.60	78.0	0.71
2.5	0.55	19.0	0.60	76.0	0.72
2.5	0.60	19.0	0.60	74.0	0.73
2.5	0.65	19.0	0.60	74.0	0.75
2.5	0.70	19.0	0.60	72.0	0.76
2.5	0.50	19.0	0.65	82.0	0.73
2.5	0.55	19.0	0.65	80.0	0.73
2.5	0.60	19.0	0.65	80.0	0.75
2.5	0.65	19.0	0.65	78.0	0.76
2.5	0.70	19.0	0.65	76.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	19.0	0.70	86.0	0.74
2.5	0.55	19.0	0.70	86.0	0.75
2.5	0.60	19.0	0.70	84.0	0.76
2.5	0.65	19.0	0.70	82.0	0.77
2.5	0.70	19.0	0.70	82.0	0.78
2.5	0.50	20.0	0.50	68.0	0.68
2.5	0.55	20.0	0.50	66.0	0.69
2.5	0.60	20.0	0.50	64.0	0.71
2.5	0.65	20.0	0.50	62.0	0.73
2.5	0.70	20.0	0.50	60.0	0.74
2.5	0.50	20.0	0.55	74.0	0.70
2.5	0.55	20.0	0.55	72.0	0.71
2.5	0.60	20.0	0.55	70.0	0.73
2.5	0.65	20.0	0.55	68.0	0.74
2.5	0.70	20.0	0.55	66.0	0.75
2.5	0.50	20.0	0.60	78.0	0.71
2.5	0.55	20.0	0.60	76.0	0.72
2.5	0.60	20.0	0.60	74.0	0.74
2.5	0.65	20.0	0.60	72.0	0.75
2.5	0.70	20.0	0.60	72.0	0.76
2.5	0.50	20.0	0.65	82.0	0.73
2.5	0.55	20.0	0.65	80.0	0.74
2.5	0.60	20.0	0.65	80.0	0.75
2.5	0.65	20.0	0.65	78.0	0.76
2.5	0.70	20.0	0.65	76.0	0.77
2.5	0.50	20.0	0.70	86.0	0.74
2.5	0.55	20.0	0.70	84.0	0.75
2.5	0.60	20.0	0.70	84.0	0.76
2.5	0.65	20.0	0.70	82.0	0.77
2.5	0.70	20.0	0.70	82.0	0.78
2.5	0.50	21.0	0.50	68.0	0.68
2.5	0.55	21.0	0.50	66.0	0.70
2.5	0.60	21.0	0.50	64.0	0.71
2.5	0.65	21.0	0.50	62.0	0.73
2.5	0.70	21.0	0.50	60.0	0.75
2.5	0.50	21.0	0.55	74.0	0.70
2.5	0.55	21.0	0.55	72.0	0.71
2.5	0.60	21.0	0.55	70.0	0.73
2.5	0.65	21.0	0.55	68.0	0.74
2.5	0.70	21.0	0.55	66.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	21.0	0.60	78.0	0.71
2.5	0.55	21.0	0.60	76.0	0.73
2.5	0.60	21.0	0.60	74.0	0.74
2.5	0.65	21.0	0.60	72.0	0.75
2.5	0.70	21.0	0.60	72.0	0.76
2.5	0.50	21.0	0.65	82.0	0.73
2.5	0.55	21.0	0.65	80.0	0.74
2.5	0.60	21.0	0.65	78.0	0.75
2.5	0.65	21.0	0.65	78.0	0.76
2.5	0.70	21.0	0.65	76.0	0.77
2.5	0.50	21.0	0.70	86.0	0.75
2.5	0.55	21.0	0.70	84.0	0.75
2.5	0.60	21.0	0.70	84.0	0.76
2.5	0.65	21.0	0.70	82.0	0.77
2.5	0.70	21.0	0.70	82.0	0.78
2.5	0.50	22.0	0.50	68.0	0.68
2.5	0.55	22.0	0.50	66.0	0.70
2.5	0.60	22.0	0.50	64.0	0.71
2.5	0.65	22.0	0.50	62.0	0.73
2.5	0.70	22.0	0.50	60.0	0.75
2.5	0.50	22.0	0.55	74.0	0.70
2.5	0.55	22.0	0.55	72.0	0.71
2.5	0.60	22.0	0.55	70.0	0.73
2.5	0.65	22.0	0.55	68.0	0.74
2.5	0.70	22.0	0.55	66.0	0.76
2.5	0.50	22.0	0.60	78.0	0.72
2.5	0.55	22.0	0.60	76.0	0.73
2.5	0.60	22.0	0.60	74.0	0.74
2.5	0.65	22.0	0.60	72.0	0.75
2.5	0.70	22.0	0.60	72.0	0.76
2.5	0.50	22.0	0.65	82.0	0.73
2.5	0.55	22.0	0.65	80.0	0.74
2.5	0.60	22.0	0.65	78.0	0.75
2.5	0.65	22.0	0.65	78.0	0.76
2.5	0.70	22.0	0.65	76.0	0.77
2.5	0.50	22.0	0.70	86.0	0.75
2.5	0.55	22.0	0.70	84.0	0.75
2.5	0.60	22.0	0.70	84.0	0.76
2.5	0.65	22.0	0.70	82.0	0.77
2.5	0.70	22.0	0.70	80.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	23.0	0.50	68.0	0.68
2.5	0.55	23.0	0.50	66.0	0.70
2.5	0.60	23.0	0.50	64.0	0.72
2.5	0.65	23.0	0.50	62.0	0.73
2.5	0.70	23.0	0.50	60.0	0.75
2.5	0.50	23.0	0.55	74.0	0.70
2.5	0.55	23.0	0.55	72.0	0.71
2.5	0.60	23.0	0.55	70.0	0.73
2.5	0.65	23.0	0.55	68.0	0.74
2.5	0.70	23.0	0.55	66.0	0.76
2.5	0.50	23.0	0.60	78.0	0.72
2.5	0.55	23.0	0.60	76.0	0.73
2.5	0.60	23.0	0.60	74.0	0.74
2.5	0.65	23.0	0.60	72.0	0.75
2.5	0.70	23.0	0.60	70.0	0.76
2.5	0.50	23.0	0.65	82.0	0.73
2.5	0.55	23.0	0.65	80.0	0.74
2.5	0.60	23.0	0.65	78.0	0.75
2.5	0.65	23.0	0.65	78.0	0.76
2.5	0.70	23.0	0.65	76.0	0.77
2.5	0.50	23.0	0.70	86.0	0.75
2.5	0.55	23.0	0.70	84.0	0.76
2.5	0.60	23.0	0.70	84.0	0.76
2.5	0.65	23.0	0.70	82.0	0.77
2.5	0.70	23.0	0.70	80.0	0.78
2.5	0.50	24.0	0.50	68.0	0.68
2.5	0.55	24.0	0.50	66.0	0.70
2.5	0.60	24.0	0.50	64.0	0.72
2.5	0.65	24.0	0.50	62.0	0.73
2.5	0.70	24.0	0.50	60.0	0.75
2.5	0.50	24.0	0.55	74.0	0.70
2.5	0.55	24.0	0.55	72.0	0.71
2.5	0.60	24.0	0.55	70.0	0.73
2.5	0.65	24.0	0.55	68.0	0.74
2.5	0.70	24.0	0.55	66.0	0.76
2.5	0.50	24.0	0.60	78.0	0.72
2.5	0.55	24.0	0.60	76.0	0.73
2.5	0.60	24.0	0.60	74.0	0.74
2.5	0.65	24.0	0.60	72.0	0.75
2.5	0.70	24.0	0.60	70.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	24.0	0.65	82.0	0.73
2.5	0.55	24.0	0.65	80.0	0.74
2.5	0.60	24.0	0.65	78.0	0.75
2.5	0.65	24.0	0.65	78.0	0.76
2.5	0.70	24.0	0.65	76.0	0.78
2.5	0.50	24.0	0.70	86.0	0.75
2.5	0.55	24.0	0.70	84.0	0.76
2.5	0.60	24.0	0.70	82.0	0.76
2.5	0.65	24.0	0.70	82.0	0.78
2.5	0.70	24.0	0.70	80.0	0.78
2.5	0.50	25.0	0.50	68.0	0.68
2.5	0.55	25.0	0.50	66.0	0.70
2.5	0.60	25.0	0.50	64.0	0.72
2.5	0.65	25.0	0.50	62.0	0.73
2.5	0.70	25.0	0.50	60.0	0.75
2.5	0.50	25.0	0.55	72.0	0.70
2.5	0.55	25.0	0.55	70.0	0.71
2.5	0.60	25.0	0.55	70.0	0.73
2.5	0.65	25.0	0.55	68.0	0.74
2.5	0.70	25.0	0.55	66.0	0.76
2.5	0.50	25.0	0.60	78.0	0.72
2.5	0.55	25.0	0.60	76.0	0.73
2.5	0.60	25.0	0.60	74.0	0.74
2.5	0.65	25.0	0.60	72.0	0.75
2.5	0.70	25.0	0.60	70.0	0.77
2.5	0.50	25.0	0.65	82.0	0.73
2.5	0.55	25.0	0.65	80.0	0.75
2.5	0.60	25.0	0.65	78.0	0.75
2.5	0.65	25.0	0.65	76.0	0.76
2.5	0.70	25.0	0.65	76.0	0.78
2.5	0.50	25.0	0.70	86.0	0.75
2.5	0.55	25.0	0.70	84.0	0.76
2.5	0.60	25.0	0.70	82.0	0.77
2.5	0.65	25.0	0.70	82.0	0.78
2.5	0.70	25.0	0.70	80.0	0.78
2.5	0.50	26.0	0.50	68.0	0.68
2.5	0.55	26.0	0.50	66.0	0.70
2.5	0.60	26.0	0.50	64.0	0.72
2.5	0.65	26.0	0.50	62.0	0.73
2.5	0.70	26.0	0.50	60.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	26.0	0.55	72.0	0.70
2.5	0.55	26.0	0.55	70.0	0.71
2.5	0.60	26.0	0.55	68.0	0.73
2.5	0.65	26.0	0.55	68.0	0.74
2.5	0.70	26.0	0.55	66.0	0.76
2.5	0.50	26.0	0.60	78.0	0.72
2.5	0.55	26.0	0.60	76.0	0.73
2.5	0.60	26.0	0.60	74.0	0.74
2.5	0.65	26.0	0.60	72.0	0.76
2.5	0.70	26.0	0.60	70.0	0.77
2.5	0.50	26.0	0.65	82.0	0.73
2.5	0.55	26.0	0.65	80.0	0.75
2.5	0.60	26.0	0.65	78.0	0.76
2.5	0.65	26.0	0.65	76.0	0.77
2.5	0.70	26.0	0.65	76.0	0.78
2.5	0.50	26.0	0.70	86.0	0.75
2.5	0.55	26.0	0.70	84.0	0.76
2.5	0.60	26.0	0.70	82.0	0.77
2.5	0.65	26.0	0.70	82.0	0.78
2.5	0.70	26.0	0.70	80.0	0.79
2.5	0.50	27.0	0.50	68.0	0.69
2.5	0.55	27.0	0.50	66.0	0.70
2.5	0.60	27.0	0.50	64.0	0.72
2.5	0.65	27.0	0.50	62.0	0.74
2.5	0.70	27.0	0.50	60.0	0.75
2.5	0.50	27.0	0.55	72.0	0.70
2.5	0.55	27.0	0.55	70.0	0.71
2.5	0.60	27.0	0.55	68.0	0.73
2.5	0.65	27.0	0.55	68.0	0.74
2.5	0.70	27.0	0.55	66.0	0.76
2.5	0.50	27.0	0.60	78.0	0.72
2.5	0.55	27.0	0.60	76.0	0.73
2.5	0.60	27.0	0.60	74.0	0.75
2.5	0.65	27.0	0.60	72.0	0.76
2.5	0.70	27.0	0.60	70.0	0.77
2.5	0.50	27.0	0.65	82.0	0.73
2.5	0.55	27.0	0.65	80.0	0.75
2.5	0.60	27.0	0.65	78.0	0.76
2.5	0.65	27.0	0.65	76.0	0.77
2.5	0.70	27.0	0.65	76.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	27.0	0.70	86.0	0.75
2.5	0.55	27.0	0.70	84.0	0.76
2.5	0.60	27.0	0.70	82.0	0.77
2.5	0.65	27.0	0.70	82.0	0.78
2.5	0.70	27.0	0.70	80.0	0.79
2.5	0.50	28.0	0.50	68.0	0.69
2.5	0.55	28.0	0.50	66.0	0.70
2.5	0.60	28.0	0.50	64.0	0.72
2.5	0.65	28.0	0.50	62.0	0.74
2.5	0.70	28.0	0.50	60.0	0.75
2.5	0.50	28.0	0.55	72.0	0.70
2.5	0.55	28.0	0.55	70.0	0.72
2.5	0.60	28.0	0.55	68.0	0.73
2.5	0.65	28.0	0.55	66.0	0.74
2.5	0.70	28.0	0.55	66.0	0.76
2.5	0.50	28.0	0.60	78.0	0.72
2.5	0.55	28.0	0.60	76.0	0.73
2.5	0.60	28.0	0.60	74.0	0.75
2.5	0.65	28.0	0.60	72.0	0.76
2.5	0.70	28.0	0.60	70.0	0.77
2.5	0.50	28.0	0.65	82.0	0.73
2.5	0.55	28.0	0.65	80.0	0.75
2.5	0.60	28.0	0.65	78.0	0.76
2.5	0.65	28.0	0.65	76.0	0.77
2.5	0.70	28.0	0.65	76.0	0.78
2.5	0.50	28.0	0.70	84.0	0.75
2.5	0.55	28.0	0.70	84.0	0.76
2.5	0.60	28.0	0.70	82.0	0.77
2.5	0.65	28.0	0.70	82.0	0.78
2.5	0.70	28.0	0.70	80.0	0.79
2.5	0.50	29.0	0.50	68.0	0.69
2.5	0.55	29.0	0.50	66.0	0.70
2.5	0.60	29.0	0.50	64.0	0.72
2.5	0.65	29.0	0.50	62.0	0.74
2.5	0.70	29.0	0.50	60.0	0.75
2.5	0.50	29.0	0.55	72.0	0.70
2.5	0.55	29.0	0.55	70.0	0.72
2.5	0.60	29.0	0.55	68.0	0.73
2.5	0.65	29.0	0.55	66.0	0.75
2.5	0.70	29.0	0.55	66.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
2.5	0.50	29.0	0.60	76.0	0.72
2.5	0.55	29.0	0.60	76.0	0.73
2.5	0.60	29.0	0.60	74.0	0.75
2.5	0.65	29.0	0.60	72.0	0.76
2.5	0.70	29.0	0.60	70.0	0.77
2.5	0.50	29.0	0.65	82.0	0.73
2.5	0.55	29.0	0.65	80.0	0.75
2.5	0.60	29.0	0.65	78.0	0.76
2.5	0.65	29.0	0.65	76.0	0.77
2.5	0.70	29.0	0.65	74.0	0.78
2.5	0.50	29.0	0.70	84.0	0.75
2.5	0.55	29.0	0.70	84.0	0.76
2.5	0.60	29.0	0.70	82.0	0.77
2.5	0.65	29.0	0.70	80.0	0.78
2.5	0.70	29.0	0.70	80.0	0.79
2.5	0.50	30.0	0.50	68.0	0.69
2.5	0.55	30.0	0.50	66.0	0.70
2.5	0.60	30.0	0.50	64.0	0.72
2.5	0.65	30.0	0.50	62.0	0.74
2.5	0.70	30.0	0.50	60.0	0.75
2.5	0.50	30.0	0.55	72.0	0.70
2.5	0.55	30.0	0.55	70.0	0.72
2.5	0.60	30.0	0.55	68.0	0.73
2.5	0.65	30.0	0.55	66.0	0.75
2.5	0.70	30.0	0.55	66.0	0.76
2.5	0.50	30.0	0.60	76.0	0.72
2.5	0.55	30.0	0.60	76.0	0.73
2.5	0.60	30.0	0.60	74.0	0.75
2.5	0.65	30.0	0.60	72.0	0.76
2.5	0.70	30.0	0.60	70.0	0.77
2.5	0.50	30.0	0.65	80.0	0.73
2.5	0.55	30.0	0.65	80.0	0.75
2.5	0.60	30.0	0.65	78.0	0.76
2.5	0.65	30.0	0.65	76.0	0.77
2.5	0.70	30.0	0.65	74.0	0.78
2.5	0.50	30.0	0.70	84.0	0.75
2.5	0.55	30.0	0.70	84.0	0.76
2.5	0.60	30.0	0.70	82.0	0.77
2.5	0.65	30.0	0.70	80.0	0.78
2.5	0.70	30.0	0.70	80.0	0.79

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	7.0	0.50	60.0	0.56
3.0	0.55	7.0	0.50	50.0	0.58
3.0	0.60	7.0	0.50	34.0	0.60
3.0	0.65	7.0	0.50	0.0	0.65
3.0	0.70	7.0	0.50	0.0	0.70
3.0	0.50	7.0	0.55	70.0	0.58
3.0	0.55	7.0	0.55	62.0	0.60
3.0	0.60	7.0	0.55	52.0	0.61
3.0	0.65	7.0	0.55	34.0	0.65
3.0	0.70	7.0	0.55	0.0	0.70
3.0	0.50	7.0	0.60	78.0	0.61
3.0	0.55	7.0	0.60	72.0	0.62
3.0	0.60	7.0	0.60	64.0	0.63
3.0	0.65	7.0	0.60	54.0	0.65
3.0	0.70	7.0	0.60	34.0	0.70
3.0	0.50	7.0	0.65	84.0	0.65
3.0	0.55	7.0	0.65	80.0	0.65
3.0	0.60	7.0	0.65	74.0	0.66
3.0	0.65	7.0	0.65	66.0	0.67
3.0	0.70	7.0	0.65	56.0	0.70
3.0	0.50	7.0	0.70	90.0	0.70
3.0	0.55	7.0	0.70	86.0	0.70
3.0	0.60	7.0	0.70	80.0	0.70
3.0	0.65	7.0	0.70	76.0	0.70
3.0	0.70	7.0	0.70	68.0	0.70
3.0	0.50	8.0	0.50	60.0	0.56
3.0	0.55	8.0	0.50	50.0	0.58
3.0	0.60	8.0	0.50	38.0	0.60
3.0	0.65	8.0	0.50	0.0	0.65
3.0	0.70	8.0	0.50	0.0	0.70
3.0	0.50	8.0	0.55	70.0	0.59
3.0	0.55	8.0	0.55	62.0	0.60
3.0	0.60	8.0	0.55	52.0	0.62
3.0	0.65	8.0	0.55	40.0	0.65
3.0	0.70	8.0	0.55	0.0	0.70
3.0	0.50	8.0	0.60	78.0	0.61
3.0	0.55	8.0	0.60	72.0	0.63
3.0	0.60	8.0	0.60	64.0	0.64
3.0	0.65	8.0	0.60	54.0	0.65
3.0	0.70	8.0	0.60	40.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	8.0	0.65	84.0	0.65
3.0	0.55	8.0	0.65	78.0	0.65
3.0	0.60	8.0	0.65	72.0	0.66
3.0	0.65	8.0	0.65	66.0	0.67
3.0	0.70	8.0	0.65	56.0	0.70
3.0	0.50	8.0	0.70	88.0	0.70
3.0	0.55	8.0	0.70	84.0	0.70
3.0	0.60	8.0	0.70	80.0	0.70
3.0	0.65	8.0	0.70	74.0	0.70
3.0	0.70	8.0	0.70	68.0	0.71
3.0	0.50	9.0	0.50	60.0	0.57
3.0	0.55	9.0	0.50	52.0	0.59
3.0	0.60	9.0	0.50	40.0	0.61
3.0	0.65	9.0	0.50	24.0	0.65
3.0	0.70	9.0	0.50	0.0	0.70
3.0	0.50	9.0	0.55	70.0	0.59
3.0	0.55	9.0	0.55	62.0	0.61
3.0	0.60	9.0	0.55	54.0	0.62
3.0	0.65	9.0	0.55	42.0	0.65
3.0	0.70	9.0	0.55	24.0	0.70
3.0	0.50	9.0	0.60	76.0	0.62
3.0	0.55	9.0	0.60	70.0	0.63
3.0	0.60	9.0	0.60	64.0	0.64
3.0	0.65	9.0	0.60	56.0	0.66
3.0	0.70	9.0	0.60	44.0	0.70
3.0	0.50	9.0	0.65	82.0	0.65
3.0	0.55	9.0	0.65	78.0	0.66
3.0	0.60	9.0	0.65	72.0	0.67
3.0	0.65	9.0	0.65	66.0	0.68
3.0	0.70	9.0	0.65	58.0	0.70
3.0	0.50	9.0	0.70	88.0	0.70
3.0	0.55	9.0	0.70	84.0	0.70
3.0	0.60	9.0	0.70	80.0	0.70
3.0	0.65	9.0	0.70	74.0	0.70
3.0	0.70	9.0	0.70	68.0	0.71
3.0	0.50	10.0	0.50	60.0	0.57
3.0	0.55	10.0	0.50	52.0	0.59
3.0	0.60	10.0	0.50	42.0	0.61
3.0	0.65	10.0	0.50	30.0	0.65
3.0	0.70	10.0	0.50	0.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	10.0	0.55	68.0	0.60
3.0	0.55	10.0	0.55	62.0	0.61
3.0	0.60	10.0	0.55	54.0	0.63
3.0	0.65	10.0	0.55	44.0	0.65
3.0	0.70	10.0	0.55	30.0	0.70
3.0	0.50	10.0	0.60	76.0	0.62
3.0	0.55	10.0	0.60	70.0	0.63
3.0	0.60	10.0	0.60	64.0	0.65
3.0	0.65	10.0	0.60	56.0	0.66
3.0	0.70	10.0	0.60	46.0	0.70
3.0	0.50	10.0	0.65	82.0	0.65
3.0	0.55	10.0	0.65	78.0	0.66
3.0	0.60	10.0	0.65	72.0	0.67
3.0	0.65	10.0	0.65	66.0	0.68
3.0	0.70	10.0	0.65	58.0	0.70
3.0	0.50	10.0	0.70	86.0	0.70
3.0	0.55	10.0	0.70	82.0	0.70
3.0	0.60	10.0	0.70	78.0	0.70
3.0	0.65	10.0	0.70	74.0	0.71
3.0	0.70	10.0	0.70	68.0	0.72
3.0	0.50	11.0	0.50	60.0	0.58
3.0	0.55	11.0	0.50	52.0	0.60
3.0	0.60	11.0	0.50	44.0	0.62
3.0	0.65	11.0	0.50	32.0	0.65
3.0	0.70	11.0	0.50	0.0	0.70
3.0	0.50	11.0	0.55	68.0	0.60
3.0	0.55	11.0	0.55	62.0	0.62
3.0	0.60	11.0	0.55	54.0	0.63
3.0	0.65	11.0	0.55	46.0	0.65
3.0	0.70	11.0	0.55	34.0	0.70
3.0	0.50	11.0	0.60	76.0	0.63
3.0	0.55	11.0	0.60	70.0	0.64
3.0	0.60	11.0	0.60	64.0	0.65
3.0	0.65	11.0	0.60	56.0	0.67
3.0	0.70	11.0	0.60	48.0	0.70
3.0	0.50	11.0	0.65	82.0	0.65
3.0	0.55	11.0	0.65	76.0	0.66
3.0	0.60	11.0	0.65	72.0	0.67
3.0	0.65	11.0	0.65	66.0	0.69
3.0	0.70	11.0	0.65	58.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	11.0	0.70	86.0	0.70
3.0	0.55	11.0	0.70	82.0	0.70
3.0	0.60	11.0	0.70	78.0	0.70
3.0	0.65	11.0	0.70	74.0	0.71
3.0	0.70	11.0	0.70	68.0	0.72
3.0	0.50	12.0	0.50	60.0	0.58
3.0	0.55	12.0	0.50	52.0	0.60
3.0	0.60	12.0	0.50	44.0	0.62
3.0	0.65	12.0	0.50	34.0	0.65
3.0	0.70	12.0	0.50	20.0	0.70
3.0	0.50	12.0	0.55	68.0	0.60
3.0	0.55	12.0	0.55	62.0	0.62
3.0	0.60	12.0	0.55	54.0	0.64
3.0	0.65	12.0	0.55	46.0	0.65
3.0	0.70	12.0	0.55	36.0	0.70
3.0	0.50	12.0	0.60	76.0	0.63
3.0	0.55	12.0	0.60	70.0	0.64
3.0	0.60	12.0	0.60	64.0	0.65
3.0	0.65	12.0	0.60	56.0	0.67
3.0	0.70	12.0	0.60	48.0	0.70
3.0	0.50	12.0	0.65	80.0	0.66
3.0	0.55	12.0	0.65	76.0	0.67
3.0	0.60	12.0	0.65	72.0	0.68
3.0	0.65	12.0	0.65	66.0	0.69
3.0	0.70	12.0	0.65	58.0	0.70
3.0	0.50	12.0	0.70	86.0	0.70
3.0	0.55	12.0	0.70	82.0	0.70
3.0	0.60	12.0	0.70	78.0	0.70
3.0	0.65	12.0	0.70	74.0	0.71
3.0	0.70	12.0	0.70	68.0	0.72
3.0	0.50	13.0	0.50	60.0	0.58
3.0	0.55	13.0	0.50	54.0	0.60
3.0	0.60	13.0	0.50	46.0	0.62
3.0	0.65	13.0	0.50	36.0	0.65
3.0	0.70	13.0	0.50	24.0	0.70
3.0	0.50	13.0	0.55	68.0	0.61
3.0	0.55	13.0	0.55	62.0	0.62
3.0	0.60	13.0	0.55	56.0	0.64
3.0	0.65	13.0	0.55	48.0	0.66
3.0	0.70	13.0	0.55	38.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	13.0	0.60	74.0	0.63
3.0	0.55	13.0	0.60	70.0	0.64
3.0	0.60	13.0	0.60	64.0	0.66
3.0	0.65	13.0	0.60	58.0	0.67
3.0	0.70	13.0	0.60	50.0	0.70
3.0	0.50	13.0	0.65	80.0	0.66
3.0	0.55	13.0	0.65	76.0	0.67
3.0	0.60	13.0	0.65	72.0	0.68
3.0	0.65	13.0	0.65	66.0	0.69
3.0	0.70	13.0	0.65	60.0	0.71
3.0	0.50	13.0	0.70	86.0	0.70
3.0	0.55	13.0	0.70	82.0	0.70
3.0	0.60	13.0	0.70	78.0	0.70
3.0	0.65	13.0	0.70	74.0	0.71
3.0	0.70	13.0	0.70	68.0	0.73
3.0	0.50	14.0	0.50	60.0	0.59
3.0	0.55	14.0	0.50	54.0	0.60
3.0	0.60	14.0	0.50	46.0	0.62
3.0	0.65	14.0	0.50	38.0	0.65
3.0	0.70	14.0	0.50	26.0	0.70
3.0	0.50	14.0	0.55	68.0	0.61
3.0	0.55	14.0	0.55	62.0	0.62
3.0	0.60	14.0	0.55	56.0	0.64
3.0	0.65	14.0	0.55	48.0	0.66
3.0	0.70	14.0	0.55	38.0	0.70
3.0	0.50	14.0	0.60	74.0	0.63
3.0	0.55	14.0	0.60	70.0	0.65
3.0	0.60	14.0	0.60	64.0	0.66
3.0	0.65	14.0	0.60	58.0	0.68
3.0	0.70	14.0	0.60	50.0	0.70
3.0	0.50	14.0	0.65	80.0	0.66
3.0	0.55	14.0	0.65	76.0	0.67
3.0	0.60	14.0	0.65	72.0	0.68
3.0	0.65	14.0	0.65	66.0	0.70
3.0	0.70	14.0	0.65	60.0	0.71
3.0	0.50	14.0	0.70	84.0	0.70
3.0	0.55	14.0	0.70	82.0	0.70
3.0	0.60	14.0	0.70	78.0	0.71
3.0	0.65	14.0	0.70	74.0	0.72
3.0	0.70	14.0	0.70	68.0	0.73

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	26.0	0.55	74.0	0.70
3.0	0.55	26.0	0.55	72.0	0.71
3.0	0.60	26.0	0.55	70.0	0.73
3.0	0.65	26.0	0.55	68.0	0.74
3.0	0.70	26.0	0.55	66.0	0.76
3.0	0.50	26.0	0.60	78.0	0.72
3.0	0.55	26.0	0.60	76.0	0.73
3.0	0.60	26.0	0.60	74.0	0.74
3.0	0.65	26.0	0.60	72.0	0.75
3.0	0.70	26.0	0.60	72.0	0.76
3.0	0.50	26.0	0.65	82.0	0.73
3.0	0.55	26.0	0.65	80.0	0.74
3.0	0.60	26.0	0.65	78.0	0.75
3.0	0.65	26.0	0.65	78.0	0.76
3.0	0.70	26.0	0.65	76.0	0.77
3.0	0.50	26.0	0.70	86.0	0.75
3.0	0.55	26.0	0.70	84.0	0.75
3.0	0.60	26.0	0.70	84.0	0.76
3.0	0.65	26.0	0.70	82.0	0.77
3.0	0.70	26.0	0.70	80.0	0.78
3.0	0.50	27.0	0.50	68.0	0.68
3.0	0.55	27.0	0.50	66.0	0.70
3.0	0.60	27.0	0.50	64.0	0.71
3.0	0.65	27.0	0.50	62.0	0.73
3.0	0.70	27.0	0.50	60.0	0.75
3.0	0.50	27.0	0.55	74.0	0.70
3.0	0.55	27.0	0.55	72.0	0.71
3.0	0.60	27.0	0.55	70.0	0.73
3.0	0.65	27.0	0.55	68.0	0.74
3.0	0.70	27.0	0.55	66.0	0.76
3.0	0.50	27.0	0.60	78.0	0.72
3.0	0.55	27.0	0.60	76.0	0.73
3.0	0.60	27.0	0.60	74.0	0.74
3.0	0.65	27.0	0.60	72.0	0.75
3.0	0.70	27.0	0.60	70.0	0.76
3.0	0.50	27.0	0.65	82.0	0.73
3.0	0.55	27.0	0.65	80.0	0.74
3.0	0.60	27.0	0.65	78.0	0.75
3.0	0.65	27.0	0.65	78.0	0.76
3.0	0.70	27.0	0.65	76.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	27.0	0.70	86.0	0.75
3.0	0.55	27.0	0.70	84.0	0.76
3.0	0.60	27.0	0.70	84.0	0.76
3.0	0.65	27.0	0.70	82.0	0.77
3.0	0.70	27.0	0.70	80.0	0.78
3.0	0.50	28.0	0.50	68.0	0.68
3.0	0.55	28.0	0.50	66.0	0.70
3.0	0.60	28.0	0.50	64.0	0.72
3.0	0.65	28.0	0.50	62.0	0.73
3.0	0.70	28.0	0.50	60.0	0.75
3.0	0.50	28.0	0.55	74.0	0.70
3.0	0.55	28.0	0.55	72.0	0.71
3.0	0.60	28.0	0.55	70.0	0.73
3.0	0.65	28.0	0.55	68.0	0.74
3.0	0.70	28.0	0.55	66.0	0.76
3.0	0.50	28.0	0.60	78.0	0.72
3.0	0.55	28.0	0.60	76.0	0.73
3.0	0.60	28.0	0.60	74.0	0.74
3.0	0.65	28.0	0.60	72.0	0.75
3.0	0.70	28.0	0.60	70.0	0.76
3.0	0.50	28.0	0.65	82.0	0.73
3.0	0.55	28.0	0.65	80.0	0.74
3.0	0.60	28.0	0.65	78.0	0.75
3.0	0.65	28.0	0.65	78.0	0.76
3.0	0.70	28.0	0.65	76.0	0.77
3.0	0.50	28.0	0.70	86.0	0.75
3.0	0.55	28.0	0.70	84.0	0.76
3.0	0.60	28.0	0.70	82.0	0.76
3.0	0.65	28.0	0.70	82.0	0.77
3.0	0.70	28.0	0.70	80.0	0.78
3.0	0.50	29.0	0.50	68.0	0.68
3.0	0.55	29.0	0.50	66.0	0.70
3.0	0.60	29.0	0.50	64.0	0.72
3.0	0.65	29.0	0.50	62.0	0.73
3.0	0.70	29.0	0.50	60.0	0.75
3.0	0.50	29.0	0.55	74.0	0.70
3.0	0.55	29.0	0.55	72.0	0.71
3.0	0.60	29.0	0.55	70.0	0.73
3.0	0.65	29.0	0.55	68.0	0.74
3.0	0.70	29.0	0.55	66.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.0	0.50	29.0	0.60	78.0	0.72
3.0	0.55	29.0	0.60	76.0	0.73
3.0	0.60	29.0	0.60	74.0	0.74
3.0	0.65	29.0	0.60	72.0	0.75
3.0	0.70	29.0	0.60	70.0	0.77
3.0	0.50	29.0	0.65	82.0	0.73
3.0	0.55	29.0	0.65	80.0	0.74
3.0	0.60	29.0	0.65	78.0	0.75
3.0	0.65	29.0	0.65	76.0	0.76
3.0	0.70	29.0	0.65	76.0	0.78
3.0	0.50	29.0	0.70	86.0	0.75
3.0	0.55	29.0	0.70	84.0	0.76
3.0	0.60	29.0	0.70	82.0	0.76
3.0	0.65	29.0	0.70	82.0	0.78
3.0	0.70	29.0	0.70	80.0	0.78
3.0	0.50	30.0	0.50	68.0	0.68
3.0	0.55	30.0	0.50	66.0	0.70
3.0	0.60	30.0	0.50	64.0	0.72
3.0	0.65	30.0	0.50	62.0	0.73
3.0	0.70	30.0	0.50	60.0	0.75
3.0	0.50	30.0	0.55	72.0	0.70
3.0	0.55	30.0	0.55	70.0	0.71
3.0	0.60	30.0	0.55	70.0	0.73
3.0	0.65	30.0	0.55	68.0	0.74
3.0	0.70	30.0	0.55	66.0	0.76
3.0	0.50	30.0	0.60	78.0	0.72
3.0	0.55	30.0	0.60	76.0	0.73
3.0	0.60	30.0	0.60	74.0	0.74
3.0	0.65	30.0	0.60	72.0	0.75
3.0	0.70	30.0	0.60	70.0	0.77
3.0	0.50	30.0	0.65	82.0	0.73
3.0	0.55	30.0	0.65	80.0	0.75
3.0	0.60	30.0	0.65	78.0	0.75
3.0	0.65	30.0	0.65	76.0	0.76
3.0	0.70	30.0	0.65	76.0	0.78
3.0	0.50	30.0	0.70	86.0	0.75
3.0	0.55	30.0	0.70	84.0	0.76
3.0	0.60	30.0	0.70	82.0	0.77
3.0	0.65	30.0	0.70	82.0	0.78
3.0	0.70	30.0	0.70	80.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	7.0	0.50	60.0	0.55
3.5	0.55	7.0	0.50	46.0	0.57
3.5	0.60	7.0	0.50	0.0	0.60
3.5	0.65	7.0	0.50	0.0	0.65
3.5	0.70	7.0	0.50	0.0	0.70
3.5	0.50	7.0	0.55	72.0	0.58
3.5	0.55	7.0	0.55	62.0	0.59
3.5	0.60	7.0	0.55	48.0	0.61
3.5	0.65	7.0	0.55	0.0	0.65
3.5	0.70	7.0	0.55	0.0	0.70
3.5	0.50	7.0	0.60	80.0	0.60
3.5	0.55	7.0	0.60	72.0	0.61
3.5	0.60	7.0	0.60	64.0	0.63
3.5	0.65	7.0	0.60	50.0	0.65
3.5	0.70	7.0	0.60	0.0	0.70
3.5	0.50	7.0	0.65	86.0	0.65
3.5	0.55	7.0	0.65	82.0	0.65
3.5	0.60	7.0	0.65	74.0	0.65
3.5	0.65	7.0	0.65	66.0	0.66
3.5	0.70	7.0	0.65	52.0	0.70
3.5	0.50	7.0	0.70	92.0	0.70
3.5	0.55	7.0	0.70	88.0	0.70
3.5	0.60	7.0	0.70	82.0	0.70
3.5	0.65	7.0	0.70	76.0	0.70
3.5	0.70	7.0	0.70	68.0	0.70
3.5	0.50	8.0	0.50	60.0	0.56
3.5	0.55	8.0	0.50	48.0	0.58
3.5	0.60	8.0	0.50	32.0	0.60
3.5	0.65	8.0	0.50	0.0	0.65
3.5	0.70	8.0	0.50	0.0	0.70
3.5	0.50	8.0	0.55	70.0	0.58
3.5	0.55	8.0	0.55	62.0	0.60
3.5	0.60	8.0	0.55	50.0	0.61
3.5	0.65	8.0	0.55	32.0	0.65
3.5	0.70	8.0	0.55	0.0	0.70
3.5	0.50	8.0	0.60	78.0	0.61
3.5	0.55	8.0	0.60	72.0	0.62
3.5	0.60	8.0	0.60	64.0	0.63
3.5	0.65	8.0	0.60	52.0	0.65
3.5	0.70	8.0	0.60	32.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	8.0	0.65	84.0	0.65
3.5	0.55	8.0	0.65	80.0	0.65
3.5	0.60	8.0	0.65	74.0	0.66
3.5	0.65	8.0	0.65	66.0	0.67
3.5	0.70	8.0	0.65	54.0	0.70
3.5	0.50	8.0	0.70	90.0	0.70
3.5	0.55	8.0	0.70	86.0	0.70
3.5	0.60	8.0	0.70	82.0	0.70
3.5	0.65	8.0	0.70	76.0	0.70
3.5	0.70	8.0	0.70	68.0	0.70
3.5	0.50	9.0	0.50	60.0	0.56
3.5	0.55	9.0	0.50	50.0	0.58
3.5	0.60	9.0	0.50	38.0	0.60
3.5	0.65	9.0	0.50	0.0	0.65
3.5	0.70	9.0	0.50	0.0	0.70
3.5	0.50	9.0	0.55	70.0	0.59
3.5	0.55	9.0	0.55	62.0	0.60
3.5	0.60	9.0	0.55	52.0	0.62
3.5	0.65	9.0	0.55	38.0	0.65
3.5	0.70	9.0	0.55	0.0	0.70
3.5	0.50	9.0	0.60	78.0	0.61
3.5	0.55	9.0	0.60	72.0	0.62
3.5	0.60	9.0	0.60	64.0	0.64
3.5	0.65	9.0	0.60	54.0	0.65
3.5	0.70	9.0	0.60	40.0	0.70
3.5	0.50	9.0	0.65	84.0	0.65
3.5	0.55	9.0	0.65	78.0	0.65
3.5	0.60	9.0	0.65	72.0	0.66
3.5	0.65	9.0	0.65	66.0	0.67
3.5	0.70	9.0	0.65	56.0	0.70
3.5	0.50	9.0	0.70	88.0	0.70
3.5	0.55	9.0	0.70	84.0	0.70
3.5	0.60	9.0	0.70	80.0	0.70
3.5	0.65	9.0	0.70	74.0	0.70
3.5	0.70	9.0	0.70	68.0	0.71
3.5	0.50	10.0	0.50	60.0	0.57
3.5	0.55	10.0	0.50	52.0	0.59
3.5	0.60	10.0	0.50	40.0	0.61
3.5	0.65	10.0	0.50	20.0	0.65
3.5	0.70	10.0	0.50	0.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	10.0	0.55	70.0	0.59
3.5	0.55	10.0	0.55	62.0	0.61
3.5	0.60	10.0	0.55	54.0	0.62
3.5	0.65	10.0	0.55	42.0	0.65
3.5	0.70	10.0	0.55	14.0	0.70
3.5	0.50	10.0	0.60	76.0	0.62
3.5	0.55	10.0	0.60	70.0	0.63
3.5	0.60	10.0	0.60	64.0	0.64
3.5	0.65	10.0	0.60	56.0	0.66
3.5	0.70	10.0	0.60	42.0	0.70
3.5	0.50	10.0	0.65	82.0	0.65
3.5	0.55	10.0	0.65	78.0	0.65
3.5	0.60	10.0	0.65	72.0	0.66
3.5	0.65	10.0	0.65	66.0	0.68
3.5	0.70	10.0	0.65	58.0	0.70
3.5	0.50	10.0	0.70	88.0	0.70
3.5	0.55	10.0	0.70	84.0	0.70
3.5	0.60	10.0	0.70	80.0	0.70
3.5	0.65	10.0	0.70	74.0	0.70
3.5	0.70	10.0	0.70	68.0	0.71
3.5	0.50	11.0	0.50	60.0	0.57
3.5	0.55	11.0	0.50	52.0	0.59
3.5	0.60	11.0	0.50	42.0	0.61
3.5	0.65	11.0	0.50	28.0	0.65
3.5	0.70	11.0	0.50	0.0	0.70
3.5	0.50	11.0	0.55	70.0	0.59
3.5	0.55	11.0	0.55	62.0	0.61
3.5	0.60	11.0	0.55	54.0	0.63
3.5	0.65	11.0	0.55	44.0	0.65
3.5	0.70	11.0	0.55	28.0	0.70
3.5	0.50	11.0	0.60	76.0	0.62
3.5	0.55	11.0	0.60	70.0	0.63
3.5	0.60	11.0	0.60	64.0	0.65
3.5	0.65	11.0	0.60	56.0	0.66
3.5	0.70	11.0	0.60	46.0	0.70
3.5	0.50	11.0	0.65	82.0	0.65
3.5	0.55	11.0	0.65	78.0	0.66
3.5	0.60	11.0	0.65	72.0	0.67
3.5	0.65	11.0	0.65	66.0	0.68
3.5	0.70	11.0	0.65	58.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	11.0	0.70	86.0	0.70
3.5	0.55	11.0	0.70	84.0	0.70
3.5	0.60	11.0	0.70	80.0	0.70
3.5	0.65	11.0	0.70	74.0	0.70
3.5	0.70	11.0	0.70	68.0	0.71
3.5	0.50	12.0	0.50	60.0	0.58
3.5	0.55	12.0	0.50	52.0	0.59
3.5	0.60	12.0	0.50	42.0	0.61
3.5	0.65	12.0	0.50	30.0	0.65
3.5	0.70	12.0	0.50	0.0	0.70
3.5	0.50	12.0	0.55	68.0	0.60
3.5	0.55	12.0	0.55	62.0	0.61
3.5	0.60	12.0	0.55	54.0	0.63
3.5	0.65	12.0	0.55	44.0	0.65
3.5	0.70	12.0	0.55	32.0	0.70
3.5	0.50	12.0	0.60	76.0	0.62
3.5	0.55	12.0	0.60	70.0	0.64
3.5	0.60	12.0	0.60	64.0	0.65
3.5	0.65	12.0	0.60	56.0	0.66
3.5	0.70	12.0	0.60	46.0	0.70
3.5	0.50	12.0	0.65	82.0	0.65
3.5	0.55	12.0	0.65	78.0	0.66
3.5	0.60	12.0	0.65	72.0	0.67
3.5	0.65	12.0	0.65	66.0	0.68
3.5	0.70	12.0	0.65	58.0	0.70
3.5	0.50	12.0	0.70	86.0	0.70
3.5	0.55	12.0	0.70	82.0	0.70
3.5	0.60	12.0	0.70	78.0	0.70
3.5	0.65	12.0	0.70	74.0	0.71
3.5	0.70	12.0	0.70	68.0	0.72
3.5	0.50	13.0	0.50	60.0	0.58
3.5	0.55	13.0	0.50	52.0	0.60
3.5	0.60	13.0	0.50	44.0	0.62
3.5	0.65	13.0	0.50	34.0	0.65
3.5	0.70	13.0	0.50	10.0	0.70
3.5	0.50	13.0	0.55	68.0	0.60
3.5	0.55	13.0	0.55	62.0	0.62
3.5	0.60	13.0	0.55	54.0	0.63
3.5	0.65	13.0	0.55	46.0	0.65
3.5	0.70	13.0	0.55	34.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	13.0	0.60	76.0	0.63
3.5	0.55	13.0	0.60	70.0	0.64
3.5	0.60	13.0	0.60	64.0	0.65
3.5	0.65	13.0	0.60	56.0	0.67
3.5	0.70	13.0	0.60	48.0	0.70
3.5	0.50	13.0	0.65	82.0	0.65
3.5	0.55	13.0	0.65	76.0	0.66
3.5	0.60	13.0	0.65	72.0	0.67
3.5	0.65	13.0	0.65	66.0	0.69
3.5	0.70	13.0	0.65	58.0	0.70
3.5	0.50	13.0	0.70	86.0	0.70
3.5	0.55	13.0	0.70	82.0	0.70
3.5	0.60	13.0	0.70	78.0	0.70
3.5	0.65	13.0	0.70	74.0	0.71
3.5	0.70	13.0	0.70	68.0	0.72
3.5	0.50	14.0	0.50	60.0	0.58
3.5	0.55	14.0	0.50	52.0	0.60
3.5	0.60	14.0	0.50	44.0	0.62
3.5	0.65	14.0	0.50	34.0	0.65
3.5	0.70	14.0	0.50	20.0	0.70
3.5	0.50	14.0	0.55	68.0	0.60
3.5	0.55	14.0	0.55	62.0	0.62
3.5	0.60	14.0	0.55	54.0	0.64
3.5	0.65	14.0	0.55	46.0	0.65
3.5	0.70	14.0	0.55	36.0	0.70
3.5	0.50	14.0	0.60	76.0	0.63
3.5	0.55	14.0	0.60	70.0	0.64
3.5	0.60	14.0	0.60	64.0	0.65
3.5	0.65	14.0	0.60	56.0	0.67
3.5	0.70	14.0	0.60	48.0	0.70
3.5	0.50	14.0	0.65	80.0	0.66
3.5	0.55	14.0	0.65	76.0	0.67
3.5	0.60	14.0	0.65	72.0	0.68
3.5	0.65	14.0	0.65	66.0	0.69
3.5	0.70	14.0	0.65	58.0	0.70
3.5	0.50	14.0	0.70	86.0	0.70
3.5	0.55	14.0	0.70	82.0	0.70
3.5	0.60	14.0	0.70	78.0	0.70
3.5	0.65	14.0	0.70	74.0	0.71
3.5	0.70	14.0	0.70	68.0	0.72

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	15.0	0.50	60.0	0.58
3.5	0.55	15.0	0.50	54.0	0.60
3.5	0.60	15.0	0.50	46.0	0.62
3.5	0.65	15.0	0.50	36.0	0.65
3.5	0.70	15.0	0.50	24.0	0.70
3.5	0.50	15.0	0.55	68.0	0.61
3.5	0.55	15.0	0.55	62.0	0.62
3.5	0.60	15.0	0.55	56.0	0.64
3.5	0.65	15.0	0.55	48.0	0.66
3.5	0.70	15.0	0.55	38.0	0.70
3.5	0.50	15.0	0.60	74.0	0.63
3.5	0.55	15.0	0.60	70.0	0.64
3.5	0.60	15.0	0.60	64.0	0.66
3.5	0.65	15.0	0.60	58.0	0.67
3.5	0.70	15.0	0.60	50.0	0.70
3.5	0.50	15.0	0.65	80.0	0.66
3.5	0.55	15.0	0.65	76.0	0.67
3.5	0.60	15.0	0.65	72.0	0.68
3.5	0.65	15.0	0.65	66.0	0.69
3.5	0.70	15.0	0.65	60.0	0.71
3.5	0.50	15.0	0.70	86.0	0.70
3.5	0.55	15.0	0.70	82.0	0.70
3.5	0.60	15.0	0.70	78.0	0.70
3.5	0.65	15.0	0.70	74.0	0.71
3.5	0.70	15.0	0.70	68.0	0.73
3.5	0.50	16.0	0.50	60.0	0.59
3.5	0.55	16.0	0.50	54.0	0.60
3.5	0.60	16.0	0.50	46.0	0.62
3.5	0.65	16.0	0.50	38.0	0.65
3.5	0.70	16.0	0.50	26.0	0.70
3.5	0.50	16.0	0.55	68.0	0.61
3.5	0.55	16.0	0.55	62.0	0.62
3.5	0.60	16.0	0.55	56.0	0.64
3.5	0.65	16.0	0.55	48.0	0.66
3.5	0.70	16.0	0.55	38.0	0.70
3.5	0.50	16.0	0.60	74.0	0.63
3.5	0.55	16.0	0.60	70.0	0.65
3.5	0.60	16.0	0.60	64.0	0.66
3.5	0.65	16.0	0.60	58.0	0.68
3.5	0.70	16.0	0.60	50.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	16.0	0.65	80.0	0.66
3.5	0.55	16.0	0.65	76.0	0.67
3.5	0.60	16.0	0.65	72.0	0.68
3.5	0.65	16.0	0.65	66.0	0.69
3.5	0.70	16.0	0.65	60.0	0.71
3.5	0.50	16.0	0.70	84.0	0.70
3.5	0.55	16.0	0.70	82.0	0.70
3.5	0.60	16.0	0.70	78.0	0.71
3.5	0.65	16.0	0.70	74.0	0.72
3.5	0.70	16.0	0.70	68.0	0.73
3.5	0.50	17.0	0.50	60.0	0.59
3.5	0.55	17.0	0.50	54.0	0.61
3.5	0.60	17.0	0.50	46.0	0.63
3.5	0.65	17.0	0.50	38.0	0.65
3.5	0.70	17.0	0.50	28.0	0.70
3.5	0.50	17.0	0.55	68.0	0.61
3.5	0.55	17.0	0.55	62.0	0.63
3.5	0.60	17.0	0.55	56.0	0.64
3.5	0.65	17.0	0.55	48.0	0.66
3.5	0.70	17.0	0.55	40.0	0.70
3.5	0.50	17.0	0.60	74.0	0.63
3.5	0.55	17.0	0.60	70.0	0.65
3.5	0.60	17.0	0.60	64.0	0.66
3.5	0.65	17.0	0.60	58.0	0.68
3.5	0.70	17.0	0.60	50.0	0.70
3.5	0.50	17.0	0.65	80.0	0.66
3.5	0.55	17.0	0.65	76.0	0.67
3.5	0.60	17.0	0.65	72.0	0.68
3.5	0.65	17.0	0.65	66.0	0.70
3.5	0.70	17.0	0.65	60.0	0.71
3.5	0.50	17.0	0.70	84.0	0.70
3.5	0.55	17.0	0.70	82.0	0.70
3.5	0.60	17.0	0.70	78.0	0.71
3.5	0.65	17.0	0.70	74.0	0.72
3.5	0.70	17.0	0.70	68.0	0.73
3.5	0.50	18.0	0.50	70.0	0.67
3.5	0.55	18.0	0.50	68.0	0.68
3.5	0.60	18.0	0.50	66.0	0.70
3.5	0.65	18.0	0.50	64.0	0.71
3.5	0.70	18.0	0.50	62.0	0.73

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	18.0	0.55	76.0	0.68
3.5	0.55	18.0	0.55	74.0	0.70
3.5	0.60	18.0	0.55	72.0	0.71
3.5	0.65	18.0	0.55	70.0	0.72
3.5	0.70	18.0	0.55	68.0	0.74
3.5	0.50	18.0	0.60	80.0	0.70
3.5	0.55	18.0	0.60	78.0	0.71
3.5	0.60	18.0	0.60	76.0	0.72
3.5	0.65	18.0	0.60	76.0	0.73
3.5	0.70	18.0	0.60	74.0	0.74
3.5	0.50	18.0	0.65	84.0	0.71
3.5	0.55	18.0	0.65	82.0	0.72
3.5	0.60	18.0	0.65	82.0	0.73
3.5	0.65	18.0	0.65	80.0	0.74
3.5	0.70	18.0	0.65	80.0	0.75
3.5	0.50	18.0	0.70	88.0	0.73
3.5	0.55	18.0	0.70	88.0	0.74
3.5	0.60	18.0	0.70	86.0	0.74
3.5	0.65	18.0	0.70	86.0	0.75
3.5	0.70	18.0	0.70	84.0	0.75
3.5	0.50	19.0	0.50	70.0	0.67
3.5	0.55	19.0	0.50	68.0	0.69
3.5	0.60	19.0	0.50	66.0	0.70
3.5	0.65	19.0	0.50	64.0	0.72
3.5	0.70	19.0	0.50	62.0	0.73
3.5	0.50	19.0	0.55	76.0	0.68
3.5	0.55	19.0	0.55	74.0	0.70
3.5	0.60	19.0	0.55	72.0	0.71
3.5	0.65	19.0	0.55	70.0	0.73
3.5	0.70	19.0	0.55	68.0	0.74
3.5	0.50	19.0	0.60	80.0	0.70
3.5	0.55	19.0	0.60	78.0	0.71
3.5	0.60	19.0	0.60	76.0	0.72
3.5	0.65	19.0	0.60	74.0	0.73
3.5	0.70	19.0	0.60	74.0	0.75
3.5	0.50	19.0	0.65	84.0	0.72
3.5	0.55	19.0	0.65	82.0	0.72
3.5	0.60	19.0	0.65	82.0	0.73
3.5	0.65	19.0	0.65	80.0	0.74
3.5	0.70	19.0	0.65	78.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	19.0	0.70	88.0	0.73
3.5	0.55	19.0	0.70	86.0	0.74
3.5	0.60	19.0	0.70	86.0	0.74
3.5	0.65	19.0	0.70	84.0	0.75
3.5	0.70	19.0	0.70	84.0	0.76
3.5	0.50	20.0	0.50	70.0	0.67
3.5	0.55	20.0	0.50	68.0	0.69
3.5	0.60	20.0	0.50	66.0	0.70
3.5	0.65	20.0	0.50	64.0	0.72
3.5	0.70	20.0	0.50	62.0	0.73
3.5	0.50	20.0	0.55	74.0	0.69
3.5	0.55	20.0	0.55	72.0	0.70
3.5	0.60	20.0	0.55	72.0	0.71
3.5	0.65	20.0	0.55	70.0	0.73
3.5	0.70	20.0	0.55	68.0	0.74
3.5	0.50	20.0	0.60	80.0	0.70
3.5	0.55	20.0	0.60	78.0	0.71
3.5	0.60	20.0	0.60	76.0	0.72
3.5	0.65	20.0	0.60	74.0	0.74
3.5	0.70	20.0	0.60	74.0	0.75
3.5	0.50	20.0	0.65	84.0	0.72
3.5	0.55	20.0	0.65	82.0	0.73
3.5	0.60	20.0	0.65	80.0	0.73
3.5	0.65	20.0	0.65	80.0	0.75
3.5	0.70	20.0	0.65	78.0	0.75
3.5	0.50	20.0	0.70	88.0	0.73
3.5	0.55	20.0	0.70	86.0	0.74
3.5	0.60	20.0	0.70	86.0	0.75
3.5	0.65	20.0	0.70	84.0	0.75
3.5	0.70	20.0	0.70	84.0	0.76
3.5	0.50	21.0	0.50	70.0	0.67
3.5	0.55	21.0	0.50	68.0	0.69
3.5	0.60	21.0	0.50	66.0	0.71
3.5	0.65	21.0	0.50	64.0	0.72
3.5	0.70	21.0	0.50	62.0	0.74
3.5	0.50	21.0	0.55	74.0	0.69
3.5	0.55	21.0	0.55	72.0	0.70
3.5	0.60	21.0	0.55	70.0	0.71
3.5	0.65	21.0	0.55	70.0	0.73
3.5	0.70	21.0	0.55	68.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	21.0	0.60	80.0	0.70
3.5	0.55	21.0	0.60	78.0	0.72
3.5	0.60	21.0	0.60	76.0	0.73
3.5	0.65	21.0	0.60	74.0	0.74
3.5	0.70	21.0	0.60	72.0	0.75
3.5	0.50	21.0	0.65	84.0	0.72
3.5	0.55	21.0	0.65	82.0	0.73
3.5	0.60	21.0	0.65	80.0	0.74
3.5	0.65	21.0	0.65	80.0	0.75
3.5	0.70	21.0	0.65	78.0	0.76
3.5	0.50	21.0	0.70	88.0	0.74
3.5	0.55	21.0	0.70	86.0	0.74
3.5	0.60	21.0	0.70	86.0	0.75
3.5	0.65	21.0	0.70	84.0	0.76
3.5	0.70	21.0	0.70	84.0	0.76
3.5	0.50	22.0	0.50	70.0	0.68
3.5	0.55	22.0	0.50	68.0	0.69
3.5	0.60	22.0	0.50	66.0	0.71
3.5	0.65	22.0	0.50	64.0	0.72
3.5	0.70	22.0	0.50	62.0	0.74
3.5	0.50	22.0	0.55	74.0	0.69
3.5	0.55	22.0	0.55	72.0	0.70
3.5	0.60	22.0	0.55	70.0	0.72
3.5	0.65	22.0	0.55	68.0	0.73
3.5	0.70	22.0	0.55	68.0	0.74
3.5	0.50	22.0	0.60	78.0	0.70
3.5	0.55	22.0	0.60	78.0	0.72
3.5	0.60	22.0	0.60	76.0	0.73
3.5	0.65	22.0	0.60	74.0	0.74
3.5	0.70	22.0	0.60	72.0	0.75
3.5	0.50	22.0	0.65	84.0	0.72
3.5	0.55	22.0	0.65	82.0	0.73
3.5	0.60	22.0	0.65	80.0	0.74
3.5	0.65	22.0	0.65	78.0	0.75
3.5	0.70	22.0	0.65	78.0	0.76
3.5	0.50	22.0	0.70	88.0	0.74
3.5	0.55	22.0	0.70	86.0	0.74
3.5	0.60	22.0	0.70	84.0	0.75
3.5	0.65	22.0	0.70	84.0	0.76
3.5	0.70	22.0	0.70	82.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	23.0	0.50	70.0	0.68
3.5	0.55	23.0	0.50	68.0	0.69
3.5	0.60	23.0	0.50	66.0	0.71
3.5	0.65	23.0	0.50	64.0	0.72
3.5	0.70	23.0	0.50	62.0	0.74
3.5	0.50	23.0	0.55	74.0	0.69
3.5	0.55	23.0	0.55	72.0	0.70
3.5	0.60	23.0	0.55	70.0	0.72
3.5	0.65	23.0	0.55	68.0	0.73
3.5	0.70	23.0	0.55	66.0	0.74
3.5	0.50	23.0	0.60	78.0	0.70
3.5	0.55	23.0	0.60	78.0	0.72
3.5	0.60	23.0	0.60	76.0	0.73
3.5	0.65	23.0	0.60	74.0	0.74
3.5	0.70	23.0	0.60	72.0	0.75
3.5	0.50	23.0	0.65	82.0	0.72
3.5	0.55	23.0	0.65	82.0	0.73
3.5	0.60	23.0	0.65	80.0	0.74
3.5	0.65	23.0	0.65	78.0	0.75
3.5	0.70	23.0	0.65	78.0	0.76
3.5	0.50	23.0	0.70	88.0	0.74
3.5	0.55	23.0	0.70	86.0	0.75
3.5	0.60	23.0	0.70	84.0	0.75
3.5	0.65	23.0	0.70	84.0	0.76
3.5	0.70	23.0	0.70	82.0	0.77
3.5	0.50	24.0	0.50	70.0	0.68
3.5	0.55	24.0	0.50	68.0	0.69
3.5	0.60	24.0	0.50	66.0	0.71
3.5	0.65	24.0	0.50	64.0	0.72
3.5	0.70	24.0	0.50	62.0	0.74
3.5	0.50	24.0	0.55	74.0	0.69
3.5	0.55	24.0	0.55	72.0	0.71
3.5	0.60	24.0	0.55	70.0	0.72
3.5	0.65	24.0	0.55	68.0	0.73
3.5	0.70	24.0	0.55	66.0	0.75
3.5	0.50	24.0	0.60	78.0	0.71
3.5	0.55	24.0	0.60	76.0	0.72
3.5	0.60	24.0	0.60	76.0	0.73
3.5	0.65	24.0	0.60	74.0	0.74
3.5	0.70	24.0	0.60	72.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	24.0	0.65	82.0	0.72
3.5	0.55	24.0	0.65	82.0	0.73
3.5	0.60	24.0	0.65	80.0	0.74
3.5	0.65	24.0	0.65	78.0	0.75
3.5	0.70	24.0	0.65	78.0	0.76
3.5	0.50	24.0	0.70	86.0	0.74
3.5	0.55	24.0	0.70	86.0	0.75
3.5	0.60	24.0	0.70	84.0	0.75
3.5	0.65	24.0	0.70	84.0	0.76
3.5	0.70	24.0	0.70	82.0	0.77
3.5	0.50	25.0	0.50	70.0	0.68
3.5	0.55	25.0	0.50	68.0	0.69
3.5	0.60	25.0	0.50	66.0	0.71
3.5	0.65	25.0	0.50	64.0	0.72
3.5	0.70	25.0	0.50	62.0	0.74
3.5	0.50	25.0	0.55	74.0	0.69
3.5	0.55	25.0	0.55	72.0	0.71
3.5	0.60	25.0	0.55	70.0	0.72
3.5	0.65	25.0	0.55	68.0	0.73
3.5	0.70	25.0	0.55	66.0	0.75
3.5	0.50	25.0	0.60	78.0	0.71
3.5	0.55	25.0	0.60	76.0	0.72
3.5	0.60	25.0	0.60	74.0	0.73
3.5	0.65	25.0	0.60	74.0	0.75
3.5	0.70	25.0	0.60	72.0	0.76
3.5	0.50	25.0	0.65	82.0	0.72
3.5	0.55	25.0	0.65	82.0	0.73
3.5	0.60	25.0	0.65	80.0	0.75
3.5	0.65	25.0	0.65	78.0	0.75
3.5	0.70	25.0	0.65	76.0	0.76
3.5	0.50	25.0	0.70	86.0	0.74
3.5	0.55	25.0	0.70	86.0	0.75
3.5	0.60	25.0	0.70	84.0	0.76
3.5	0.65	25.0	0.70	84.0	0.76
3.5	0.70	25.0	0.70	82.0	0.77
3.5	0.50	26.0	0.50	70.0	0.68
3.5	0.55	26.0	0.50	66.0	0.69
3.5	0.60	26.0	0.50	64.0	0.71
3.5	0.65	26.0	0.50	62.0	0.72
3.5	0.70	26.0	0.50	62.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	26.0	0.55	74.0	0.70
3.5	0.55	26.0	0.55	72.0	0.71
3.5	0.60	26.0	0.55	70.0	0.72
3.5	0.65	26.0	0.55	68.0	0.74
3.5	0.70	26.0	0.55	66.0	0.75
3.5	0.50	26.0	0.60	78.0	0.71
3.5	0.55	26.0	0.60	76.0	0.72
3.5	0.60	26.0	0.60	74.0	0.73
3.5	0.65	26.0	0.60	74.0	0.75
3.5	0.70	26.0	0.60	72.0	0.76
3.5	0.50	26.0	0.65	82.0	0.73
3.5	0.55	26.0	0.65	80.0	0.73
3.5	0.60	26.0	0.65	80.0	0.75
3.5	0.65	26.0	0.65	78.0	0.76
3.5	0.70	26.0	0.65	76.0	0.77
3.5	0.50	26.0	0.70	86.0	0.74
3.5	0.55	26.0	0.70	86.0	0.75
3.5	0.60	26.0	0.70	84.0	0.76
3.5	0.65	26.0	0.70	82.0	0.76
3.5	0.70	26.0	0.70	82.0	0.77
3.5	0.50	27.0	0.50	68.0	0.68
3.5	0.55	27.0	0.50	66.0	0.69
3.5	0.60	27.0	0.50	64.0	0.71
3.5	0.65	27.0	0.50	62.0	0.73
3.5	0.70	27.0	0.50	62.0	0.74
3.5	0.50	27.0	0.55	74.0	0.70
3.5	0.55	27.0	0.55	72.0	0.71
3.5	0.60	27.0	0.55	70.0	0.72
3.5	0.65	27.0	0.55	68.0	0.74
3.5	0.70	27.0	0.55	66.0	0.75
3.5	0.50	27.0	0.60	78.0	0.71
3.5	0.55	27.0	0.60	76.0	0.72
3.5	0.60	27.0	0.60	74.0	0.73
3.5	0.65	27.0	0.60	74.0	0.75
3.5	0.70	27.0	0.60	72.0	0.76
3.5	0.50	27.0	0.65	82.0	0.73
3.5	0.55	27.0	0.65	80.0	0.74
3.5	0.60	27.0	0.65	80.0	0.75
3.5	0.65	27.0	0.65	78.0	0.76
3.5	0.70	27.0	0.65	76.0	0.77

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	27.0	0.70	86.0	0.74
3.5	0.55	27.0	0.70	86.0	0.75
3.5	0.60	27.0	0.70	84.0	0.76
3.5	0.65	27.0	0.70	82.0	0.77
3.5	0.70	27.0	0.70	82.0	0.78
3.5	0.50	28.0	0.50	68.0	0.68
3.5	0.55	28.0	0.50	66.0	0.69
3.5	0.60	28.0	0.50	64.0	0.71
3.5	0.65	28.0	0.50	62.0	0.73
3.5	0.70	28.0	0.50	60.0	0.74
3.5	0.50	28.0	0.55	74.0	0.70
3.5	0.55	28.0	0.55	72.0	0.71
3.5	0.60	28.0	0.55	70.0	0.73
3.5	0.65	28.0	0.55	68.0	0.74
3.5	0.70	28.0	0.55	66.0	0.75
3.5	0.50	28.0	0.60	78.0	0.71
3.5	0.55	28.0	0.60	76.0	0.72
3.5	0.60	28.0	0.60	74.0	0.74
3.5	0.65	28.0	0.60	72.0	0.75
3.5	0.70	28.0	0.60	72.0	0.76
3.5	0.50	28.0	0.65	82.0	0.73
3.5	0.55	28.0	0.65	80.0	0.74
3.5	0.60	28.0	0.65	80.0	0.75
3.5	0.65	28.0	0.65	78.0	0.76
3.5	0.70	28.0	0.65	76.0	0.77
3.5	0.50	28.0	0.70	86.0	0.74
3.5	0.55	28.0	0.70	84.0	0.75
3.5	0.60	28.0	0.70	84.0	0.76
3.5	0.65	28.0	0.70	82.0	0.77
3.5	0.70	28.0	0.70	82.0	0.78
3.5	0.50	29.0	0.50	68.0	0.68
3.5	0.55	29.0	0.50	66.0	0.70
3.5	0.60	29.0	0.50	64.0	0.71
3.5	0.65	29.0	0.50	62.0	0.73
3.5	0.70	29.0	0.50	60.0	0.74
3.5	0.50	29.0	0.55	74.0	0.70
3.5	0.55	29.0	0.55	72.0	0.71
3.5	0.60	29.0	0.55	70.0	0.73
3.5	0.65	29.0	0.55	68.0	0.74
3.5	0.70	29.0	0.55	66.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
3.5	0.50	29.0	0.60	78.0	0.71
3.5	0.55	29.0	0.60	76.0	0.73
3.5	0.60	29.0	0.60	74.0	0.74
3.5	0.65	29.0	0.60	72.0	0.75
3.5	0.70	29.0	0.60	72.0	0.76
3.5	0.50	29.0	0.65	82.0	0.73
3.5	0.55	29.0	0.65	80.0	0.74
3.5	0.60	29.0	0.65	80.0	0.75
3.5	0.65	29.0	0.65	78.0	0.76
3.5	0.70	29.0	0.65	76.0	0.77
3.5	0.50	29.0	0.70	86.0	0.75
3.5	0.55	29.0	0.70	84.0	0.75
3.5	0.60	29.0	0.70	84.0	0.76
3.5	0.65	29.0	0.70	82.0	0.77
3.5	0.70	29.0	0.70	82.0	0.78
3.5	0.50	30.0	0.50	68.0	0.68
3.5	0.55	30.0	0.50	66.0	0.70
3.5	0.60	30.0	0.50	64.0	0.71
3.5	0.65	30.0	0.50	62.0	0.73
3.5	0.70	30.0	0.50	60.0	0.75
3.5	0.50	30.0	0.55	74.0	0.70
3.5	0.55	30.0	0.55	72.0	0.71
3.5	0.60	30.0	0.55	70.0	0.73
3.5	0.65	30.0	0.55	68.0	0.74
3.5	0.70	30.0	0.55	66.0	0.76
3.5	0.50	30.0	0.60	78.0	0.72
3.5	0.55	30.0	0.60	76.0	0.73
3.5	0.60	30.0	0.60	74.0	0.74
3.5	0.65	30.0	0.60	72.0	0.75
3.5	0.70	30.0	0.60	72.0	0.76
3.5	0.50	30.0	0.65	82.0	0.73
3.5	0.55	30.0	0.65	80.0	0.74
3.5	0.60	30.0	0.65	78.0	0.75
3.5	0.65	30.0	0.65	78.0	0.76
3.5	0.70	30.0	0.65	76.0	0.77
3.5	0.50	30.0	0.70	86.0	0.75
3.5	0.55	30.0	0.70	84.0	0.75
3.5	0.60	30.0	0.70	84.0	0.76
3.5	0.65	30.0	0.70	82.0	0.77
3.5	0.70	30.0	0.70	80.0	0.78

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	7.0	0.50	60.0	0.55
4.0	0.55	7.0	0.50	42.0	0.56
4.0	0.60	7.0	0.50	0.0	0.60
4.0	0.65	7.0	0.50	0.0	0.65
4.0	0.70	7.0	0.50	0.0	0.70
4.0	0.50	7.0	0.55	74.0	0.57
4.0	0.55	7.0	0.55	62.0	0.58
4.0	0.60	7.0	0.55	44.0	0.60
4.0	0.65	7.0	0.55	0.0	0.65
4.0	0.70	7.0	0.55	0.0	0.70
4.0	0.50	7.0	0.60	82.0	0.60
4.0	0.55	7.0	0.60	74.0	0.61
4.0	0.60	7.0	0.60	64.0	0.62
4.0	0.65	7.0	0.60	46.0	0.65
4.0	0.70	7.0	0.60	0.0	0.70
4.0	0.50	7.0	0.65	90.0	0.65
4.0	0.55	7.0	0.65	84.0	0.65
4.0	0.60	7.0	0.65	76.0	0.65
4.0	0.65	7.0	0.65	66.0	0.66
4.0	0.70	7.0	0.65	48.0	0.70
4.0	0.50	7.0	0.70	98.0	0.70
4.0	0.55	7.0	0.70	90.0	0.70
4.0	0.60	7.0	0.70	84.0	0.70
4.0	0.65	7.0	0.70	78.0	0.70
4.0	0.70	7.0	0.70	68.0	0.70
4.0	0.50	8.0	0.50	60.0	0.55
4.0	0.55	8.0	0.50	46.0	0.57
4.0	0.60	8.0	0.50	0.0	0.60
4.0	0.65	8.0	0.50	0.0	0.65
4.0	0.70	8.0	0.50	0.0	0.70
4.0	0.50	8.0	0.55	72.0	0.58
4.0	0.55	8.0	0.55	62.0	0.59
4.0	0.60	8.0	0.55	48.0	0.61
4.0	0.65	8.0	0.55	0.0	0.65
4.0	0.70	8.0	0.55	0.0	0.70
4.0	0.50	8.0	0.60	80.0	0.60
4.0	0.55	8.0	0.60	72.0	0.61
4.0	0.60	8.0	0.60	64.0	0.63
4.0	0.65	8.0	0.60	50.0	0.65
4.0	0.70	8.0	0.60	0.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	8.0	0.65	86.0	0.65
4.0	0.55	8.0	0.65	82.0	0.65
4.0	0.60	8.0	0.65	74.0	0.65
4.0	0.65	8.0	0.65	66.0	0.66
4.0	0.70	8.0	0.65	52.0	0.70
4.0	0.50	8.0	0.70	92.0	0.70
4.0	0.55	8.0	0.70	88.0	0.70
4.0	0.60	8.0	0.70	82.0	0.70
4.0	0.65	8.0	0.70	76.0	0.70
4.0	0.70	8.0	0.70	68.0	0.70
4.0	0.50	9.0	0.50	60.0	0.56
4.0	0.55	9.0	0.50	48.0	0.58
4.0	0.60	9.0	0.50	30.0	0.60
4.0	0.65	9.0	0.50	0.0	0.65
4.0	0.70	9.0	0.50	0.0	0.70
4.0	0.50	9.0	0.55	70.0	0.58
4.0	0.55	9.0	0.55	62.0	0.59
4.0	0.60	9.0	0.55	50.0	0.61
4.0	0.65	9.0	0.55	32.0	0.65
4.0	0.70	9.0	0.55	0.0	0.70
4.0	0.50	9.0	0.60	78.0	0.61
4.0	0.55	9.0	0.60	72.0	0.62
4.0	0.60	9.0	0.60	64.0	0.63
4.0	0.65	9.0	0.60	52.0	0.65
4.0	0.70	9.0	0.60	30.0	0.70
4.0	0.50	9.0	0.65	84.0	0.65
4.0	0.55	9.0	0.65	80.0	0.65
4.0	0.60	9.0	0.65	74.0	0.65
4.0	0.65	9.0	0.65	66.0	0.67
4.0	0.70	9.0	0.65	54.0	0.70
4.0	0.50	9.0	0.70	90.0	0.70
4.0	0.55	9.0	0.70	86.0	0.70
4.0	0.60	9.0	0.70	82.0	0.70
4.0	0.65	9.0	0.70	76.0	0.70
4.0	0.70	9.0	0.70	68.0	0.70
4.0	0.50	10.0	0.50	60.0	0.56
4.0	0.55	10.0	0.50	50.0	0.58
4.0	0.60	10.0	0.50	36.0	0.60
4.0	0.65	10.0	0.50	0.0	0.65
4.0	0.70	10.0	0.50	0.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	10.0	0.55	70.0	0.59
4.0	0.55	10.0	0.55	62.0	0.60
4.0	0.60	10.0	0.55	52.0	0.62
4.0	0.65	10.0	0.55	38.0	0.65
4.0	0.70	10.0	0.55	0.0	0.70
4.0	0.50	10.0	0.60	78.0	0.61
4.0	0.55	10.0	0.60	72.0	0.62
4.0	0.60	10.0	0.60	64.0	0.64
4.0	0.65	10.0	0.60	54.0	0.65
4.0	0.70	10.0	0.60	38.0	0.70
4.0	0.50	10.0	0.65	84.0	0.65
4.0	0.55	10.0	0.65	78.0	0.65
4.0	0.60	10.0	0.65	74.0	0.66
4.0	0.65	10.0	0.65	66.0	0.67
4.0	0.70	10.0	0.65	56.0	0.70
4.0	0.50	10.0	0.70	88.0	0.70
4.0	0.55	10.0	0.70	84.0	0.70
4.0	0.60	10.0	0.70	80.0	0.70
4.0	0.65	10.0	0.70	76.0	0.70
4.0	0.70	10.0	0.70	68.0	0.71
4.0	0.50	11.0	0.50	60.0	0.57
4.0	0.55	11.0	0.50	50.0	0.58
4.0	0.60	11.0	0.50	38.0	0.60
4.0	0.65	11.0	0.50	14.0	0.65
4.0	0.70	11.0	0.50	0.0	0.70
4.0	0.50	11.0	0.55	70.0	0.59
4.0	0.55	11.0	0.55	62.0	0.60
4.0	0.60	11.0	0.55	52.0	0.62
4.0	0.65	11.0	0.55	40.0	0.65
4.0	0.70	11.0	0.55	0.0	0.70
4.0	0.50	11.0	0.60	78.0	0.62
4.0	0.55	11.0	0.60	70.0	0.63
4.0	0.60	11.0	0.60	64.0	0.64
4.0	0.65	11.0	0.60	54.0	0.66
4.0	0.70	11.0	0.60	42.0	0.70
4.0	0.50	11.0	0.65	84.0	0.65
4.0	0.55	11.0	0.65	78.0	0.65
4.0	0.60	11.0	0.65	72.0	0.66
4.0	0.65	11.0	0.65	66.0	0.68
4.0	0.70	11.0	0.65	56.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	11.0	0.70	88.0	0.70
4.0	0.55	11.0	0.70	84.0	0.70
4.0	0.60	11.0	0.70	80.0	0.70
4.0	0.65	11.0	0.70	74.0	0.70
4.0	0.70	11.0	0.70	68.0	0.71
4.0	0.50	12.0	0.50	60.0	0.57
4.0	0.55	12.0	0.50	52.0	0.59
4.0	0.60	12.0	0.50	40.0	0.61
4.0	0.65	12.0	0.50	24.0	0.65
4.0	0.70	12.0	0.50	0.0	0.70
4.0	0.50	12.0	0.55	70.0	0.59
4.0	0.55	12.0	0.55	62.0	0.61
4.0	0.60	12.0	0.55	54.0	0.62
4.0	0.65	12.0	0.55	42.0	0.65
4.0	0.70	12.0	0.55	24.0	0.70
4.0	0.50	12.0	0.60	76.0	0.62
4.0	0.55	12.0	0.60	70.0	0.63
4.0	0.60	12.0	0.60	64.0	0.64
4.0	0.65	12.0	0.60	56.0	0.66
4.0	0.70	12.0	0.60	44.0	0.70
4.0	0.50	12.0	0.65	82.0	0.65
4.0	0.55	12.0	0.65	78.0	0.66
4.0	0.60	12.0	0.65	72.0	0.67
4.0	0.65	12.0	0.65	66.0	0.68
4.0	0.70	12.0	0.65	58.0	0.70
4.0	0.50	12.0	0.70	88.0	0.70
4.0	0.55	12.0	0.70	84.0	0.70
4.0	0.60	12.0	0.70	80.0	0.70
4.0	0.65	12.0	0.70	74.0	0.70
4.0	0.70	12.0	0.70	68.0	0.71
4.0	0.50	13.0	0.50	60.0	0.57
4.0	0.55	13.0	0.50	52.0	0.59
4.0	0.60	13.0	0.50	42.0	0.61
4.0	0.65	13.0	0.50	28.0	0.65
4.0	0.70	13.0	0.50	0.0	0.70
4.0	0.50	13.0	0.55	68.0	0.60
4.0	0.55	13.0	0.55	62.0	0.61
4.0	0.60	13.0	0.55	54.0	0.63
4.0	0.65	13.0	0.55	44.0	0.65
4.0	0.70	13.0	0.55	30.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	13.0	0.60	76.0	0.62
4.0	0.55	13.0	0.60	70.0	0.63
4.0	0.60	13.0	0.60	64.0	0.65
4.0	0.65	13.0	0.60	56.0	0.66
4.0	0.70	13.0	0.60	46.0	0.70
4.0	0.50	13.0	0.65	82.0	0.65
4.0	0.55	13.0	0.65	78.0	0.66
4.0	0.60	13.0	0.65	72.0	0.67
4.0	0.65	13.0	0.65	66.0	0.68
4.0	0.70	13.0	0.65	58.0	0.70
4.0	0.50	13.0	0.70	86.0	0.70
4.0	0.55	13.0	0.70	84.0	0.70
4.0	0.60	13.0	0.70	78.0	0.70
4.0	0.65	13.0	0.70	74.0	0.70
4.0	0.70	13.0	0.70	68.0	0.72
4.0	0.50	14.0	0.50	60.0	0.58
4.0	0.55	14.0	0.50	52.0	0.59
4.0	0.60	14.0	0.50	44.0	0.61
4.0	0.65	14.0	0.50	32.0	0.65
4.0	0.70	14.0	0.50	0.0	0.70
4.0	0.50	14.0	0.55	68.0	0.60
4.0	0.55	14.0	0.55	62.0	0.61
4.0	0.60	14.0	0.55	54.0	0.63
4.0	0.65	14.0	0.55	46.0	0.65
4.0	0.70	14.0	0.55	32.0	0.70
4.0	0.50	14.0	0.60	76.0	0.62
4.0	0.55	14.0	0.60	70.0	0.64
4.0	0.60	14.0	0.60	64.0	0.65
4.0	0.65	14.0	0.60	56.0	0.67
4.0	0.70	14.0	0.60	46.0	0.70
4.0	0.50	14.0	0.65	82.0	0.65
4.0	0.55	14.0	0.65	78.0	0.66
4.0	0.60	14.0	0.65	72.0	0.67
4.0	0.65	14.0	0.65	66.0	0.68
4.0	0.70	14.0	0.65	58.0	0.70
4.0	0.50	14.0	0.70	86.0	0.70
4.0	0.55	14.0	0.70	82.0	0.70
4.0	0.60	14.0	0.70	78.0	0.70
4.0	0.65	14.0	0.70	74.0	0.71
4.0	0.70	14.0	0.70	68.0	0.72

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	15.0	0.50	60.0	0.58
4.0	0.55	15.0	0.50	52.0	0.60
4.0	0.60	15.0	0.50	44.0	0.62
4.0	0.65	15.0	0.50	34.0	0.65
4.0	0.70	15.0	0.50	14.0	0.70
4.0	0.50	15.0	0.55	68.0	0.60
4.0	0.55	15.0	0.55	62.0	0.62
4.0	0.60	15.0	0.55	54.0	0.63
4.0	0.65	15.0	0.55	46.0	0.65
4.0	0.70	15.0	0.55	34.0	0.70
4.0	0.50	15.0	0.60	76.0	0.63
4.0	0.55	15.0	0.60	70.0	0.64
4.0	0.60	15.0	0.60	64.0	0.65
4.0	0.65	15.0	0.60	56.0	0.67
4.0	0.70	15.0	0.60	48.0	0.70
4.0	0.50	15.0	0.65	82.0	0.65
4.0	0.55	15.0	0.65	76.0	0.66
4.0	0.60	15.0	0.65	72.0	0.67
4.0	0.65	15.0	0.65	66.0	0.69
4.0	0.70	15.0	0.65	58.0	0.70
4.0	0.50	15.0	0.70	86.0	0.70
4.0	0.55	15.0	0.70	82.0	0.70
4.0	0.60	15.0	0.70	78.0	0.70
4.0	0.65	15.0	0.70	74.0	0.71
4.0	0.70	15.0	0.70	68.0	0.72
4.0	0.50	16.0	0.50	60.0	0.58
4.0	0.55	16.0	0.50	52.0	0.60
4.0	0.60	16.0	0.50	44.0	0.62
4.0	0.65	16.0	0.50	34.0	0.65
4.0	0.70	16.0	0.50	20.0	0.70
4.0	0.50	16.0	0.55	68.0	0.60
4.0	0.55	16.0	0.55	62.0	0.62
4.0	0.60	16.0	0.55	54.0	0.64
4.0	0.65	16.0	0.55	46.0	0.65
4.0	0.70	16.0	0.55	36.0	0.70
4.0	0.50	16.0	0.60	76.0	0.63
4.0	0.55	16.0	0.60	70.0	0.64
4.0	0.60	16.0	0.60	64.0	0.65
4.0	0.65	16.0	0.60	56.0	0.67
4.0	0.70	16.0	0.60	48.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	16.0	0.65	80.0	0.66
4.0	0.55	16.0	0.65	76.0	0.67
4.0	0.60	16.0	0.65	72.0	0.68
4.0	0.65	16.0	0.65	66.0	0.69
4.0	0.70	16.0	0.65	58.0	0.70
4.0	0.50	16.0	0.70	86.0	0.70
4.0	0.55	16.0	0.70	82.0	0.70
4.0	0.60	16.0	0.70	78.0	0.70
4.0	0.65	16.0	0.70	74.0	0.71
4.0	0.70	16.0	0.70	68.0	0.72
4.0	0.50	17.0	0.50	60.0	0.58
4.0	0.55	17.0	0.50	54.0	0.60
4.0	0.60	17.0	0.50	46.0	0.62
4.0	0.65	17.0	0.50	36.0	0.65
4.0	0.70	17.0	0.50	24.0	0.70
4.0	0.50	17.0	0.55	68.0	0.61
4.0	0.55	17.0	0.55	62.0	0.62
4.0	0.60	17.0	0.55	54.0	0.64
4.0	0.65	17.0	0.55	48.0	0.66
4.0	0.70	17.0	0.55	38.0	0.70
4.0	0.50	17.0	0.60	74.0	0.63
4.0	0.55	17.0	0.60	70.0	0.64
4.0	0.60	17.0	0.60	64.0	0.66
4.0	0.65	17.0	0.60	58.0	0.67
4.0	0.70	17.0	0.60	48.0	0.70
4.0	0.50	17.0	0.65	80.0	0.66
4.0	0.55	17.0	0.65	76.0	0.67
4.0	0.60	17.0	0.65	72.0	0.68
4.0	0.65	17.0	0.65	66.0	0.69
4.0	0.70	17.0	0.65	60.0	0.71
4.0	0.50	17.0	0.70	86.0	0.70
4.0	0.55	17.0	0.70	82.0	0.70
4.0	0.60	17.0	0.70	78.0	0.70
4.0	0.65	17.0	0.70	74.0	0.71
4.0	0.70	17.0	0.70	68.0	0.73
4.0	0.50	18.0	0.50	60.0	0.59
4.0	0.55	18.0	0.50	54.0	0.60
4.0	0.60	18.0	0.50	46.0	0.62
4.0	0.65	18.0	0.50	36.0	0.65
4.0	0.70	18.0	0.50	26.0	0.70

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	18.0	0.55	68.0	0.61
4.0	0.55	18.0	0.55	62.0	0.62
4.0	0.60	18.0	0.55	56.0	0.64
4.0	0.65	18.0	0.55	48.0	0.66
4.0	0.70	18.0	0.55	38.0	0.70
4.0	0.50	18.0	0.60	74.0	0.63
4.0	0.55	18.0	0.60	70.0	0.64
4.0	0.60	18.0	0.60	64.0	0.66
4.0	0.65	18.0	0.60	58.0	0.67
4.0	0.70	18.0	0.60	50.0	0.70
4.0	0.50	18.0	0.65	80.0	0.66
4.0	0.55	18.0	0.65	76.0	0.67
4.0	0.60	18.0	0.65	72.0	0.68
4.0	0.65	18.0	0.65	66.0	0.69
4.0	0.70	18.0	0.65	60.0	0.71
4.0	0.50	18.0	0.70	86.0	0.70
4.0	0.55	18.0	0.70	82.0	0.70
4.0	0.60	18.0	0.70	78.0	0.70
4.0	0.65	18.0	0.70	74.0	0.72
4.0	0.70	18.0	0.70	68.0	0.73
4.0	0.50	19.0	0.50	60.0	0.59
4.0	0.55	19.0	0.50	54.0	0.61
4.0	0.60	19.0	0.50	46.0	0.63
4.0	0.65	19.0	0.50	38.0	0.65
4.0	0.70	19.0	0.50	28.0	0.70
4.0	0.50	19.0	0.55	68.0	0.61
4.0	0.55	19.0	0.55	62.0	0.62
4.0	0.60	19.0	0.55	56.0	0.64
4.0	0.65	19.0	0.55	48.0	0.66
4.0	0.70	19.0	0.55	40.0	0.70
4.0	0.50	19.0	0.60	74.0	0.63
4.0	0.55	19.0	0.60	70.0	0.65
4.0	0.60	19.0	0.60	64.0	0.66
4.0	0.65	19.0	0.60	58.0	0.68
4.0	0.70	19.0	0.60	50.0	0.70
4.0	0.50	19.0	0.65	80.0	0.66
4.0	0.55	19.0	0.65	76.0	0.67
4.0	0.60	19.0	0.65	72.0	0.68
4.0	0.65	19.0	0.65	66.0	0.70
4.0	0.70	19.0	0.65	60.0	0.71

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	19.0	0.70	84.0	0.70
4.0	0.55	19.0	0.70	82.0	0.70
4.0	0.60	19.0	0.70	78.0	0.71
4.0	0.65	19.0	0.70	74.0	0.72
4.0	0.70	19.0	0.70	68.0	0.73
4.0	0.50	20.0	0.50	70.0	0.67
4.0	0.55	20.0	0.50	68.0	0.68
4.0	0.60	20.0	0.50	66.0	0.70
4.0	0.65	20.0	0.50	64.0	0.71
4.0	0.70	20.0	0.50	62.0	0.73
4.0	0.50	20.0	0.55	76.0	0.68
4.0	0.55	20.0	0.55	74.0	0.70
4.0	0.60	20.0	0.55	72.0	0.71
4.0	0.65	20.0	0.55	70.0	0.72
4.0	0.70	20.0	0.55	68.0	0.73
4.0	0.50	20.0	0.60	80.0	0.70
4.0	0.55	20.0	0.60	78.0	0.71
4.0	0.60	20.0	0.60	76.0	0.72
4.0	0.65	20.0	0.60	76.0	0.73
4.0	0.70	20.0	0.60	74.0	0.74
4.0	0.50	20.0	0.65	84.0	0.71
4.0	0.55	20.0	0.65	84.0	0.72
4.0	0.60	20.0	0.65	82.0	0.73
4.0	0.65	20.0	0.65	80.0	0.74
4.0	0.70	20.0	0.65	80.0	0.75
4.0	0.50	20.0	0.70	88.0	0.73
4.0	0.55	20.0	0.70	88.0	0.74
4.0	0.60	20.0	0.70	86.0	0.74
4.0	0.65	20.0	0.70	86.0	0.75
4.0	0.70	20.0	0.70	84.0	0.75
4.0	0.50	21.0	0.50	70.0	0.67
4.0	0.55	21.0	0.50	68.0	0.68
4.0	0.60	21.0	0.50	66.0	0.70
4.0	0.65	21.0	0.50	64.0	0.71
4.0	0.70	21.0	0.50	62.0	0.73
4.0	0.50	21.0	0.55	76.0	0.68
4.0	0.55	21.0	0.55	74.0	0.70
4.0	0.60	21.0	0.55	72.0	0.71
4.0	0.65	21.0	0.55	70.0	0.72
4.0	0.70	21.0	0.55	68.0	0.74

SAND		COARSE AGGREGATE		VOLUME %	MAXIMUM
d'	PHI,0	d'	PHI,0	COARSE AGGREGATE	DENSITY
4.0	0.50	21.0	0.60	80.0	0.70
4.0	0.55	21.0	0.60	78.0	0.71
4.0	0.60	21.0	0.60	76.0	0.72
4.0	0.65	21.0	0.60	76.0	0.73
4.0	0.70	21.0	0.60	74.0	0.74
4.0	0.50	21.0	0.65	84.0	0.71
4.0	0.55	21.0	0.65	82.0	0.72
4.0	0.60	21.0	0.65	82.0	0.73
4.0	0.65	21.0	0.65	80.0	0.74
4.0	0.70	21.0	0.65	78.0	0.75
4.0	0.50	21.0	0.70	88.0	0.73
4.0	0.55	21.0	0.70	88.0	0.74
4.0	0.60	21.0	0.70	86.0	0.74
4.0	0.65	21.0	0.70	86.0	0.75
4.0	0.70	21.0	0.70	84.0	0.76
4.0	0.50	22.0	0.50	70.0	0.67
4.0	0.55	22.0	0.50	68.0	0.69
4.0	0.60	22.0	0.50	66.0	0.70
4.0	0.65	22.0	0.50	64.0	0.72
4.0	0.70	22.0	0.50	62.0	0.73
4.0	0.50	22.0	0.55	74.0	0.68
4.0	0.55	22.0	0.55	74.0	0.70
4.0	0.60	22.0	0.55	72.0	0.71
4.0	0.65	22.0	0.55	70.0	0.73
4.0	0.70	22.0	0.55	68.0	0.74
4.0	0.50	22.0	0.60	80.0	0.70
4.0	0.55	22.0	0.60	78.0	0.71
4.0	0.60	22.0	0.60	76.0	0.72
4.0	0.65	22.0	0.60	74.0	0.73
4.0	0.70	22.0	0.60	74.0	0.75
4.0	0.50	22.0	0.65	84.0	0.72
4.0	0.55	22.0	0.65	82.0	0.72
4.0	0.60	22.0	0.65	82.0	0.73
4.0	0.65	22.0	0.65	80.0	0.74
4.0	0.70	22.0	0.65	78.0	0.75
4.0	0.50	22.0	0.70	88.0	0.73
4.0	0.55	22.0	0.70	86.0	0.74
4.0	0.60	22.0	0.70	86.0	0.75
4.0	0.65	22.0	0.70	84.0	0.75
4.0	0.70	22.0	0.70	84.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	23.0	0.50	70.0	0.67
4.0	0.55	23.0	0.50	68.0	0.69
4.0	0.60	23.0	0.50	66.0	0.70
4.0	0.65	23.0	0.50	64.0	0.72
4.0	0.70	23.0	0.50	62.0	0.73
4.0	0.50	23.0	0.55	74.0	0.69
4.0	0.55	23.0	0.55	72.0	0.70
4.0	0.60	23.0	0.55	72.0	0.71
4.0	0.65	23.0	0.55	70.0	0.73
4.0	0.70	23.0	0.55	68.0	0.74
4.0	0.50	23.0	0.60	80.0	0.70
4.0	0.55	23.0	0.60	78.0	0.72
4.0	0.60	23.0	0.60	76.0	0.73
4.0	0.65	23.0	0.60	74.0	0.74
4.0	0.70	23.0	0.60	72.0	0.75
4.0	0.50	23.0	0.65	84.0	0.72
4.0	0.55	23.0	0.65	82.0	0.73
4.0	0.60	23.0	0.65	80.0	0.73
4.0	0.65	23.0	0.65	80.0	0.75
4.0	0.70	23.0	0.65	78.0	0.75
4.0	0.50	23.0	0.70	88.0	0.73
4.0	0.55	23.0	0.70	86.0	0.74
4.0	0.60	23.0	0.70	86.0	0.75
4.0	0.65	23.0	0.70	84.0	0.75
4.0	0.70	23.0	0.70	84.0	0.76
4.0	0.50	24.0	0.50	70.0	0.67
4.0	0.55	24.0	0.50	68.0	0.69
4.0	0.60	24.0	0.50	66.0	0.71
4.0	0.65	24.0	0.50	64.0	0.72
4.0	0.70	24.0	0.50	62.0	0.74
4.0	0.50	24.0	0.55	74.0	0.69
4.0	0.55	24.0	0.55	72.0	0.70
4.0	0.60	24.0	0.55	70.0	0.71
4.0	0.65	24.0	0.55	70.0	0.73
4.0	0.70	24.0	0.55	68.0	0.74
4.0	0.50	24.0	0.60	80.0	0.70
4.0	0.55	24.0	0.60	78.0	0.72
4.0	0.60	24.0	0.60	76.0	0.73
4.0	0.65	24.0	0.60	74.0	0.74
4.0	0.70	24.0	0.60	72.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	24.0	0.65	84.0	0.72
4.0	0.55	24.0	0.65	82.0	0.73
4.0	0.60	24.0	0.65	80.0	0.74
4.0	0.65	24.0	0.65	80.0	0.75
4.0	0.70	24.0	0.65	78.0	0.76
4.0	0.50	24.0	0.70	88.0	0.74
4.0	0.55	24.0	0.70	86.0	0.74
4.0	0.60	24.0	0.70	86.0	0.75
4.0	0.65	24.0	0.70	84.0	0.76
4.0	0.70	24.0	0.70	84.0	0.76
4.0	0.50	25.0	0.50	70.0	0.68
4.0	0.55	25.0	0.50	68.0	0.69
4.0	0.60	25.0	0.50	66.0	0.71
4.0	0.65	25.0	0.50	64.0	0.72
4.0	0.70	25.0	0.50	62.0	0.74
4.0	0.50	25.0	0.55	74.0	0.69
4.0	0.55	25.0	0.55	72.0	0.70
4.0	0.60	25.0	0.55	70.0	0.72
4.0	0.65	25.0	0.55	68.0	0.73
4.0	0.70	25.0	0.55	68.0	0.74
4.0	0.50	25.0	0.60	78.0	0.70
4.0	0.55	25.0	0.60	78.0	0.72
4.0	0.60	25.0	0.60	76.0	0.73
4.0	0.65	25.0	0.60	74.0	0.74
4.0	0.70	25.0	0.60	72.0	0.75
4.0	0.50	25.0	0.65	84.0	0.72
4.0	0.55	25.0	0.65	82.0	0.73
4.0	0.60	25.0	0.65	80.0	0.74
4.0	0.65	25.0	0.65	80.0	0.75
4.0	0.70	25.0	0.65	78.0	0.76
4.0	0.50	25.0	0.70	88.0	0.74
4.0	0.55	25.0	0.70	86.0	0.74
4.0	0.60	25.0	0.70	84.0	0.75
4.0	0.65	25.0	0.70	84.0	0.76
4.0	0.70	25.0	0.70	82.0	0.76
4.0	0.50	26.0	0.50	70.0	0.68
4.0	0.55	26.0	0.50	68.0	0.69
4.0	0.60	26.0	0.50	66.0	0.71
4.0	0.65	26.0	0.50	64.0	0.72
4.0	0.70	26.0	0.50	62.0	0.74

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	26.0	0.55	74.0	0.69
4.0	0.55	26.0	0.55	72.0	0.70
4.0	0.60	26.0	0.55	70.0	0.72
4.0	0.65	26.0	0.55	68.0	0.73
4.0	0.70	26.0	0.55	68.0	0.74
4.0	0.50	26.0	0.60	78.0	0.70
4.0	0.55	26.0	0.60	78.0	0.72
4.0	0.60	26.0	0.60	76.0	0.73
4.0	0.65	26.0	0.60	74.0	0.74
4.0	0.70	26.0	0.60	72.0	0.75
4.0	0.50	26.0	0.65	84.0	0.72
4.0	0.55	26.0	0.65	82.0	0.73
4.0	0.60	26.0	0.65	80.0	0.74
4.0	0.65	26.0	0.65	78.0	0.75
4.0	0.70	26.0	0.65	78.0	0.76
4.0	0.50	26.0	0.70	88.0	0.74
4.0	0.55	26.0	0.70	86.0	0.75
4.0	0.60	26.0	0.70	84.0	0.75
4.0	0.65	26.0	0.70	84.0	0.76
4.0	0.70	26.0	0.70	82.0	0.77
4.0	0.50	27.0	0.50	70.0	0.68
4.0	0.55	27.0	0.50	68.0	0.69
4.0	0.60	27.0	0.50	66.0	0.71
4.0	0.65	27.0	0.50	64.0	0.72
4.0	0.70	27.0	0.50	62.0	0.74
4.0	0.50	27.0	0.55	74.0	0.69
4.0	0.55	27.0	0.55	72.0	0.71
4.0	0.60	27.0	0.55	70.0	0.72
4.0	0.65	27.0	0.55	68.0	0.73
4.0	0.70	27.0	0.55	66.0	0.75
4.0	0.50	27.0	0.60	78.0	0.71
4.0	0.55	27.0	0.60	76.0	0.72
4.0	0.60	27.0	0.60	76.0	0.73
4.0	0.65	27.0	0.60	74.0	0.74
4.0	0.70	27.0	0.60	72.0	0.75
4.0	0.50	27.0	0.65	82.0	0.72
4.0	0.55	27.0	0.65	82.0	0.73
4.0	0.60	27.0	0.65	80.0	0.74
4.0	0.65	27.0	0.65	78.0	0.75
4.0	0.70	27.0	0.65	78.0	0.76

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	27.0	0.70	86.0	0.74
4.0	0.55	27.0	0.70	86.0	0.75
4.0	0.60	27.0	0.70	84.0	0.75
4.0	0.65	27.0	0.70	84.0	0.76
4.0	0.70	27.0	0.70	82.0	0.77
4.0	0.50	28.0	0.50	70.0	0.68
4.0	0.55	28.0	0.50	68.0	0.69
4.0	0.60	28.0	0.50	66.0	0.71
4.0	0.65	28.0	0.50	64.0	0.72
4.0	0.70	28.0	0.50	62.0	0.74
4.0	0.50	28.0	0.55	74.0	0.69
4.0	0.55	28.0	0.55	72.0	0.71
4.0	0.60	28.0	0.55	70.0	0.72
4.0	0.65	28.0	0.55	68.0	0.73
4.0	0.70	28.0	0.55	66.0	0.75
4.0	0.50	28.0	0.60	78.0	0.71
4.0	0.55	28.0	0.60	76.0	0.72
4.0	0.60	28.0	0.60	76.0	0.73
4.0	0.65	28.0	0.60	74.0	0.75
4.0	0.70	28.0	0.60	72.0	0.76
4.0	0.50	28.0	0.65	82.0	0.72
4.0	0.55	28.0	0.65	82.0	0.73
4.0	0.60	28.0	0.65	80.0	0.74
4.0	0.65	28.0	0.65	78.0	0.75
4.0	0.70	28.0	0.65	78.0	0.76
4.0	0.50	28.0	0.70	86.0	0.74
4.0	0.55	28.0	0.70	86.0	0.75
4.0	0.60	28.0	0.70	84.0	0.76
4.0	0.65	28.0	0.70	84.0	0.76
4.0	0.70	28.0	0.70	82.0	0.77
4.0	0.50	29.0	0.50	70.0	0.68
4.0	0.55	29.0	0.50	68.0	0.69
4.0	0.60	29.0	0.50	64.0	0.71
4.0	0.65	29.0	0.50	64.0	0.72
4.0	0.70	29.0	0.50	62.0	0.74
4.0	0.50	29.0	0.55	74.0	0.69
4.0	0.55	29.0	0.55	72.0	0.71
4.0	0.60	29.0	0.55	70.0	0.72
4.0	0.65	29.0	0.55	68.0	0.74
4.0	0.70	29.0	0.55	66.0	0.75

SAND d'	SAND PHI,0	COARSE AGGREGATE d'	COARSE AGGREGATE PHI,0	VOLUME % COARSE AGGREGATE	MAXIMUM DENSITY
4.0	0.50	29.0	0.60	78.0	0.71
4.0	0.55	29.0	0.60	76.0	0.72
4.0	0.60	29.0	0.60	74.0	0.73
4.0	0.65	29.0	0.60	74.0	0.75
4.0	0.70	29.0	0.60	72.0	0.76
4.0	0.50	29.0	0.65	82.0	0.72
4.0	0.55	29.0	0.65	82.0	0.73
4.0	0.60	29.0	0.65	80.0	0.75
4.0	0.65	29.0	0.65	78.0	0.75
4.0	0.70	29.0	0.65	76.0	0.76
4.0	0.50	29.0	0.70	86.0	0.74
4.0	0.55	29.0	0.70	86.0	0.75
4.0	0.60	29.0	0.70	84.0	0.76
4.0	0.65	29.0	0.70	82.0	0.76
4.0	0.70	29.0	0.70	82.0	0.77
4.0	0.50	30.0	0.50	70.0	0.68
4.0	0.55	30.0	0.50	66.0	0.69
4.0	0.60	30.0	0.50	64.0	0.71
4.0	0.65	30.0	0.50	62.0	0.73
4.0	0.70	30.0	0.50	62.0	0.74
4.0	0.50	30.0	0.55	74.0	0.70
4.0	0.55	30.0	0.55	72.0	0.71
4.0	0.60	30.0	0.55	70.0	0.72
4.0	0.65	30.0	0.55	68.0	0.74
4.0	0.70	30.0	0.55	66.0	0.75
4.0	0.50	30.0	0.60	78.0	0.71
4.0	0.55	30.0	0.60	76.0	0.72
4.0	0.60	30.0	0.60	74.0	0.73
4.0	0.65	30.0	0.60	74.0	0.75
4.0	0.70	30.0	0.60	72.0	0.76
4.0	0.50	30.0	0.65	82.0	0.73
4.0	0.55	30.0	0.65	80.0	0.73
4.0	0.60	30.0	0.65	80.0	0.75
4.0	0.65	30.0	0.65	78.0	0.76
4.0	0.70	30.0	0.65	76.0	0.77
4.0	0.50	30.0	0.70	86.0	0.74
4.0	0.55	30.0	0.70	86.0	0.75
4.0	0.60	30.0	0.70	84.0	0.76
4.0	0.65	30.0	0.70	82.0	0.76
4.0	0.70	30.0	0.70	82.0	0.78