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Volume One: Text, References, and Appendices

This report contains the 1987 HMAC field construction data and an explanation of the methods used to organize the data into several computer files. Statistical summaries of parameters such as relative density, asphalt content, voids in mineral aggregates, and percent voids filled with asphalt are included. Gradation data plotted on a 0.45 power curve are included for each project.

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ORGANIZATION AND ANALYSIS OF 1987 HMAC FIELD CONSTRUCTION DATA

VOLUME ONE: TEXT, REFERENCES, AND APPENDICES

by

Maghsoud Tahmoressi
Thomas W. Kennedy

Research Report Number 1197-1F

Research Project 3-9-88-1197

Organization and Analysis of 1987 HMAC Field Construction Data

conducted for

Texas State Department of Highways and Public Transportation

in cooperation with the

U.S. Department of Transportation Federal Highway Administration

by the

CENTER FOR TRANSPORTATION RESEARCH

Bureau of Engineering Research

THE UNIVERSITY OF TEXAS AT AUSTIN

November 1988

PREFACE

This is the first and final report dealing with the organization and analysis of 1987 Hot Mixed Asphalt Concrete (HMAC) field construction data. The report includes a description of the method used to obtain the field data, the type of data obtained, and the process of organizing the data using several computer files. In addition, a statistical summary of available data and a brief analysis of the data are also included.

The authors wish to acknowledge the assistance received from various individuals and organizations. The support of the Texas State Department of Highways and Public Transportation (SDHPT) and the Federal Highway Administration is acknowledged. The efforts of Paul Krugler of D-9 and James Joslin of D-6 in obtaining the data and providing valuable inputs for the data base are greatly appreciated. Appreciation is due to all districts of the SDHPT which responded to the survey and provided this valuable data. Special thanks to members of the Center for Transportation Research staff, including Julie Alkire, Mansour Solaimanian, Massoud Mortazavi, and Clay Brown, who helped with the tremendous task of inputting the data into the computer.

Maghsoud Tahmoressi
Thomas W. Kennedy

October 1988

LIST OF REPORTS

Research Report No. 1197-1F, "Organization and Analysis of 1987 HMAC Field Construction Data," by Maghsoud Tahmoressi and Thomas W. Kennedy, includes the 1987 HMAC field data and a statistical summary. November 1988.

ABSTRACT

This report contains the 1987 HMAC field construction data and an explanation of the methods used to organize the data into several computer files. Statistical summaries of parameters such as relative density, asphalt content, voids in mineral aggregates, and percent voids filled with asphalt are included. Gradation data plotted on a 0.45-power curve are included for each project.

KEY WORDS: HMAC, VMA, PVF, gradation, density, asphalt content

SUMMARY

In 1987 the Texas State Department of Highways and Public Transportation requested each District to provide all HMAC field construction data for projects constructed between August 11 and September 30, 1987. Data were received from 72 projects involving 92 different mixtures. These data were organized in a computerized data base and were analyzed. The data base is described in this report and the results of the analyses are summarized.

IMPLEMENTATION STATEMENT

The data contained in this report provide a summary of information related to the quality of Hot Mixed Asphaltic Concrete currently being produced in Texas. Results of this study can be used to help establish new specifications or to evaluate the success of new specifications designed to improve the quality of HMAC. Current or future research projects can also benefit from this information. The entire data base is contained on floppy disks and can be used with IBM or IBM-compatible personal computers. This data base can provide a basis for automating the quality control aspects of HMAC construction.

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CHAPTER 1. INTRODUCTION

In 1987 a survey was conducted by the Texas State Department of Highways and Public Transportation (SDHPT) to establish the properties of hot mixed asphalt concrete as constructed in the field. In this survey all SDHPT districts were asked to provide mixture designs, construction processes, and job control data for all hot mixed asphalt concrete pavements constructed during June 1987.

The Center for Transportation Research at The University of Texas at Austin was asked to organize the data in a data base and perform an initial analysis under research contract 1197. Eighteen districts responded to the request for construction data and furnished the data for 72 projects. A total of 92 different mixtures were represented. An intentional change in asphalt content or aggregate gradation constitutes a new mixture within a project. Although the initial request was for projects constructed in June 1987, the data which was received consisted of projects constructed from August 11 through the end of September, 1987. Data were received for most classes of highways such as Interstate, U.S. Highways, and Farm-to-Market Roads. Of the 92 mixtures, 62 were type D (Fine Graded Surface Course), 9 were type B (Fine Graded Base or Leveling-up Course), 13 were type C (Fine Graded Surface Course), 1 was type A (Coarse Graded Base Course), and 7 were type G (Gradation Determined by Engineer) mixtures. The following is a summary of the available data by several different categories.

This report describes the process by which these data were organized and presents the results of the data analysis. As a result of this study a data base is now in place which contains field construction data and which can be used to analyze the effects of several important parameters on the quality of HMAC projects constructed now and in the future. The entire data base is contained on floppy disks suitable for use with IBM-compatible personal computers. These floppy disks can be made available to SDHPT personnel and other interested parties such as other researchers for use in ongoing projects.

Chapter 2 contains a description of the method by which the data were organized and a description of the data base. Chapter 3 contains a summary of the data contained in the data base and the results of an initial analysis.

CHAPTER 2. ORGANIZATION OF THE DATA AND THE DATA BASE

In June 1987 the Center for Transportation Research at The University of Texas at Austin was asked to develop information which could relate asphalt mixture characteristics and construction factors to pavement performance and to determine the characteristics of mixtures constructed in Texas. As part of this effort, a data base of mixture and construction variables was to be established for use by researchers and personnel of the State Department of Highways and Public Transportation (SDHPT).

SURVEY

In the summer of 1987, the Materials and Tests Division (D-9) of the State Department of Highways and Public Transportation requested all districts to provide asphalt mixture and construction data for all projects constructed between August 11 and the end of September, 1987. From the 24 districts in the Texas State Department of Highways and Public Transportation (SDHPT), 18 districts responded to the request for data; however, it should be noted that not all of the data were received for all projects. The type of data and information which were received included mix design data, relative core densities, relative densities of the laboratory-compacted specimens, asphalt contents, and aggregate gradations. Most districts also included the daily construction record, Form 404 of SDHPT (Appendix A), which, in addition to the data above, includes Hveem stabilities and total production for each day.

In addition, a miscellaneous data work sheet (Appendix A), designed to obtain information regarding construction, was sent to all districts. Information requested included information such as the characterization and type of compaction equipment used; the type and operational procedures the mixing plant used to produce the asphalt mixture; the temperature of the mixture at the plant laydown, and compaction; and type of power, and other miscellaneous information are covered in this data sheet. This data sheet was completed and submitted along with the data for most projects.

ORGANIZATION

The data received were organized and analyzed using an IBM personal computer using Lotus 1,2,3, DBASE III Plus, and Microsoft Chart computer softwares. Lotus 1,2,3 is a spread sheet software which has the capability to perform limited statistical analysis and which can perform complex data reductions. DBASE III Plus is a powerful data base software which can be used to manage the data, and Microsoft Chart can be used to perform plotting tasks.

To simplify data management tasks, the data were categorized into three levels. Level 1 data consisted of all the data as received from the districts. This included the information from the daily construction record (Form 404) and the miscellaneous data sheet. A computer file was created for each project.

A separate computer file was created for each project to contain Level 2 data. Level 2 data include Level 1 which was transferred in order to calculate mixture properties such as VMA and percent voids filled. These files also include data such as Hveem stability, specific gravities (Rice, effective, and bulk), and relative density of cores and laboratory-compacted specimens based on various theoretical maximum specific gravities. Gradation data are contained in separate Gradation Files.

Level 3 data are the values which were entered into the DBASE III Plus data base. These include number of data points, averages, standard deviation, and maximum and minimum for each parameter and in each project. Level 3 data also includes construction data from Level 1.

Level 2 and Level 3 data will be used during analysis. Level 2 data will enable analysis of the data for a specific project, while Level 3 data include overall data and will enable data analysis for all projects.

LEVEL 1 DATA FILES

Level 1 files provide the first step in data management and deal with specific projects. Level 1 data files are separated into two segments. Segment 1 contains qualitative information regarding construction activities as well as a description of the project (Fig 1). The second segment contains relative densities, nuclear densities, asphalt contents, and air temperature data which were obtained from daily construction records (Form 404) provided for each working day. Descriptive statistics were calculated for each project at this level (Fig 2). Appendix B contains a glossary of terms used in Fig 2.

Each segment has a header which identifies the mixture type and course project by district, county, highway, and project code and control.

Level 1 data for each project are presented in Appendix C.

LEVEL 2 DATA FILES

Level 2 project files were created by adding several parameters to Level 1 files. The data contained in these files enable the user to perform analysis on several parameters for a specific project. Each Level 2 file contains two major segments. The first segment includes daily relative core density based on Rice specific gravity and

```
* ***************************************************************************** *
* DISTRICT:      23 DISTRICT:LAMPASAS          HIGHWAY: US 190                   *
*    TYPE: D        COURSE: SURFACE                                              *
* PROJECT: C231-1-24                           CONTROL: 231-1-24                 *
* ***************************************************************************** *
*                                                                                *
* GENERAL INFORMATION                                                            *
*                                                                                *
* THICKNESS  1-1.5   OLD ACP          ROLLERS:  WEIGHT    SPEED    #PASS IN  TRAIN *
* UNDERLAIN LAYER:  FLEX BASE                   (TON)    (MPH)         POSITION  *
* MIX DISCHARGE TEMP  335 F            3-WHEEL                                   *
* TEMP @ 1st PASS:    320 F           VIBRATORY   10.6    1-2        3       1   *
* TEMP @ 2nd PASS:  200-275 F         PNEUMATIC    9.5    1-2        3       2   *
* EXISTING PVT.:    SMOOTH&WARPED     VIBRATORY    9.1    1-2        2       3   *
* PLANT:            BATCH                                                        *
* PILE CAP,           137                                                        *
* SILO CAP.,TON:                                                                 *
* NO. OF BINS:      4(HOT),4(COLD)                                               *
*                                                                                *
*                           VIBRATORY ROLLER INFORMATION                         *
*                                                                                *
*                   VIBRAT.  VIBRAT.  AMPLITUDE        FREQ     NO. OF           *
*                   FORWARD  BACK.    (IN.)            (CPS)    VIB. DRUMS       *
*                                                                                *
*                      X        X       0.022            37          2           *
*                                                                                *
*                                                                                *
*                                                                                *
* HAULING & LOADING EQIPMENT:                  MAX. THEORETICAL DENSITY          *
*                                                                                *
* BOBTAIL  SEMI-    BOBTAIL/W  FLOW-             RICE              Gt            *
*          TRAILER  TRAILER     BOY             (227-F)          (207-F)         *
*    X                                             X                             *
*                                                                                *
* DENSITY MEASUREMENT TECHNIQUE                DAY OF DENSITY TEST               *
*                                                                                *
* CORES    NUCLEAR  IN WHEEL BETWEEN           SAME DAY          NEXT DAY        *
*                   PATH     W. PATH           PLACED            OR LATER        *
*    X        X        X        X                                   X            *
*                                                                                *
* ***************************************************************************** *
```

Fig 1. Typical computer output contaiing miscellaneous construction data (level 1 data).

```
* ************************************************************************************ *
* DISTRICT:      23 DISTRICT:LAMPASAS          HIGHWAY: US 190                          *
*   TYPE: D           COURSE: SURFACE                                                   *
* PROJECT: C231-1-24                           CONTROL: 231-1-24                        *
* ************************************************************************************ *
```

DENSITY INFORMATION
DESIGN AC #1D

WORKING DAY	CORE DEN., %	NUC. DEN., %	LAB. DEN., %	WORKING DAY	EXT. AC, %	DESIGN AC, %	DES. - EXT.	MIN. AIR TEMP.,F	MAX. AIR TEMP.,F
1			97.5	1	5.5	5.2	-0.3	73	94
4	90.8		97.3	4	5.1	5.2	0.1	73	93
5	91.9		96.8	5	5.3	5.2	-0.1	75	90
7	93.4		97.1	7	5.4	5.3	-0.1	70	95
11	93.3		97.5	11	5.2	5.3	0.1	75	98
12	88.9		98.3	12	5.4	5.3	-0.1	75	98
13	91.5		98.5	13	5.5	5.3	-0.2	75	98
14	93.8		98.6	14	5.2	5.3	0.1	73	98
15	95.2		97.9	15	5.3	5.2	-0.1	75	98
18	93.7		98.3	18	5.3	5.2	-0.1	75	98
19	92.3		97.3	19	5.3	5.2	-0.1	75	100
21	93.2		96.9	21	4.9	5.0	0.1	78	96
22	93.2		97.5	22	4.9	5.0	0.1	78	100
25	93.1		96.1	25	5.1	5.0	-0.1	82	102
26	92.5		97.6	26	5.2	5.0	-0.2	80	100
27	95.2		97.0	27	5.1	5.0	-0.1	85	105
28	91.1		97.2	28	5.0	5.0	0.0	80	102
29			96.3	29	5.1	5.0	-0.1	77	103
32			97.2	32	5.0	5.0	0.0	77	95
34	92.4		97.1	34	5.0	5.0	0.0	80	102
35			97.3	35	4.9	5.0	0.1	77	100
36	92.4		97.5	36	5.1	5.0	-0.1	77	100
37	92.9		97.0	37	5.2	5.0	-0.2	76	103
40	91.1		96.9	40	5.1	5.0	-0.1	80	106
41	91.2		96.9	41	5.1	5.0	-0.1	78	106
COUNT=	21		25	25	25	25	25	25	25
AVG=	92.5		97.3		5.17	5.11	-0.06	76.76	99.20
STD=	1.44		0.60		0.17	0.13	0.11	3.18	3.93
MAX=	95.2		98.6		5.5	5.3	0.1	85.0	106.0
MIN=	88.9		96.1		4.9	5.0	-0.3	70.0	90.0
STD N-1=	1.48		0.62		0.17	0.13	0.11	3.24	4.01

Glossary of terms in Appendix B.

Fig 2. Typical computer output containing relative densities, nuclear density, asphalt content, and air temperature data (level 1 data).

laboratory density based on maximum theoretical specific gravity (calculated from extracted asphalt content and aggregate-effective specific gravity), mat thickness, production quantity, air voids, VMA, Hveem stability, and percent voids filled (Fig 3). The second segment includes relative core densities based on the density of laboratory-compacted specimens and relative core densities based on maximum theoretical specific gravity calculated from extracted and design asphalt contents. Also included in this segment are relative laboratory density values based on maximum theoretical density from design and extracted asphalt contents (Fig 4). Descriptive statistics are provided for each parameter. Level 2 data for each project are presented in Appendix D.

GRADATION FILES

For ease of operation, both Level 1 and Level 2 gradation data were combined in these 92 files. The gradations files include daily extracted gradation, average extracted gradation, design gradation, the difference between design and extracted gradation for each sieve, gradation for a 0.45-power gradation line corresponding to the maximum aggregate size (Fig 5), and the difference between a 0.45-power line and the average extracted gradation for each sieve. Also, the sum of the differences between 0.45-power line and extracted gradation in several regions of the gradation chart are given (Fig 6). The 0.45-power gradation was established based on the zero point and the nominal maximum aggregate size which is the largest sieve on which material is retained. The gradation data are presented in Appendix E.

LEVEL 3 DATA BASE

Descriptive statistics generated in Level 2 project files were used to establish the Level 3 data base which was generated using DBASE III Plus software. The Level 3 data base consists of more than 123 fields with each field containing one parameter regarding a specific project. Forty-two fields contain primarily qualitative data used to describe the construction details. The remaining 81 fields contain quantitative data such as average, standard deviation, maximum, minimum, and number of data points for each parameter.

The data base was developed to be able to provide the user with specific information. For example, the user may request to have the relative core densities for all projects which had compaction temperature less than 175° F, had mat thickness less than 2 inches, and used a vibratory roller weighing 5 tons and operating at speeds of 3 to 5 mph. The data base program would search all available data and identify all projects which satisfied the prescribed conditions and would then display the results. These results can then be printed on an on-line printer or saved for future work. If further analyses of the data are required, the displayed results can be transported to Lotus 1,2,3 software where the data can be plotted and analyzed.

A large number of parameters had to be considered in this study. The Level 3 data base alone contains more than 123 parameters for each project. A glossary of terms is given in Appendix F which includes a description for all variable names which were used in the data base. Appendix B contains descriptions of variable names which were used in Levels 1 and 2 and are shown in Figs 1 through 6. All entries in the data base are presented in Appendix G.

```
* ******************************************************************************** *
* DISTRICT:      23 DISTRICT:LAMPASAS          HIGHWAY: US 190                     *
*    TYPE: D          COURSE: SURFACE                                              *
* PROJECT: C231-1-24                           CONTROL: 231-1-24                   *
* ******************************************************************************** *
```

DENSITY INFORMATION
DESIGN AC #1D

WORKING DAY	CORE DEN., %	LAB. DEN., %	AC, %	CORE THICK., IN.	HVEEM STAB., %	CORE AIR VOIDS	LAB AIR VOIDS	CORE VMA	LAB VMA	CORE VOIDS FILLED	LAB VOIDS FILLED
1		97.5	5.5	1.262	57		2.5		12.8		80.5
4	90.8	97.3	5.1	1.626	55	9.2	2.7	18.0	12.2	49.0	77.8
5	91.9	96.8	5.3	1.533	52	8.1	3.2	17.4	13.0	53.6	75.5
7	93.4	97.1	5.4	1.160	54	6.6	2.9	16.3	13.0	59.5	77.7
11	93.3	97.5	5.2	1.167	51	6.7	2.5	16.0	12.2	58.1	79.5
12	88.9	98.3	5.4	1.337	51	11.1	1.7	20.3	11.9	45.4	85.7
13	91.5	98.5	5.5	1.307	50	8.5	1.5	18.2	12.0	53.3	87.5
14	93.8	98.6	5.2	1.470	51	6.2	1.4	15.5	11.2	60.1	87.5
15	95.2	97.9	5.3	1.150	48	4.8	2.1	14.5	12.1	66.9	82.6
18	93.7	98.3	5.3	1.317	49	6.3	1.7	15.8	11.7	60.2	85.5
19	92.3	97.3	5.3	1.330	51	7.7	2.7	17.1	12.6	54.9	78.6
21	93.2	96.9	4.9	1.497	50	6.8	3.1	15.4	12.1	56.0	74.4
22	93.2	97.5	4.9	1.497	51	6.8	2.5	15.4	11.5	56.0	78.4
25	93.1	96.1	5.1	1.266	49	6.9	3.9	16.0	13.2	56.8	70.6
26	92.5	97.6	5.2	1.640	50	7.5	2.4	16.7	12.1	55.1	80.2
27	95.2	97.0	5.1	1.283	52	4.8	3.0	14.1	12.4	65.9	75.9
28	91.1	97.2	5.0	1.490	51	8.9	2.8	17.6	12.0	49.3	76.7
29		96.3	5.1		54		3.7		13.1		71.7
32		97.2	5.0		50		2.8		12.0		76.7
34	92.4	97.1	5.0	1.603	53	7.6	2.9	16.4	12.1	53.6	76.1
35		97.3	4.9		53		2.7				
36	92.4	97.5	5.1	1.843	51	7.6	2.5	16.6	12.0	54.2	79.1
37	92.9	97.0	5.2	1.802	54	7.1	3.0	16.3	12.7	56.6	76.3
40	91.1	96.9	5.1	1.750	55	8.9	3.1	17.8	12.5	49.9	75.3
41	91.2	96.9	5.1	1.620	54	8.8	3.1	17.7	12.5	50.2	75.3
COUNT=	21	25	25	22	25	21	25	21	24	21	24
AVG=	92.53	97.34	5.17	1.452	51.8	7.47	2.66	16.63	12.29	55.45	78.53
STD=	1.44	0.60	0.17	0.204	2.2	1.44	0.60	1.37	0.50	5.17	4.42
MAX=	95.2	98.6	5.5	1.843	57	11.1	3.9	20.3	13.2	66.9	87.5
MIN=	88.9	96.1	4.9	1.150	48	4.8	1.4	14.1	11.2	45.4	70.6
STD-1=	1.48	0.62	0.17	0.209	2.2	1.48	0.62	1.40	0.51	5.30	4.52

Glossary of terms in Appendix B.

Fig 3. A typical computer output containing level 2, segment 1 data.

```
* ******************************************************************************** *
* DISTRICT:      23 DISTRICT:LAMPASAS         HIGHWAY: US 190                        *
*    TYPE: D         COURSE: SURFACE                                                 *
* PROJECT: C231-1-24                          CONTROL: 231-1-24                      *
* ******************************************************************************** *
```

DENSITY INFORMATION
DESIGN AC #1D

	Gc/Gl	Gc/Gt ext.	Gc/Gt des.	Gl/Gt ext.	Gl/Gt des.
				99.6	99.2
	93.3	92.8	92.9	99.4	99.6
	94.9	93.9	93.8	98.9	98.8
	96.2	95.4	95.2	99.2	99.0
	95.7	95.4	95.4	99.6	99.6
	90.4	90.8	90.6	100.5	100.2
	92.9	93.5	93.1	100.7	100.2
	95.1	95.9	95.9	100.8	100.8
	97.2	97.3	97.2	100.0	99.9
	95.3	95.8	95.6	100.5	100.3
	94.9	94.3	94.2	99.4	99.3
	96.2	95.3	95.7	99.0	99.5
	95.6	95.3	95.7	99.7	100.1
	96.9	95.2	95.3	98.2	98.4
	94.8	94.5	94.5	99.7	99.7
	98.1	97.3	97.4	99.1	99.3
	93.7	93.1	93.4	99.4	99.6
				98.4	98.6
				99.4	99.6
	95.2	94.4	94.7	99.2	99.5
				99.5	99.9
	94.8	94.4	94.6	99.7	99.8
	95.8	94.9	94.9	99.1	99.1
	94.0	93.1	93.2	99.0	99.2
	94.1	93.2	93.3	99.0	99.2
COUNT=	21	21	21	25	25
AVG=	95.01	94.57	94.60	99.49	99.53
STD=	1.61	1.47	1.51	0.61	0.55
MAX=	98.1	97.3	97.4	100.8	100.8
MIN=	90.4	90.8	90.6	98.2	98.4
STD-1=	1.65	1.51	1.54	0.63	0.56

Glossary of terms in Appendix B.

Fig 4. A typical computer output containing level 2, segment 2 data.

```
* ************************************************************************************* *
* DISTRICT:      23 DISTRICT:LAMPASAS               HIGHWAY: US 190                     *
*    TYPE: D          COURSE: SURFACE                                                   *
* PROJECT: C231-1-24                                CONTROL: 231-1-24                   *
* ************************************************************************************* *
```

GRADATION INFORMATION

SIEVE	0.45 LINE	DESIGN GRAD. 1D	1	2	3	4	5	6	7
+1/2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1/2-3/8	0.0	7.2	5.5	4.9	5.6	6.5	4.4	7.0	7.4
3/8-#4	26.9	31.3	33.4	35.7	35.0	35.6	33.4	33.2	34.2
#4-#10	23.6	27.3	26.6	26.1	25.5	24.4	27.0	26.4	23.5
+# 10	50.5	65.8	65.5	66.7	66.1	66.5	64.8	66.6	65.1
#10-#40	25.0	10.6	9.0	7.8	6.9	8.6	8.8	8.8	9.5
#40-#80	7.8	13.7	8.3	11.8	8.7	9.3	7.4	8.7	9.6
#80-#200	5.5	7.5	12.2	8.9	13.1	11.3	12.4	10.6	10.1
-#200	11.2	2.4	5.0	4.8	5.2	4.3	6.6	5.3	5.7
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Glossary of terms in Appendix B.

Fig 5. Typical computer output containing gradation data for 7 extractions (level 1 data).

```
*************************************************************************************
*        DISTRICT:      23 DISTRICT:   LAMPASAS        HIGHWAY: US 190             *
*           TYPE: D          COURSE: SURFACE                                        *
*        PROJECT: C231-1-24                            CONTROL: 231-1-24           *
*************************************************************************************
```

GRADATION INFORMATION   EXTRACTED GRADATIONS

SIEVE	0.45 LINE	DESIGN GRAD. 1D	AVG. EXT. GRADATION	SIEVES FOR % PASS.	AVG. EXT. % PASS.	DES. GRAD % PASS	DES-EXT	.45 LINE % PASSING	.45 LINE - AVG. EXT	SUM IN REGIONS	SUM OF ABS. VALUES
+1/2	0.0	0.0	0.0	1/2	100.0	100.0	0.0				
1/2-3/8	0.0	7.2	5.7	3/8	94.3	92.8	-1.5	100	5.7	5.7	5.7
3/8-#4	26.9	31.3	33.4	4	60.9	61.5	0.6	73.1	12.2		
#4-#10	23.6	27.3	26.9	10	34.1	34.2	0.1	49.5	15.4		
+# 10	50.5	65.8	65.9							27.6	27.6
#10-#40	25.0	10.6	9.2	40	24.9	23.6	-1.3	24.5	-0.4		
#40-#80	7.8	13.7	8.0	80	16.9	9.9	-7.0	16.7	-0.2	-0.6	0.6
#80-#200	5.5	7.5	12.3	200	4.6	2.4	-2.2	11.2	6.6	6.6	6.6
-#200	11.2	2.4	4.6						TOTAL:	39.3	40.5
	100.0	100.0	100.0			SUM =	-11.3				

Glossary of terms in Appendix B.

Fig 6. Typical computer output containing level 2 extracted aggregate gradation data.

CHAPTER 3. SUMMARY OF THE DATA

Eighteen districts responded to the request for construction data and furnished the data for 72 projects. A total of 92 different mixtures were represented. An intentional change in asphalt content or aggregate gradation constituted a new mixture within a project. Although the initial request was for projects constructed in June 1987, the data which was received consisted of projects from August 11 through September 30, 1987. Data were received for most classes of highways such as Interstate, U.S. Highways, and Farm-to-Market Roads. Of the 92 mixtures, 62 were type D, 9 were type B, 13 were type C, 1 was type A, and 7 were type G mixtures. The following is a summary of the available data by several different categories.

OVERALL SUMMARY

Some of the parameters which are contained in the data base include: relative core density, relative laboratory density, Hveem stability, voids in mineral aggregates for both cores and laboratory-compacted specimens, percentage of voids filled with asphalt for both cores and laboratory-compacted specimens, and asphalt content data. All relative densities are calculated based on Rice maximum specific gravity and theoretical maximum specific gravity. Theoretical maximum specific gravity is calculated based on extracted asphalt content as well as design asphalt content.

ASPHALT CONTENT

Variations in asphalt content data are shown in Table 3.1. As shown, the average difference between design and extracted asphalt content is .04 percent with a standard deviation of 0.14 percent. The range of differences between the design and extracted asphalt contents is 0.4 to -0.4 percentage points. This indicates that the asphalt contents are well within the present specification limit of plus or minus 0.5 percentage points.

Extracted asphalt content data for each mixture are presented in Appendix C, and the average values for each project are contained in Appendix H.

RELATIVE DENSITY

Relative density data are included in the data base for roadway cores as well as the laboratory-compacted specimens. Relative core and laboratory densities were obtained directly from entries in SDHPT Form 404 (Appendix A) which were provided by the districts. The density entries in Form 404 are expressed in terms of air void content or percentage of maximum density; however, there is no indication of which maximum density was used to calculate the relative density parameters. It is assumed that generally the relative core densities were based on Rice maximum specific gravity and that the relative densities of laboratory-compacted specimens were based on the theoretical maximum specific gravity (G_t). This theoretical maximum specific gravity is calculated using the following equation:

$$G_{te} = \frac{100}{\frac{\%\,Agg}{G_{agg}} + \frac{\%\,AC}{G_{ac}}}$$

where

G_t = theoretical maximum specific gravity,
%Agg = percentage of aggregate based on total mixture weight,
%Ac = percentage of asphalt based on total mixture weight,
G_{agg} = specific gravity of the aggregate, and
G_{ac} = specific gravity of the asphalt.

An attempt was made to contact the districts to clarify the calculation of relative density; however, because of the number of projects and districts, the effort was relatively non-productive.

Aggregate specific gravity, which is often used by the districts, is the effective specific gravity which takes into account absorption of asphalt by the aggregate particles. If effective specific gravity is used, then calculated G_t is a realistic value and will be close to the maximum specific gravity obtained using the Rice method. For the

TABLE 3.1. OVERALL VARIATION OF ASPHALT CONTENT DATA (86 MIXTURES)

	Extracted AC Content (%)	Design AC Content (%)	Design-Extracted AC Content (%)
Average	5.03	5.07	0.04
Std Deviation	0.67	0.69	0.02
Maximum	7.5	7.6	0.10
Minimum	3.6	3.7	0.10

purpose of this summary, the relative core density entries from Form 404 were designated G_c/G_r where

G_c = core specific gravity and
G_r = Rice specific gravity.

Relative laboratory densities were G_l/G_{te} where

G_l = specific gravity of laboratory-compacted specimens and
G_t = theoretical maximum specific gravity based on the effective specific gravity of the aggregate.

Other relative density parameters which were analyzed included

(1) relative core and laboratory densities based on the theoretical maximum specific gravity calculated from extracted asphalt content, and
(2) relative core and laboratory density based on the theoretical maximum specific gravity calculated from the specified design asphalt content.

These theoretical maximum densities are calculated using the formula given for G_t, and the aggregate specific gravity (G_{agg}) used is the bulk specific gravity, which does not take into account the asphalt absorption.

CORE DATA

G_c/G_r: RELATIVE CORE DENSITY BASED ON RICE SPECIFIC GRAVITY

Relative core density data for all projects are summarized in Tables 3.2A and 3.2B. Table 3.2A values are obtained by using the average values for each project to establish the mean as well as the range for each parameter. Table 3.2B values are obtained by using every data point from every project (not only the averages) to establish the mean and the range of parameters.

As shown in Table 3.2A, G_c/G_r information (relative core density based on Rice maximum specific gravity) was available for 58 different mixtures. Values ranged from 90.1 percent to 95.8 percent with an average of 93.0 percent. The standard deviations ranged from 0.17 percent to 3.37 percent with an average of 1.23 percent.

Relative density data have been shown in the past to follow a normal distribution (Ref 1). A histogram of the G_c/G_r data contained in this data base is shown in Fig 7 and indicates a normal distribution. Assuming the data are normally distributed, the percentage of the densities which satisfy current specification limits of 92.0 percent to 97.0 percent relative density (3 percent to 8 percent air

TABLE 3.2A. VARIATION OF CORE DENSITY PARAMETERS BY MIXTURE

	Number of Mixtures	Relative Density Range	Relative Density Average	Standard Deviation Range	Standard Deviation Average
Gc/Gr	58	90.1-95.8	93.0	0.17-3.37	1.23
Gc/Gl	26	92.4-102.3	95.9	0.53-3.15	1.51
Gc/Gt Ext	18	91.8-97.9	94.3	0.35-3.38	1.41
Gc/Gt Design	18	92.1-97.8	94.5	0.35-3.17	1.46
VMA	18	12.7-19.5	16.7	0.33-2.68	1.27
% Voids Filled	15	49.7-71.8	57.4	2.42-10.76	5.50

Note: The average value for each mixture was used to establish the range and averages.

TABLE 3.2B. OVERALL VARIATION OF CORE DENSITY PARAMETERS

	Number of Mixtures	Relative Density Range	Relative Density Average	Standard Deviation Range	Standard Deviation Average
Gc/Gr	58	86.0-98.0	93.1	0.17-3.37	1.23
Gc/Gl	26	87.5-104.0	95.7	0.53-3.15	1.51
Gc/Gt Ext	18	86.2-99.2	94.4	0.35-3.38	1.41
Gc/Gt Design	18	86.9-102.6	94.6	0.35-3.17	1.46
VMA	18	11.9-23.5	16.6	0.33-2.68	1.27
% Voids Filled	15	40.1-82.5	48.1	2.42-10.76	5.50

Note: The minimum and maximum values of all mixtures were used to establish the range and averages.

voids) can be calculated. These percentages are presented in Appendix I, and are summarized in Table 3.3A.

As shown in Table 3.3A, the percentage of the densities satisfying specification requirements ranged from 15.1 to 100 percent with an average of 70 percent. These results are also shown for types A, B, C, D, and G mixtures. For type D mixtures, which are more common than other mixture types, 15.1 to 100 percent of the time, density requirements were satisfied with an average of 66.6 percent. Type B mixtures showed the best results with 74.2 to 100 percent of the densities meeting the specification requirements. It must also be mentioned that these percentages include several ranges of mat thickness and other specific pavement characteristics; therefore, a clear distinction could not be made from this analysis alone to indicate which mixture types yield better relative densities.

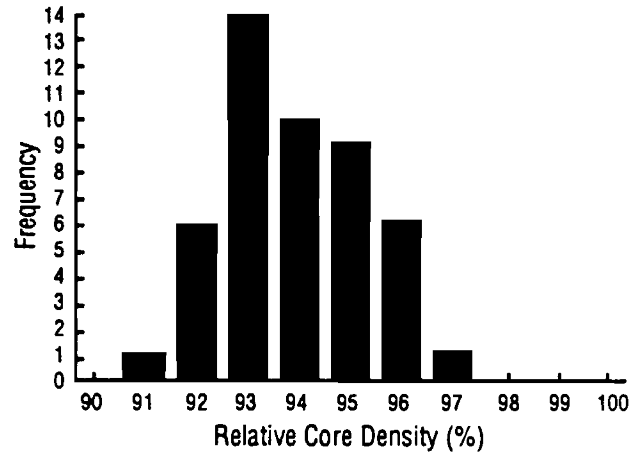

Fig 7. Histogram of relative core density data.

TABLE 3.3A. PERCENTAGE OF CORE DENSITIES WITHIN 92.0 – 97.0%

	Number of Mixtures	Range	Average	Std. Dev (%)
All Mixtures	57	15.1-100	70	26
Type A Mixtures	–	–	–	–
Type B Mixtures	8	74.2-100	90.5	9.8
Type C Mixtures	11	25.0-92.0	65.5	23.2
Type D Mixtures	38	15.1-100	66.6	27.5
Type G Mixtures	1	100	100	–

TABLE 3.3B. PERCENTAGE OF CORE DENSITIES BELOW 92.0%

	Number of Mixtures	Range	Average	Std Dev (%)
All Mixtures	57	0-84.9	28	27
Type A Mixtures	–	-	-	-
Type B Mixtures	8	0-21.0	4.8	6.8
Type C Mixtures	11	7.7-75.0	34.4	23.2
Type D Mixtures	38	0-84.9	31.9	28.3
Type G Mixtures	1	0	0	-

TABLE 3.3C. PERCENTAGE OF CORE DENSITIES ABOVE 97.0%

	Number of Mixtures	Range	Average	Std Dev (%)
All Mixtures	57	0-22	2	5
Type A Mixtures	–	–	–	–
Type B Mixtures	8	0-22.1	4.7	7.9
Type C Mixtures	11	0-0.6	0.05	0.17
Type D Mixtures	38	0-19.2	1.5	4.1
Type G Mixtures	1	0	0	

The percentages of relative core densities below 92.0 percent and above 97.0 percent are summarized in Tables 3.3B and 3.3C, respectively. As shown in Table 3.3B for all mixture types, 0 to 84.9 percent of the densities fell below 92.0 percent, with an average of 28 percent, whereas on the average only 2.0 percent of the relative densities were above 97.0 percent, with a range of 0 to 22 percent. Detailed G_c/G_r data for each project and mixture type are contained in Appendix J.

G_c/G_l: RELATIVE CORE DENSITY BASED ON SPECIFIC GRAVITY OF LABORATORY-COMPACTED SPECIMENS

G_c/G_l data were calculated using the data available from Form 404's or the mixture design data. To calculate G_c/G_l, the specific gravity of both cores and laboratory compacted specimens had to be known. The density data reported in Form 404 are generally relative densities. Therefore G_c and G_l had to be calculated. These values can be calculated from relative core density (G_c/G_r) and relative lab density (G_l/G_r or G_l/G_{te}), provided G_r or G_{te} are known. For projects where the daily values of G_r were reported, these values were used directly to calculate G_c and G_l. If daily G_r was not reported, then aggregate effective specific gravities were obtained from mixture design information and used in conjunction with daily averages of the extracted asphalt content to obtain a maximum specific gravity (G_{te}) according to the following formula:

$$G_{te} = \frac{100}{\frac{\% Agg}{G_e} + \frac{\% AC_{avg}}{G_{ac}}}$$

where

G_{te} = maximum specific gravity of the mixture,

% Agg = percentage of aggregate based on total mixture weight,

% AC_{avg} = a daily average of the extracted asphalt content based on total mixture weight,

G_e = effective specific gravity of aggregate mixture, and

G_{ac} = specific gravity of the asphalt.

G_{te} was in turn used to calculate G_c and G_l according to the following relationships:

G_c = $(G_c/G_r)G_{te}$ (used only if daily G_r was not reported), and

G_l = $(G_l/G_r)G_{te}$ or $G_l = (G_l/G_{te})G_{te}$.

These relationships will be accurate only if $G_r = G_{te}$. Analyzing G_r and G_{te} from projects which had provided both values indicated that G_r's and G_{te}'s values are very similar. Therefore it was decided to use G_r and G_{te} interchangeably, since this was the only way to obtain G_c and G_l. The G_c and G_l calculated in this manner were also used to calculate voids in the mineral aggregate (VMA).

Also included in Table 3.2 are the summaries of the G_c/G_l data. As shown in Table 3.2A, the average value of G_c/G_l for all projects ranged from 92.4 to 102.3 percent with an average of 95.9 percent. Detailed G_c/G_l data for each project and mixture type are summarized in Appendix K.

As it has been stated in literature (Ref 1), G_c/G_l values do not provide a measure of the true relative density (air voids), since the laboratory-compacted specimens contain air voids and the amount of voids will vary from project to project, mixture to mixture, and day to day.

$G_c/G_{t\ Ext.}$: RELATIVE CORE DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FROM EXTRACTED ASPHALT CONTENT

$G_c/G_{l\ Ext.}$ values based on the average of each project are presented in Table 3.2A; in Table 3.2B they are presented based on overall data. $G_c/G_{l\ Ext.}$ averages range from 91.8 to 97.9 percent with an average of 94.3 percent. Standard deviations range from 0.35 to 3.38 percent with an average of 1.41 percent. Detailed $G_c/G_{t\ Ext.}$ data for all mixture types are contained in Appendix K.

$G_c/G_{t\ Design}$: RELATIVE CORE DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FROM DESIGN ASPHALT CONTENT

$G_c/G_{t\ Design}$ values based on the average of each project are summarized in Table 3.2A; in Table 3.2B, based on overall data. $G_c/G_{t\ Design}$ averages range from 92.1 to 97.8 percent with an average of 94.5 percent. Standard deviations range from 0.35 to 3.17 percent with an average of 1.46 percent. $G_c/G_{t\ Design}$ range and average are very close to $G_c/G_{t\ Ext.}$ values. However, $G_c/G_{t\ Ext.}$ data provide a more realistic indication of daily relative densities. Detailed $G_c/G_{t\ Design}$ data for all mixture types are contained in Appendix K.

VOIDS IN MINERAL AGGREGATES OF CORES

The voids in the mineral aggregate (VMA's) for cores were calculated for each project using the following relationship:

$$VMA = 100 - (G_c (\% Agg)) / G_{agg}$$

where

G_c = core specific gravity,

% Agg = percentage of aggregates in the mixture, and

G_{agg} = bulk specific gravity of aggregates.

There are differing opinions regarding the use of bulk specific gravity of the aggregate in VMA calculations. Some experts prefer to use effective specific gravity of the aggregate because bulk specific gravity does not reflect the asphalt which is absorbed in the aggregate. The reported VMA's are based on aggregate bulk specific gravity of the aggregate due to the preference of the Texas SDHPT.

Core VMA's are summarized in Table 3.2. Table 3.2A includes VMA summaries based on the average values in each project. These VMA's ranged from 12.7 to 19.5 percent with an average of 16.7 percent. Standard deviations ranged from 0.33 to 2.68 with an average of 1.27 percent. It must be mentioned that in states which have VMA requirements in their specifications, the requirements are generally for laboratory-compacted specimens, not cores. Core VMA's are presented here to reflect actual in-place values. Also important is the influence of maximum aggregate size used in the mixture on the VMA. VMA specifications generally include a minimum required VMA for a given aggregate size. Minimum VMA requirements are designed to insure that adequate void space is available for asphalt cement. One commonly used VMA specification is the one which has been developed by the Asphalt Institute (Ref 2) and is contained in Table 3.4.

TABLE 3.4. VMA SPECIFICATIONS RECOMMENDED BY THE ASPHALT INSTITUTE (REF 2)

Maximum Aggregate Size	Minimum Required VMA (%)
No. 16	23.5
No. 8	21
No. 4	18
3/8 in.	16
1/2 in.	15
3/4 in.	14
1 in.	13
1 1/2 in.	12
2 in.	11.5
2 1/2 in.	11

It must be mentioned that the Asphalt Institute requirements were developed based on the specimens which are compacted using the Marshall Hammer. A common compaction technique in Texas employs a gyratory shear compactor which does not produce a given compactive effort. Rather the procedure is defined in terms of resistance to compaction or deformation.

Because of the importance of the maximum aggregate size on VMA, the VMA data are summarized for each mixture type and presented in Table 3.5. The values in Table 3.5 are based on project averages. Detailed core VMA data are included in Appendix L.

PERCENTAGE OF VOIDS FILLED (PVF) WITH ASPHALT FOR CORES

The percentages of voids in the mineral aggregates which are filled with asphalt is a parameter which is felt to influence the durability of asphalt pavements. The PVF value is calculated using the following relationship:

$$PVF = (VMA - \% Air (100)) / VMA$$

where

% Air = air voids content of the mixture.

The allowable PVF is generally specified as a range. The acceptable range of maximum PVF values generally is 70 to 85 percent (Ref 3). Extremely high values of PVF indicate that the mixture is susceptible to flushing and rutting. Low values of PVF indicate low asphalt film thicknesses, which can result in reduced mixture durability due to moisture and oxidation. A summary of the PVF values for cores are contained in Table 3.6.

As shown in Table 3.6, the PVF's obtained from the cores are much lower than 70 to 85 percent. These low PVF values indicate either high air void contents or low asphalt content. Both deficiencies can contribute to lower durability. Detailed core PVF values are included in Appendix L.

LABORATORY DATA

The preceding discussion was focused on data related to pavement cores which characterize the quality of the in-place mixture. However, prior to construction the

TABLE 3.5. SUMMARY OF CORE VMA'S BY MIXTURE TYPES

Mixture Type	Number of Mixtures	Max Agg Size (in.)	Average VMA Range (%)	Average VMA Average (%)	Average VMA Std Dev (%)	Standard Deviation Range (%)	Standard Deviation Average (%)
All mixtures	18	–	12.7 - 19.5	16.7	1.9	0.33-2.68	1.27
Type A	0	13/4	–	–	–	–	–
Type B	0	7/8	–	–	–	–	–
Type C	6	5/8	12.7-17.9	16.4	1.9	0.33-1.82	0.95
Type D	11	3/8	15.0-19.5	17.1	1.6	0.70-2.68	1.49
Type G	1	–	13.0	13.0	–	0.81	0.81

TABLE 3.6. SUMMARY OF CORE VMA'S BY MIXTURE TYPES

Mixture Type	Number of Mixtures	Max Agg Size (in.)	Average PVG Range (%)	Average PVG Average (%)	Average PVG Std Dev (%)	Standard Deviation Range (%)	Standard Deviation Average (%)
All mixtures	18	–	49.7-71.8	57.4	6.1	2.4-10.8	5.5
Type A	0	1 3/4	–	–	–	–	–
Type B	0	7/8	–	–	–	–	–
Type C	6	5/8	51.6-62.0	54.6	4.4	2.8-7.0	4.3
Type D	10	3/8	49.7-71.8	58.7	6.5	2.4-10.8	6.1
Type G	1	–	–	–	–	–	–

mixture needs to be tested and analyzed in the laboratory at the design stage. For this reason, characteristics of the laboratory-molded specimens, which are fabricated daily in the mixing plant, can provide valuable data which may help in establishing mixture design guidelines.

The data presented in this section include Relative Density of Laboratory Molded Specimens based on:

(1) Maximum Theoretical Specific Gravity based on effective specific gravity of the aggregate and daily extracted asphalt contents (G_{te});
(2) Maximum Theoretical Specific Gravity based on aggregate bulk specific gravity and daily extracted asphalt contents ($G_{t\ Ext.}$); and
(3) Maximum Theoretical Specific Gravity based on aggregate bulk specific gravity and design asphalt content ($G_{t\ Design}$).

Voids in mineral aggregate of laboratory-molded specimens and percent voids filled with asphalt are also included.

The data for laboratory-molded specimens are summarized in Tables 3.7A and 3.7B. Table 3.7A contains the range and average values based on the average value of each project, whereas Table 3.7B includes the overall variation, which is obtained by using the extreme minimum and maximum values in each project.

G_l/G_{te}: RELATIVE LABORATORY DENSITY BASED ON MAXIMUM THEORETICAL SPECIFIC GRAVITY

Table 3.8 contains G_l/G_{te} values summarized by mixture types. Since the mixture design procedures are established to give a G_l/G_{te} value of 97.0 percent then all G_l/G_{te} numbers need to be compared to 97.0 percent. For all mixtures average G_l/G_{te} was 96.9 percent with average standard deviation 0.90. This indicates that 68 percent of the values were within 96.0 to 97.8 percent and 99 percent of the values were within 94.3 to 99.2 percent.

TABLE 3.7A. VARIATION OF LAB DENSITY PARAMETERS BY MIXTURE

	Number of Mixtures	Relative Density		Standard Deviation	
		Range	Average	Range	Average
Gl/Gte	82	94.4-98.1	96.9	0.13-1.36	0.57
Gl/G_t Ext	24	95.7-101.5	98.5	0.13-1.66	0.75
Gl/G_t Design	24	95.6-102.3	98.7	0.20-3.38	0.81
VMA	24	11.3-15.0	13.0	0.21-1.30	0.59
% Voids Filled	21	63.0-85.9	78.7	0.75-8.03	4.83

TABLE 3.7B. OVERALL VARIATION OF LAB DENSITY PARAMETERS

	Number of Mixtures	Relative Density		Standard Deviation	
		Range	Average	Range	Average
Gl/Gte	82	93.1-99.7	97.0	0.13-1.36	0.57
Gl/G_t Ext	24	94.2-102.5	98.5	0.13-1.66	0.75
Gl/G_t Design	24	94.3-110.6	98.6	0.20-3.38	0.81
VMA	24	9.9-16.2	12.9	0.21-1.30	0.59
% Voids Filled	21	52.7-97.1	67.5	0.75-8.03	4.83

TABLE 3.8. SUMMARY OF G_l/G_{te} DATA BY MIXTURE TYPES

Mixture Type	Number of Mixtures	Max. Agg. Size (In.)	AverageGL/Gte			Standard Deviation	
			Range (%)	Average (%)	Std Dev (%)	Range (%)	Average (%)
All mixtures	82	–	94.4-98.1	96.9	0.9	0.13-1.36	0.57
Type A	1	–	97.3	97.3	–	0.91	0.91
Type B	8	–	95.1-97.3	96.4	0.8	0.23-1.01	.50
Type C	11	–	96.3-98.1	97.7	0.9	0.13-0.91	0.51
Type D	59	–	94.4-98.0	96.8	0.9	0.19-1.36	0.58
Type G	3	–	96.1-98.0	97.3	1.0	0.42-0.82	0.56

Detailed G_l/G_{te} data for various mixture types are included in Appendix M.

G_l/G_t Ext.: RELATIVE LABORATORY DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FROM EXTRACTED ASPHALT CONTENT

G_l/G_t Ext. ranges values are presented in Table 3.7A for the average of each project, and the overall ranges of values are shown in Table 3.7B. Average values of G_l/G_t Ext. ranged from 95.7 to 101.5 percent with an average of 98.5 percent. Standard deviations ranged from 0.13 to 1.66 percent with an average of 0.75 percent. Since calculation of maximum theoretical density is based on the bulk specific gravity of aggregates and the absorption of asphalt by the aggregate is not taken into consideration, some of the relative densities are over 100 percent. G_l/G_t Ext. values for all projects are presented in Appendix N.

G_l/G_t Design: RELATIVE LABORATORY DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FOR DESIGN ASPHALT CONTENT

G_l/G_t Design ranges of values are presented in Table 3.7A for the average of each project, and the overall ranges of values are shown in Table 3.7B. Average values ranged from 95.6 to 102.3 percent with an average of 98.7 percent. Standard deviations ranged from 0.20 to 3.38 percent with an average of 0.81 percent. Detailed values of G_l/G_t Design for each project are included in Appendix N.

VMA: VOIDS IN MINERAL AGGREGATES OF LABORATORY-COMPACTED SPECIMENS

As discussed in the preceding section on VMA of cores, the VMA of laboratory-compacted specimens is generally used as a specification item. These VMA's are summarized in Table 3.9.

As shown in the Table 3.9, average VMA's ranged from 11.3 to 15.0 percent with an average of 13.0 percent. As discussed in previous sections, VMA is highly dependent on aggregate gradation and maximum aggregate size. Therefore VMA ranges for various aggregate types are shown in Table 3.9. A comparison between the VMA values which are recommended by the Asphalt Institute (Table 3.4) and the values shown in Table 3.9 indicate that VMA's obtained in Texas are generally lower than those recommended by the Asphalt Institute. However, it must be emphasized that VMA's in Table 3.4 are based on the Marshall Hammer method of compaction and are very general. Detailed laboratory VMA values for each project are included in Appendix O. It should be noted that the VMA's in this report were calculated based on plant-produced, lab-compacted specimens and not mix designs. VMA values obtained using this procedure are generally lower than the VMA's calculated at the mix design stage.

PVF: PERCENTAGE OF VOIDS FILLED WITH ASPHALT FOR LABORATORY-COMPACTED SPECIMENS

PVF data for laboratory compacted specimens are contained in Table 3.7 for all data and in Table 3.10 for specific aggregate sizes.

As shown in Table 3.10, PVF values for all mixtures range from 63.0 to 85.9 percent with an average of 78.7 percent. Detailed laboratory PVF data are included in Appendix O.

AGGREGATE GRADATION

Daily extracted aggregate gradations which are reported in Form 404 were used to analyze the variations in aggregate gradations. These gradations were input in a separate Lotus 1,2,3 file (Fig 3). Level 1 and Level 2 gradation data are contained in the same file for ease of operation. Typical Level 1 and Level 2 gradation data files are shown in Figs 3 and 6 respectively. Level 2 gradation data for all projects are contained in Appendix E. Average

TABLE 3.9. VMA'S OF LABORATORY-COMPACTED SPECIMENS

			Average VMA			Standard Deviation	
Mixture Type	Number of Mixtures	Max Agg Size (in.)	Range (%)	Average (%)	Std Dev (%)	Range (%)	Average (%)
All mixtures	24	-	11.3-15.0	13.0	1.2	0.21-1.3	0.59
Type A	1	-	12.0	12.0	-	0.74	0 74
Type B	-	-	-	-	-	-	-
Type C	6	-	11.4-13.6	12.2	0.8	0.23-1.28	0.64
Type D	13	-	11.3-15.0	13.3	1.1	0.21-1.30	0.60
Type G	4	-	11.8-15.0	13.7	1.5	0.35-0.55	0.49

daily gradation data for each sieve size were obtained and plotted on 0.45-power gradation charts for each project and used in analysis. These gradation charts are shown in Appendix P. Gradation charts in Appendix P are organized by mixture types (i.e., types A, B, C, D, and G).

The aggregate gradation has significant effects on characteristics of asphalt mixtures. The rutting potential of the mixture is one characteristic which is influenced by distribution of aggregate sizes. It is generally believed that a hump in gradation in the region of the No. 10 to No. 40 sieves could contribute to tenderness of the mixture, which may result in subsequent rutting of the pavement. Of the 92 mixtures in this data base, 55 showed some indications of a hump in the No. 10 sieve to No. 40 sieve region. Most of these humps were concentrated in type D mixtures. Types A, B, and G mixtures did not have any humps. Only 2 of the 12 type C mixtures showed humps. Of the 63 type D mixtures, 53 showed a hump in the No. 10 sieve to No. 40 sieve region.

TABLE 3.10. SUMMARY OF PVF DATA FOR LABORATORY-COMPACTED SPECIMENS BY MIXTURE TYPE

			Average VMA			Standard Deviation	
Mixture Type	Number of Mixtures	Max Agg Size (in.)	Range (%)	Average (%)	Std Dev (%)	Range (%)	Average (%)
All mixtures	2	–	63.0-85.9	78.7	5.4	0.75-8.03	4.83
Type A	1	–	77.5	77.5	–	6.63	6.63
Type B	–	–	–	–	–	–	–
Type C	5	–	79.8-83.7	81.9	1.6	0.75-6.54	4.39
Type D	12	–	63-85.9	77.3	6.2	2.45-8.03	5.14
Type G	3	–	73.9-84.5	79.6	5.6	3.03-5.05	1.13

REFERENCES

1. Kennedy, Thomas W., Maghsoud Tahmoressi, and James N. Anagnos, "A Summary of the Field Compaction of Asphalt Mixtures in Texas," Research Report No. 317-2F, Center for Transportation Research, The University of Texas at Austin, November 1986.

2. "Mix Design Methods for Asphalt Concrete," The Asphalt Institute, Manual Series No. 2, 1979.

3. Huber, G. A., and G. H. Heiman, "Effects of Asphalt Concrete Parameters on Rutting Performance: A Field Investigation," *Proceedings*: Association of Asphalt Pavement Technologists, Volume 56, 1987.

APPENDIX A

State Department of Highways and
Public Transportation Form 404
and Miscellaneous Data Sheet

MISCELLANEOUS DATA WORK SHEET

Project CSB 373-2-67

Highway SH 44

County Nueces

Date June 15, 1987

Submitted by Pedro Flores Jr. (Name)

Rolling Equipment Used	Yes	No	Roller Weight (#1) (lbs)	Roller Speed (mph)	Vibratory Roller Information: Vibrating Forward Yes	Vibrating Forward No	Vibrating Back Yes	Vibrating Back No	Amplitude (in.)	Frequency (cps)	No. of Vib. Drums	Position in Rolling Train 1	2	3	4	5	Number of Passes (#2)
3-Wheel	X		23,400	6								X					5
Vibratory		X															
Pneumatic	X		21,000	8										X			5
Tandem	X		17,200	3-4									X				5

Note (#1) - Actual scale weight preferred

Note (#2) - One pass is a movement in one direction

ACP Mix Temperature	At Mixer Discharge	At Time of First R. Pass	At Time of Last R. Pass
	335°	230°	175°

Type of ACP Mixing Plant	Yes	No	Maximum Plant Capacity (TPH)	Surge Storage Capacity (tons)	Number of Bins Hot	Cold
Batch		X				
Drum Mixer		X				
Dryer Drum	X		250	60		4

Hauling & Loading Equipment	Yes	No
Bobtail		X
Semitrailer		X
Bobtail w/trailer		X
Preloader		X

Thickness of Compacted Mat Being Placed (in.)	
1 and Under	
More Than 1 Up to 1 1/2	
More than 1 1/2 Up to 2	X
More than 2 Up to 2 1/2	
More than 2 1/2	

Note (#4) - Frequency of correlation work is ________

Structure On Which New Mat is being Placed	Yes	No
Old ACP	X	
Recent ACP Placement		X
Concrete Pavement		X
Flexible Base		X

Note (#3) - Usual depth of rut is ________ inches

Condition of Existing Pavement	Yes	No
Rutted (#3)		
Smooth		
Warped		
Frequently Patched	X	
Open Joints		
Flushed		

Road Density Test Method	Yes	No
Cores	X	
Nuclear (#4)		X

Theoretical Maximum Gravity Used for Lab Density	Yes	No
G_t (207-F)		X
Rice (227-F)	X	

Location of Road Density Tests	Yes	No
Wheel Path		X
Between Wheel Paths	X	
Other		X

Day of Road Density Testing	Yes	No
Same Day Placed	X	
Next Day or later		X

CORE 2 1/4"

Comments: HAULING EQUIPMENT USED ARE BELLY DROPS AND MIX IS BEING PICK-UP BY ELEVATOR MACHINE INTO LAYING MACHINE. 6.3% AIR VOIDS

Comments on mixture quality are most important (harsh, [illegible] ... [illegible] the rollers, prone to segregate.

State Department of Highways
and Public Transportation
Form 404 Rev. 3

DAILY CONSTRUCTION REPORT
ASPHALTIC CONCRETE PAVEMENT

Filed Under:
CSR 102-2-68, US 77

County Nueces Highway SH 44 Project CSB373-2-67 Control 373-2-67

Location of Plant Robstown Type of Plant Dryer Drum Contractor Bay, Inc.

Date June 15, 1987 Specification Item 340 Type D Plant Started 9:15 M. Plant Stopped 6:50 P.M.

Location No.							
1	Rt Main Lane	3	Decel. Lane	5	Entr. Ramp	7	Level-Up
2	Lt F-Rd. Lane	4	Accel. Lane	6	Exit Ramp	8	

Sieve Size	Design No.	Combined Bin Analysis 1	2	3	4	5	6	7	8	Extractions 1	2	3	4	5
+ 1/2	0									0	0			
1 3/4"-7/8"														
7/8"-5/8"														
5/8"-3/8"														
1/2"-3/8"	10.2									9.1	9.5			
3/8"-4	32.2									33.5	33.3			
1/4"-10														
4-10	17.1									19.6	19.7			
+10	59.5									62.2	62.5			
10-40	22.5									22.4	22.0			
40-80	13.0									10.3	9.9			
80-200	3.6									3.5	3.7			
Pass 200	1.4									1.6	1.9			
Total	100.0									100.0	100.0			
Asphalt	4.8									4.8	4.7			

Bin Analy. No.	Extr. No.	Time	Location No.	Course	of Courses	Station No.	Mix Temp. °F. Plant	Road	Specimen Nos.	Road Dens.	Lab Dens.	% Stab.
	1	10:15	1	2	2	344+35	300	280	D-061587		96.3	45
	2	1:00	2	2	2	384+30	300	295				
			1	2	2	340+00			Core #1	93.7		

Materials Used H.M.A.	Asphalt (Tons)	Aggregate (Tons or C.Y.)
Previous Report		5240.46
This Report		2017.73
Total To Date		7258.19

Percent Complete-Asphaltic Concrete Pavement	
Percent Complete—This Type	56.1 %
Percent Complete—All Types	63.4 %

Days Run

Location No.	Course	of Courses	Station to Station		Width (Feet)	Rate of Application 150 Lbs/Sq. Yd. Sq. Yds.	Tons	Inches Lbs/Sq. Yd. Sq. Yds.	Tons	Inches Lbs/Sq. Yd. Sq. Yds.	Tons
1	2	2	337+10	432+55	12	12727					
2	2	2	361+75	430+90	12	9220					

Weather Party Cloudy & Hot

Min. Temp. 79° °F.

Max. Temp. 86° °F.

	Sq. Yds.	Tons	Sq. Yds.	Tons	Sq. Yds.	Tons
Total Today	21,947	2017.73				
Previous Report	58,567	5240.46				
Total To Date	80,514	7258.19				
Avg. Rate To Date	180.3	Lbs/Sq. Yd.		Lbs/Sq. Yd.		Lbs/Sq. Y

Remarks ACTUAL SPECIFIC GRAVITY 2.323 BELT SAMPLE MOISTURE 5.9 HOT MIX MOIST 0.08% AIR VOIDS = 6.3% CORE HT. 1. 5/8" PAVEBOND SP. = 0.98%

[signature]
Inspector

Type D Date June 15, 1987 Report No. D-4

APPENDIX B

Description of Variable Names Used in Levels 1 and 2 Files

TERMINOLOGY	DESCRIPTION
FIGURE 2:	
WORKING DAY	CORRESPONDS TO THE DATES ON 404 FORMS
CORE DEN., %	RELATIVE CORE DENSITY BASED ON RICE SPECIFIC GRAVITY
NUC. DEN., %	RELATIVE NUCLEAR DENSITY BASED ON RICE SPECIFIC GRAVITY
LAB. DEN., %	RELATIVE LAB DENSITY BASED ON RICE SPECIFIC GRAVITY
EXT. AC, %	EXTRACTED ASPHALT CONTENT
DESIGN AC, %	DESIGN ASPHALT CONTENT
DES.-EXT.	DIFFERENCE BETWEEN DESIGN AND EXTERACTED ASPHALT CONTENT
COUNT	NUMBER OF DATA POINTS
AVG.	AVERAGE OF EACH COLUMN
STD	STANDARD DEVIATION OF EACH COLUMN WITH n DEGREE OF FREEDOM
MAX	MAXIMUM VALUE FOR EACH COLUMN OF DATA
MIN	MINIMUM VALUE FOR EACH COLUMN OF DATA
STD N-1	STANDARD DEVIATION OF EACH COLUMN WITH n-1 DEGREES OF FREEDOM. THIS VALUE IS MORE REALISTIC AND IS USED IN ANALYSES.
FIGURE 3:	
SIEVE	DESIGNATED SIEVE
0.45 LINE	GRADATION OF A LINE ON 0.45 POWER CHART CORRESPONDING TO MAXIMUM AGGREGATE SIZE
DESIGN GRAD.	DESIGN GRADATION
1,2,ETC.	GRADATION FOR EACH WORKING DAY
FIGURE 4:	
CORE THICK, IN.	CORE(MAT) THICKNESS. WHEN CORE THICKNESS WAS GIVEN IN 404 FORMS IT WAS ENTERED HERE. IF CORE THICKNESS WAS NOT GIVEN, THEN IT WAS CALCULATED FROM TONNAGE AND AREA COVERAGE
HVEEM STAB., %	HVEEM STABILITY
SQ. YDS.	SQURE YARDS OF AREA PAVED EACH DAY
TONS	AMOUNT OF MIX LAID IN ONE DAY
CORE AND LAB. AIR VOIDS	OBTAINED BY SUBTRACTING ERLATIVE DENSITY FROM 100
CORE AND LAB. VMA	VOIDS IN MINERAL AGGREGATE
CORE AND LAB. VOIDS FILLED	PERCENTAGE OF VOIDS FILLED WITH ASPHALT
FIGURE 5:	
GC/GL	RELATIVE CORE DENSITY BASED ON DENSITY OF LABORATORY COMPACTED SPECIMENS
GC/GText.	RELATIVE CORE DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FROM EXTRACTED ASPHALT CONTENT
GC/GTdes.	RELATIVE CORE DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FROM DESIGN ASPHALT CONTENT
GL/GText.	RELATIVE LABORATORY DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FROM EXTRACTED ASPHALT CONTENT
GL/GT	RELATIVE LABORATORY DENSITY BASED ON THEORETICAL MAXIMUM SPECIFIC GRAVITY CALCULATED FROM DESIGN ASPHALT CONTENT

TERMINOLOGY	DESCRIPTION
FIGURE 6:	
SIEVE	SIEVE SIZE DESIGNATION FOR FIRST THREE COLUMNS OF DATA
0.45 LINE	GRADATION OF A LINE ON 0.45 POWER GRADATION CHART. THIN LINE CORRESPONDS TO MAXIMUM AGGREGATE SIZE FOR EACH PROJECT
DESIGN GRAD.	DESIGN GRADATION
AVG. EXT. GRADATION	AVERAGE OF ALL GRADATIONS FOR A GIVEN SIEVE SIZE
SIEVES FOR % PASS	SIEVE SIZE DESIGNATIONS FOR THE LAST 5 COLUMNS OF DATA
AVG. EXT. % PASS	AVERAGE VALUE OF GRADATIONS, % PASSING
DES. GRAD. % PASS	DESIGN GRADATION CONVERTED TO REFLECT % PASSING EACH SIEVE
0.45 LINE % PASS	GRADATION OF 0.45 LINE, % PASSING
0.45 LINE AVG. EXT.	DIFFERENCE BETWEEN GRADATION OF 0.45 LINE AND AVERAGE GRADATION

APPENDICES C, D, AND E
ARE IN VOLUME II OF RESEARCH REPORT 1197-1F

APPENDIX F

Description of Variable Names Used in Level 3 Data Base

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******************************************************************************
*  THE FOLLOWING ARE THE DESCRIPTIONS OF THE CODE NAMES BY CATEGORY          *
*  USED IN THE "PROJECTS.DBF" DATA BASE FILE DEVELOPED FOR THE TEXAS         *
*  STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION CONSTRUCTION       *
*  DATA.                                                                     *
******************************************************************************
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**** (GENERAL INFORMATION) ****

	CODE NAMES	DESCRIPTION
A1	A1_PROJECT	PROJECT ID

(MIXING PLANT INFORMATION)

	CODE NAMES	DESCRIPTION
A2	A2_PLANT	PLANT TYPE
A3	A3_PLNTCAP	PLANT CAPACITY, TPH
A4	A4_SILOCAP	SILO STORAGE CAPACITY, TONS
A5	A5_NUMBINS	NUMBER OF BINS

(EXISTING PAVEMENT STRUCTURE INFORMATION)

	CODE NAMES	DESCRIPTION
A6	A6_MATHICK	MAT THICKNESS, IN.
A7	A7_UNDRLYR	UNDERLAYER (EXISTING LAYER BEFORE PAVING)
A8	A8_PVTCOND	EXISTING PAVEMENT CONDITION

(MIX TEMPERATURE INFORMATION)

	CODE NAMES	DESCRIPTION
A9	A9_MXDSTMP	MIX TEMPERATURE AT DISCHARGE
B1	B1_FSTPTMP	MIX TEMPERATURE AT FIRST ROLLER PASS
B2	B2_LSTPTMP	MIX TEMPERATURE AT LAST ROLLER PASS

(HAULING AND ROLLING EQUIPMENT INFORMATION)

	CODE NAMES	DESCRIPTION
B3	B3_HAULEQP	HAULING EQUIPMENT TYPE
	THREE WHEELER:	
B4	B4_THRWLSP	THREE WHEELER SPEED, MPH
B5	B5_THRWLWT	THREE WHEELER WEIGHT, TONS
B6	B6_RTPTW	POSITION OF THREE WHEELER IN ROLLING TRAIN
B7	B7_NPSTW	NUMBER OF PASSES OF THREE WHEELER
	VIBRATORY ROLLER:	
B8	B8_VIBSP	VIBRATORY ROLLER SPEED, MPH
B9	B9_VIBWT	VIBRATORY ROLLER WEIGHT, TONS
C1	C1_RTPVB	POSITION OF VIBRATORY ROLLER IN ROLLING TRAIN
C2	C2_NPSVB	NUMBER OF PASSES OF VIBRATORY ROLLER
C3	C3_VIBFWD	VIBRATORY ROLLER VIBRATING FORWARD (YES OR NO)
C4	C4_VIBBAK	VIBRATORY ROLLER VIBRATING BACKWARD (YES OR NO)
C5	C5_AMPL	AMPLITUDE OF VIBRATION, IN.
C6	C6_FREQ	FREQUENCY OF VIBRATION, CPS
C7	C7_NUMDRM	NUMBER OF DRUMS

GENERAL INFORMATION CONTINUED ON NEXT PAGE

GENERAL INFORMATION CONTINUED

PNEUMATIC ROLLER:

C8	C8_PNMTCSP	PNEUMATIC ROLLER SPEED, MPH
C9	C9_PNMTCWT	PNEUMATIC ROLLER WEIGHT, TONS
D1	D1_RTPPN	POSITION OF PNEUMATIC ROLLER IN ROLLING TRAIN
D2	D2_NPSPN	NUMBER OF PASSES OF PNEUMATIC ROLLER

TANDEM ROLLER:

D3	D3_TANDMSP	TANDEM ROLLER SPEED, MPH
D4	D4_TANDMWT	TANDEM ROLLER WEIGHT, TONS
D5	D5_RTPSTM	POSITION OF TANDEM ROLLER IN ROLLING TRAIN
D6	D6_NPSTM	NUMBER OF PASSES OF TANDEM ROLLER

(MISCELLANEOUS AC AND ROAD DENSITY TEST INFORMATION)

	CODE NAMES	DESCRIPTION
D7	D7_GRICE	RICE SPECIFIC GRAVITY (Y/N)
D8	D8_MXTYPE	PAVING MIXTURE TYPE
D9	D9_MXAGSZE	MAXIMUM.AGGREGATE SIZE
E1	E1_ACGRDE	AC GRADE
E2	E2_PRODUCR	AC PRODUCER
E3	E3_DNSMTHD	ROAD DENSITY TEST METHOD (CORE OR NUCLEAR)
E4	E4_DENSLOC	LOCATION WHERE ROAD DENSITY TAKEN
E5	E5_TESTDAY	DAY OF ROAD DENSITY TEST

(HVEEM STABILITY DATA)

	CODE NAMES	DESCRIPTION
E6	E6_DUSTAC	AVERAGE AMOUNT PASSING NO. 200 SIEVE DIVIDED BY AVERAGE EXTERACTED AC
E7	E7_HVMCNT	NUMBER OF HVEEM STABILITY TESTS
E8	E8_HVMAVG	AVERAGE OF HVEEM STABILITY VALUES, %
E9	E9_HVMSTD	STANDARD DEVIATION OF HVEEM STABILITY VALUES, %
F1	F1_HVMMAX	MAXIMUM VALUE OBTAINED FOR HVEEM STABILITY, %
F2	F2_HVMMIN	MINIMUM VALUE OBTAINED FOR HVEEM STABILITY, %

(RELATIVE CORE DENSITY DATA, GC/GR)

	CODE NAMES	DESCRIPTION
	GC	CORE SPECIFIC GRAVITY
	GR	RICE SPECIFIC GRAVITY
	GL	SPECIFIC GRAVITY OF LAB COMPACTED SPECIMEN
	GTEX,GTX	MAXIMUM THEORETICAL SPECIFIC GRAVITY BASED ON EXTERACTED AC CONTENT
	GTDS,GTD	MAXIMUM THEORETICAL SPECIFIC GRAVITY BASED ON DESIGN AC CONTENT
F3	F3_GCGRN	NO. OF SAMPLES FOR GC/GR
F4	F4_GCGRAVG	AVERAGE OF GC/GR DATA
F5	F5_GCGRSTD	STANDARD DEVIATION OF GC/GR DATA
F6	F6_GCGRMIN	MINIMUM GC/GR
F7	F7_GCGRMAX	MAXIMUM GC/GR

(RATIO OF CORE DENSITY TO LAB DENSITY, GC/GL)

	CODE NAMES	DESCRIPTION
F8	F8_GCGLN	NO. OF SAMPLES FOR GC/GL
F9	F9_GCGLAVG	AVERAGE OF GC/GL DATA
G1	G1_GCGLSTD	STANDARD DEVIATION OF GC/GL DATA
G2	G2_GCGLMIN	MINIMUM GC/GL
G3	G3_GCGLMAX	MAXIMUM GC/GL

(RATIO OF CORE DENSITY TO EXTERACTED THEORETICAL DENSITY)

	CODE NAMES	DESCRIPTION
G4	G4_GCGTEXN	NO. OF SAMPLES FOR GC/GTEX
G5	G5_GCGTXAV	AVERAGE OF GC/GTX DATA
G6	G6_GCGTXSD	STANDARD DEVIATION OF GC/GTX DATA
G7	G7_GCGTXMN	MINIMUM GC/GTX
G8	G8_GCGTXMX	MAXIMUM GC/GTX

(RATIO OF CORE DENSITY TO DESIGN THEORETICAL DENSITY)

	CODE NAMES	DESCRIPTION
G9	G9_GCGTDSN	NO. OF SAMPLES FOR GC/GTDS
H1	H1_GCGTDAV	AVERAGE OF GC/GTD DATA
H2	H2_GCGTDSD	STANDARD DEVIATION OF GC/GTD DATA
H3	H3_GCGTDMN	MINIMUM GC/GTD
H4	H4_GCGTDMX	MAXIMUM GC/GTD

(RELATIVE LAB DENSITY DATA, GL/GR)

	CODE NAMES	DESCRIPTION
H5	H5_GLGRN	NO. OF SAMPLES FOR GL/GR
H6	H6_GLGRAVG	AVERAGE OF GL/GR DATA
H7	H7_GLGRSTD	STANDARD DEVIATION OF GL/GR DATA
H8	H8_GLGRMIN	MINIMUM GL/GR
H9	H9_GLGRMAX	MAXIMUM GL/GR

(RATIO OF LAB DENSITY TO EXTERACTED THEORETICAL DENSITY)

	CODE NAMES	DESCRIPTION
J1	J1_GLGTXN	NO. OF SAMPLES FOR GL/GTX
J2	J2_GLGTXAV	AVERAGE OF GL/GTX DATA
J3	J3_GLGTXSD	STANDARD DEVIATION OF GL/GTX DATA
J4	J4_GLGTXMN	MINIMUM GL/GTX
J5	J5_GLGTXMX	MAXIMUM GL/GTX

(RATIO OF LAB DENSITY TO DESIGN THEORETICAL DENSITY)

	CODE NAMES	DESCRIPTION
J6	J6_GLGTDN	NO. OF SAMPLES FOR GL/GTD
J7	J7_GLGTDAV	AVERAGE OF GL/GTD DATA
J8	J8_GLGTDSD	STANDARD DEVIATION OF GL/GTD DATA
J9	J9_GLGTDMN	MINIMUM GL/GTD
K1	K1_GLGTDMX	MAXIMUM GL/GTD

(ASPHALT CONTENT DATA)

	CODE NAMES	DESCRIPTION
K2	K2_ACDESN	NO. OF DIFFERENT DESIGN ASPHALT CONTENTS
K3	K3_ACDES	AVERAGE DESIGN AC CONTENT, %

(EXTERACTED AC DATA)

	CODE NAMES	DESCRIPTION
K4	K4_ACEXT	AVERAGE EXTERACTED AC CONTENT
K5	K5_EXTACSD	STANDARD DEVIATION OF EXTERACTED AC CONTENT
K6	K6_AVGDXAC	AVERAGE OF DIFFERENCES BETWEEN DESIGN AND EXTERACTED AC CONTENT
K7	K7_STDDXAC	STANDARD DEVIATION OF DIFFERENCES BETWEEN DESIGN AND EXTERACTED AC CONTENT

(CORE VMA DATA)

	CODE NAMES	DESCRIPTION
	VMA	VOIDS IN MINERAL AGGREGATE
K8	K8_VMACON	NO. OF CORES USED IN DETERMINING VMA
K9	K9_VMACRAV	AVERAGE VMA OF CORES, %
L1	L1_VMACRSD	STANDARD DEVIATION OF CORE VMA, %
L2	L2_VMACRMN	MINIMUM VMA OF CORES, %
L3	L3_VMACRMX	MAXIMUM VMA OF CORES, %

(CORE PVF DATA)

	CODE NAMES	DESCRIPTION
	PVF	PERCENT VOIDS FILLED
L4	L4_PVFCORN	NO. OF CORES USED IN DETERMINING PVF
L5	L5_PVFCRAV	AVERAGE PVF OF CORES, %
L6	L6_PVFCRSD	STANDARD DEVIATION OF CORE PVF, %
L7	L7_PVFCRMN	MINIMUM PVF OF CORES, %
L8	L8_PVFCRMX	MAXIMUM PVF OF CORES, %

(LAB VMA DATA)

	CODE NAMES	DESCRIPTION
L9	L9_VMALABN	NO. OF SPECIMENS USED IN DETERMINING LAB VMA
M1	M1_VMALBAV	AVERAGE LAB VMA, %
M2	M2_VMALBSD	STANDARD DEVIATION OF LAB VMA, %
M3	M3_VMALBMN	MINIMUM LAB VMA, %
M4	M4_VMALBMX	MAXIMUM LAB VMA, %

(LAB PVF DATA)

	CODE NAMES	DESCRIPTION
M5	M5_PVFLABN	NO. OF SPECIMENS USED IN DETERMINING LAB PVF
M6	M6_PVFLBAV	AVERAGE PVF OF LAB COMPACTED SPECIMENS, %
M7	M7_PVFLBSD	STANDARD DEVIATION OF LAB PVF, %
M8	M8_PVFLBMN	MINIMUM LAB PVF, %
M9	M9_PVFLBMX	MAXIMUM LAB PVF, %

	CODE NAMES	DESCRIPTION
N1	N1_P38AVG	AVERAGE OF PERCENTAGES PASSING 3/8 INCH SIEVE
N2	N2_P38DAV	DIFFERENCE BETWEEN DESIGN AND AVERAGE EXTERACTION FOR PERCENT PASSING 3/8 INCH SIEVE
N3	N3_P3845AV	DIFFERENCE BETWEEN 0.45 LINE AND AVERAGE EXTERACTION FOR PERCENT PASSING 3/8 INCH SIEVE
N4	N4_P10AVG	AVERAGE OF PERCENTAGES PASSING NO. 10 SIEVE
N5	N5_P10DAV	DIFFERENCE BETWEEN DESIGN AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 10 SIEVE
N6	N6_P1045AV	DIFFERENCE BETWEEN 0.45 LINE AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 10 SIEVE
N7	N7_P40AVG	AVERAGE OF PERCENTAGES PASSING NO. 40 SIEVE
N8	N8_P40DAV	DIFFERENCE BETWEEN DESIGN AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 40 SIEVE
N9	N9_P4045AV	DIFFERENCE BETWEEN 0.45 LINE AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 40 SIEVE
P1	P1_P80AVG	AVERAGE OF PERCENTAGES PASSING NO. 80 SIEVE
P2	P2_P80DAV	DIFFERENCE BETWEEN DESIGN AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 80 SIEVE
P3	P3_P8045AV	DIFFERENCE BETWEEN 0.45 LINE AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 80 SIEVE
P4	P4_P200AVG	AVERAGE OF PERCENTAGES PASSING NO. 200 SIEVE
P5	P5_P200DAV	DIFFERENCE BETWEEN DESIGN AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 200 SIEVE
P6	P6_P20045A	DIFFERENCE BETWEEN 0.45 LINE AND AVERAGE EXTERACTION FOR PERCENT PASSING NO. 200 SIEVE

(AGGREGATE INFORMATION)

	CODE NAMES	DESCRIPTION
P7	P7_CRAGTYP	COARSE AGGREGATE TYPE
P8	P8_IMAGTYP	INTERMEDIATE AGGREGATE TYPE
P9	P9_SCRGTYP	SCREENINGS TYPE
Q1	Q1_FDSDTYP	FIELD SAND TYPE
Q2	Q2_PCTCRAG	PERCENTAGE OF COARSE AGGREGATE USED IN THE MIX
Q3	Q3_PCTIMAG	PERCENTAGE OF INTERMEDIATE AGGREGATE USED IN THE MIX
Q4	Q4_PCTSCRG	PERCENTAGE OF SCREENINGS USED IN THE MIX
Q5	Q5_PCTFDSD	PERCENTAGE OF FIELD SAND USED IN THE MIX

(AMBIENT TEMPERATURE INFORMATION)

	CODE NAMES	DESCRIPTION
Q6	Q6_AVMNTMP	AVERAGE MINIMUM AIR TEMPERATURE
Q7	Q7_AVMXTMP	AVERAGE MAXIMUM AIR TEMPERATURE

APPENDIX G

Data Included in DBASE III Plus
Data Base

PROJECT	PLANT	PLANT CAPCTY	SILO CAP.	# OF BINS	MAT THCK	UNDER LAYER	PAVMENT CONDITION	MIX DISCH TEMP	FIRST PASS TEMP
D16NSH44	DRUM	250	60	4	1.44	AC(OLD)	RUTTED	335	230
D16RFM26	DRUM	400	90	4	1.25	AC(OLD)	RUTTED	0	0
D16RUS77B1	DRUM	400	90	4	3.11	AC,FL BASE		0	0
D16RUS77B2	DRUM	400	90	4	3.03	AC,FL BASE		0	0
D16RUS77L	DRUM	400	90	4	1.25	AC(OLD)	RUTTED	0	0
D16RUS77S	DRUM	400	90	4	1.64	AC(RECENT)		0	0
D16SPU18B	DRUM	400	90	4	3.14	AC,FL BASE		0	0
D16SPU18S	DRUM	400	90	4	1.60	AC(RECENT)		0	0
D17BFM28	DRUM	200	0	0	1.69	AC,FL BASE	RUT,SMTH,PCH	295	290
D17BSH21	DRUM	325	600	0	1.50	AC,FL BASE	RUT,PATCH	0	0
D17BUS21	BATCH	300	600	0	3.02	AC(RECENT)	SMOOTH	310	305
D17BSH36TB	DRUM	300	200	4	2.49	AC,FL BASE	SMOOTH	300	275
D17BSH36TD	DRUM	300	200	4	1.53	AC(RECENT)	SMOOTH	300	275
D17GS105	DRUM	350	200	4	1.23	AC(OLD),PCC	RUT,P,SM,WP,	300	275
D17GSH6	DRUM	450	40	4	1.53	AC(OLD)		325	310
D17GSH6B	DRUM	450	40	4	1.51	AC(OLD)		325	310
D17GSH6C	DRUM	450	40	4	1.25	AC(OLD)		325	310
D17WUS29D	DRUM	450	400	4	1.67	AC(OLD)	RUT,SMTH,WRP	315	305
D17WUS29B1	BATCH	450	200	4	2.97	AC,FL BS,SC	SMOOTH	300	275
D17WUS29B2	BATCH	450	200	4	3.25	AC,FL BS,SC	SMOOTH	300	275
D17WUS29B3	BATCH	450	200	4	3.19	AC,FL BS,SC	SMOOTH	300	275
D17WUS29B4	BATCH	450	200	4	2.50	AC,FL BS,SC	SMOOTH	300	275
D17WU29COM	DRUM	450	40	4	1.25	AC(OLD),PCC	ALL,NO FLUSH	325	275
D17BSORCOM	DRUM	450	40	4	1.45	AC(OLD),PCC	ALL,NO FLUSH	325	275
D17B21COM	DRUM	450	40	4	1.53	AC(OLD),PCC	ALL,NO FLUSH	325	275
D17R79COM	DRUM	450	40	4	1.49	AC(OLD),PCC	ALL,NO FLUSH	325	275
D17MS21COM	DRUM	450	40	4	1.38	AC(OLD),PCC	ALL,NO FLUSH	325	275
D18DIH63	DRUM	225	65	4	1.70	AC(OLD),PCC	SMOOTH,WRP	0	0
D18NFM16	DRUM	250	80	4	3.00	SUBGRADE	JOINT(OPEN)	260	210
D19CUS59	DRUM	400	100	4	2.68	FLEX BASE	RUT,JT,CRACK	315	300
D19MUS59	DRUM	250	100	4	2.51	LFA SUBG.	NEW	290	270
D19PUS59	DRUM	250	75	4	2.97	LFA SUBG.	NEW	275	225
D20TUS69	DRUM	0	0	4	1.74	AC,PCC,FL BS	RUT,WARP,FLS	300	265
D21CFM14	DRUM	240	100	4	1.75	PCC	WARP,PATCH	300	255
D21HUS83	DRUM	200	35	4	1.75	AC,FL BASE	PATCHED	300	270
D21SFM75	DRUM	300	75	4	1.50	FLEX BASE	SMOOTH	280	270
D23BFM45	DRUM	400	120	4	1.33	AC(OLD),PCC	PATCH,FAB,SL	325	290
D23BUS67	DRUM	400	120	4	1.50	AC(OLD),PCC	PATCH,FAB,SL	325	290
D23EIH20A	BATCH	250	0	0	1.25	AC(OLD)	PLANED	325	310
D23EIH20B	BATCH	250	0	0	1.25	AC(OLD)	PLANED	325	310
D23LU190	BATCH	137	0	4	1.45	AC,FL BASE	WARP,SMOOTH	335	320
D23MUS87	DRUM	0	0	0	4.43	PCC,ASB	SMOOTH	320	290
D24CUS62	DRUM	500	70	3	1.50	AC(OLD)	WARP,PATCH	295	265

PROJECT	PLANT	PLANT CAPCTY	SILO CAP.	# OF BINS	MAT THCK	UNDER LAYER	PAVMENT CONDITION	MIX DISCH TEMP	FIRST PASS TEMP
D1FNUS82	DRUM	700	70	4	1.95	AC(OLD)	WARP,PATCH	300	265
D1HUSH50	DRUM	250	80	4	1.50	FLEX BASE	SMOOTH	285	260
D1LMSH19	DRUM	700	70	4	1.40	AC(OLD),ASB	SMOOTH	340	280
D1LMUS82	BATCH	150	0	3	1.54	AC(OLD)		300	275
D2TFM188	DRUM	500	600	6	2.04	AC(OLD)	RUTTED	325	320
D2TFM188B	DRUM	500	600	6	2.25	AC(OLD)	RUTTED	325	320
D2TFM188C	DRUM	500	600	6	2.25	AC(OLD)	RUTTED	325	320
D2TI20G2	DRUM	500	200	0	2.06	AC,PCC	RUT,SMOOTH	325	300
D3CUS287	DRUM	800	70	4	1.25	AC,PCC		315	305
D3WUS82	DRUM	400	50	4	1.97	AC,FL BASE	RUT,PATCH	275	270
D4CUS60S	BATCH	150	0	3	1.34	AC(OLD)	RUT,FLUSH	295	225
D4CUS60L	BATCH	150	0	3	1.50	AC(OLD)	RUT,FLUSH	295	225
D5GAFM65	DRUM	150	22	4	1.40	AC(O&N),PTRM	RUT,WARP	325	295
D5HOLO44	DRUM	300	85	4	1.50	ASB	SMOOTH	335	320
D5LSP326	DRUM	170	100	4	1.75	ASB	SMOOTH	300	290
D5LUUS84D	DRUM	700	50	4	1.62	AC,SURF TRT	RUT,WARP	320	280
D5LUUS84C	DRUM	700	50	4	1.93	AC,SURF TRT	RUT,WARP	320	280
D5LUUS84L1	DRUM	700	50	4	1.62	AC,SURF TRT	RUT,WARP	320	280
D5LUUS84L2	DRUM	700	50	4	2.25	AC,SURF TRT	RUT,WARP	320	280
D5GAUS84	DRUM	300	85	4	1.73	PCC BRG,ASB	SMOOTH	310	292
D7TGS12	BATCH	150	0	4	1.19	AC(OLD)	RUT,SM,WP,P,	310	290
D7TGU67	BATCH	150	0	0	1.59	FLEX BASE	SMOOTH(SEMI)	310	295
D8NI20S	DRUM	500	90	4	1.25	AC(OLD&NEW)	RUT,PATCH	290	270
D8NI20L	DRUM	500	90	4	1.25	AC(OLD)	RUT,FLSH,PAC	290	275
D8TI20	DRUM	500	90	4	1.50	AC(OLD&NEW)	RUT,PATCH	290	270
D8TYUS83	BATCH	800	0	5	2.25	AC(OLD)	WARP,FLUSH	320	300
D10ANU28	BATCH	90	100	3	1.49	AC(OLD),SEAL	RUT,PACH,FLS	325	288
D12GFM17	DRUM	250	80	4	1.63	PCC	SMOOTH	320	225
D12GFM17B	DRUM	250	80	4	1.36	PCC	SMOOTH	320	225
D12MFM13	DRUM	400	150	5	1.62	ASB	SMOOTH	300	270
D12MIH45	DRUM	350	90	4	1.60	AC(RECENT)	SMOOTH	300	285
D13FAU77	DRUM	400	90	4	1.55	AC(RECENT)	SMOOTH	295	280
D13FAU77B	DRUM	400	90	4	1.60	AC(RECENT)	SMOOTH	295	280
D13FAU77C	DRUM	400	90	4	1.65	AC(RECENT)	SMOOTH	295	280
D13FAU77D	DRUM	400	90	4	1.25	AC(RECENT)	SMOOTH	295	280
D13GOSH8	DRUM	240	400	4	1.28	AC(RECENT)	SMOOTH	300	240
D13GOU87	DRUM	240	400	4	1.26	AC(RECENT)	SMOOTH	300	240
D13JAS11	BATCH	90	0	4	1.19	AC(RECENT)	SMOOTH	325	230
D13LAS95	DRUM	400	90	4	1.78	AC(OLD),PCC	WARP,PATCH,J	295	280
D14BSH21	DRUM	300	210	5	1.71	AC(OLD)	RUT,MED FLSH	305	251
D14BSH21B	DRUM	300	210	5	2.03	AC(OLD)	RUT,MED FLSH	305	251
D14BSH71	BATCH	320	180	7	1.81	FLEX BASE	SMOOTH	300	260
D14BUS28	DRUM	250	70	5	1.62	SL CT(OLD)	FLUSHD HEAVY	315	255
D14LUS29	DRUM	385	175	6	1.67	AC(OLD)	SMOOTH,CRAKD	305	281
D14TIH35	DRUM	387	525	6	2.51	FLEX BASE		295	233
D14TIH35ML	DRUM	250	70	5	2.18	AC(OLD),GR5	SMOOTH	280	264
D14TIH35FR	BATCH	320	180	5	1.63	AC(OLD)	SMOOTH,CRACK	285	243
D16JUS28	DRUM	350	75	4	1.58	AC(RECENT)	SMOOTH	300	300
D16JUS28B	DRUM	350	75	4	1.63	AC(RECENT)	SMOOTH	300	300

PROJECT	LST PAS TMP	HAUL EQUIPMENT	THR WHL SPD	THRE WHEL WGHT	RL.TR POS TW	NO. PASS TW	VIB ROL SPD	VIB. ROL. WT.	RL.TR POS. VB	NO. PASS VB	VIB ROL FWD	VIB ROL BACK	AMPL TUDE
D1FNUS82	195	BOB&SEMI	0.0	0.0	0	0	2.5	15.0	1	2	T	T	HIGH
D1HUSH50	180	BOBTAIL	0.0	0.0	0	0	3.0	0.0	1	3	T	T	LOW
D1LMSH19	200	SEMI&PRE	0.0	0.0	0	0	3.0	0.0	1	3	T	T	LOW
D1LMUS82	180	BOBTAIL	4.0	0.0	1	2	0.0	0.0	0	0	F	F	
D2TFM188	290	BOBTAIL	0.0	0.0	0	0	3.0	11.0	1	2	T	T	.016
D2TFM188B	290	BOBTAIL	0.0	0.0	0	0	3.0	11.0	1	2	T	T	.016
D2TFM188C	290	BOBTAIL	0.0	0.0	0	0	3.0	11.0	1	2	T	T	.016
D2TI20G2	188	BOBTAIL	2.0	14.0	1	3	2.0	8.5	2	1	T	T	VAR
D3CUS287	290	BOB&SEMI	0.0	0.0	0	0	5.0	11.1	1	1	T	F	.036
D3WUS82	225	BOBTAIL	0.0	0.0	0	0	3.0	10.0	1	2	T	T	.025
D4CUS60S	181	BOBTAIL	0.0	0.0	0	0	3.0	8.0	1	4	T	F	.016
D4CUS60L	181	BOBTAIL	0.0	0.0	0	0	3.0	8.0	1	4	T	F	.016
D5GAFM65	135	BOBTAIL	0.0	0.0	0	0	7.0	12.0	1	6	T	T	.016
D5HOL044	160	BOBTAIL	2.5	13.0	1	2	2.5	15.0	2	2	F	F	
D5LSP326	175	BOBTAIL	4.0	13.4	1	0	0.0	0.0	0	0	T	T	
D5LUUS84D	180	SEMI TR	0.0	0.0	0	0	2.5	15.7	1	16	T	F	.016
D5LUUS84C	180	SEMI TR	0.0	0.0	0	0	2.5	15.7	1	16	T	F	.016
D5LUUS84L1	180	SEMI TR	0.0	0.0	0	0	2.5	15.7	1	16	T	F	.016
D5LUUS84L2	180	SEMI TR	0.0	0.0	0	0	2.5	15.7	1	16	F	F	.016
D5GAUS84	170	BOBTAIL	2.5	10.0	1	13	2.5	10.0	2	3	F	F	
D7TGS12	180	BOBTAIL	0.0	0.0	0	0	5.5	11.0	1	2	T	T	.019
D7TGU67	180	BOBTAIL	0.0	0.0	0	0	6.5	13.5	1	2	T	T	.029
D8NI20S	250	BOBTAIL	0.0	15.0	1	3	0.0	0.0	0	0	F	F	
D8NI20L	230	SEMI TR	3.0	15.0	1	1	0.0	0.0	0	0	F	F	
D8TI20	250	BOBTAIL	3.0	15.0	1	3	0.0	0.0	0	0	F	F	
D8TYUS83	0	BOBTAIL	3.0	0.0	1	9	0.0	0.0	0	0	F	F	
D10ANU28	190	BOBTAIL	3.0	10.0	1	2	0.0	0.0	0	0	F	F	
D12GFM17	180	BOBTAIL	0.0	0.0	0	0	0.0	9.0	1	4	T	F	.013
D12GFM17B	180	BOBTAIL	0.0	0.0	0	0	0.0	9.0	1	4	T	F	.013
D12MFM13	200	SEMI TR	0.0	0.0	0	0	4.0	25.0	1	4	T	F	LOW
D12MIH45	0	SEMI TR	0.0	0.0	0	0	3.0	12.0	1	2	T	T	
D13FAU77	185	SEMI TR	0.0	0.0	0	0	2.4	10.0	1	4	T	T	.040
D13FAU77B	185	SEMI TR	0.0	0.0	0	0	2.4	10.0	1	4	T	T	.040
D13FAU77C	185	SEMI TR	0.0	0.0	0	0	2.4	10.0	1	4	T	T	.040
D13FAU77D	185	SEMI TR	0.0	0.0	0	0	2.4	10.0	1	4	T	T	.040
D13GOSH8	200	SEMI TR	0.0	0.0	0	0	3.5	10.0	1	3	T	T	.029
D13GOU87	200	BOBTAIL	3.5	13.8	1	3	3.0	9.3	2	1	T	F	.047
D13JAS11	190	BOBTAIL	3.0	10.8	1	2	0.0	0.0	0	0	F	F	
D13LAS95	185	SEMI TR	0.0	0.0	0	0	2.4	10.0	1	4	T	T	.040
D14BSH21	180	BELLY DUMP	8.0	12.0	3	2	6.0	13.0	1	2	T	F	LOW
D14BSH21B	180	BELLY DUMP	8.0	12.0	3	2	6.0	13.0	1	2	T	F	LOW
D14BSH71	230	BELLY DUMP	0.0	0.0	0	0	2.7	10.0	1	2	T	F	.028
D14BUS28	230	BELLY DUMP	0.0	0.0	0	0	3.0	10.0	1	3	T	F	.031
D14LUS29	183	SEMI TR	0.0	0.0	0	0	2.0	9.0	1	2	T	F	.042
D14TIH35	180		0.0	0.0	0	0	2.0	10.0	1	2	F	F	
D14TIH35ML	245	BELLY DUMP	0.0	0.0	0	0	2.5	10.0	1	1	T	F	.019
D14TIH35FR	195	BOBTAIL	0.0	0.0	0	0	2.5	10.0	1	1	T	F	L&M
D16JUS28	150	BOBTAIL	4.0	12.7	1	3	0.0	0.0	0	0	F	F	
D16JUS28B	150	BOBTAIL	4.0	12.7	1	3	0.0	0.0	0	0	F	F	

PROJECT	LST PAS TMP	HAUL EQUIPMENT	THR WHL SPD	THRE WHEL WGHT	RL.TR POS TW	NO. PASS TW	VIB ROL SPD	VIB. ROL. WT.	RL.TR POS. VB	NO. PASS VB	VIB ROL FWD	VIB ROL BACK	AMPLITUDE
D16NSH44	175	BELLY DUMP	6.0	11.7	1	5	0.0	0.0	0	0	F	F	
D16RFM26	0	BOBTAIL	0.0	14.0	1	2	2.5	10.0	2	1	T	T	HIGH
D16RUS77B1	0	BOBTAIL	0.0	14.0	1	2	2.5	10.0	2	1	T	T	HIGH
D16RUS77B2	0	BOBTAIL	0.0	14.0	1	2	2.5	10.0	2	1	T	T	HIGH
D16RUS77L	0	SEMI TR	0.0	14.0	1	2	2.5	10.0	2	1	T	F	
D16RUS77S	0	BOB&SEMI	0.0	14.0	1	2	2.5	10.0	2	1	T	F	HIGH
D16SPU18B	0	BOBTAIL	0.0	0.0	1	2	2.5	0.0	2	1	T	T	HIGH
D16SPU18S	0	BOB&SEM&TM	0.0	0.0	1	2	2.5	0.0	2	1	T	T	HIGH
D17BFM28	270	BOB&BTT	3.0	20.0	0	0	2.0	15.0	0	0	T	F	
D17BSH21	0	BOB&SEMI	0.0	0.0	1	0	0.0	0.0	3	0	T	F	
D17BUS21	260	BOB&SEMI	2.0	9.0	1	2	2.0	11.0	3	2	F	F	
D17BSH36TB	225	BOB&SEMI	4.0	13.5	1	3	4.0	0.0	3	3	F	F	
D17BSH36TD	225	BOB&SEMI	4.0	12.0	1	3	4.0	0.0	3	3	F	F	
D17GS105	225	SEMI TR	0.0	0.0	0	0	4.0	0.0	1	4	T	F	.060
D17GSH6	275	BOB&SEM&BT	0.0	0.0	0	0	4.0	8.5	1	2	T	F	.060
D17GSH6B	275	BOB&SEM&BT	0.0	0.0	0	0	4.0	8.5	1	2	T	F	.060
D17GSH6C	275	BOB&SEM&BT	0.0	0.0	0	0	4.0	8.5	1	2	T	F	.060
D17WUS29D	275	BOBTAIL	4.0	12.0	1	4	0.0	0.0	0	0	F	F	
D17WUS29B1	225	BOBTAIL	4.0	12.0	1	3	0.0	0.0	0	0	F	F	
D17WUS29B2	225	BOBTAIL	4.0	12.0	1	3	0.0	0.0	0	0	F	F	
D17WUS29B3	225	BOBTAIL	4.0	12.0	1	3	0.0	0.0	0	0	F	F	
D17WUS29B4	225	BOBTAIL	4.0	12.0	1	3	0.0	0.0	0	0	F	F	
D17WU29COM	225	BOB&SEM&BT	0.0	0.0	0	0	4.0	0.0	1	2	T	F	.060
D17BSORCOM	225	BOB&SEM&BT	0.0	0.0	0	0	4.0	0.0	1	2	T	F	.060
D17B21COM	225	BOB&SEM&BT	0.0	0.0	0	0	4.0	0.0	1	2	T	F	.060
D17R79COM	225	BOB&SEM&BT	0.0	0.0	0	0	4.0	0.0	1	2	T	F	.060
D17MS21COM	225	BOB&SEM&BT	0.0	0.0	0	0	4.0	0.0	1	2	T	F	.060
D18DIH63	0	BOB&SEM	0.0	0.0	0	0	3.0	9.1	1	1	T	T	
D18NFM16	200	BOBTAIL	0.0	0.0	0	0	3.3	12.0	2	5	F	T	.023
D19CUS59	265	BOBTAIL	0.0	0.0	0	0	6.4	10.9	1	3	F	F	
D19MUS59	240	BOBTAIL	0.0	0.0	0	0	6.7	10.0	1	2	T	T	.023
D19PUS59	200	BOBTAIL	0.0	0.0	0	0	3.0	12.8	1	2	T	T	
D20TUS69	245	BOB&SEMI	0.0	0.0	0	0	0.0	0.0	1	4	T	F	.060
D21CFM14	180	SEMI TR	3.0	12.0	1	5	0.0	0.0	0	0	F	F	
D21HUS83	185	SEMI TR	3.0	12.0	1	4	0.0	0.0	0	0	F	F	
D21SFM75	200	SEMI TR	3.0	12.0	1	5	0.0	0.0	0	0	F	F	
D23BFM45	170	BOBTAIL	0.0	12.0	1	4	0.0	12.0	3	6	F	F	
D23BUS67	170	BOBTAIL	0.0	0.0	0	0	0.0	16.0	1	10	F	F	
D23EIH20A	200	BOBTAIL	7.5	0.0	1	4	5.0	0.0	3	2	F	F	
D23EIH20B	200	BOBTAIL	7.5	0.0	1	4	5.0	0.0	3	2	F	F	
D23LU190	237	BOBTAIL	0.0	0.0	0	0	1.5	10.6	1	5	T	T	.022
D23MUS87	220	BOB&SEMI	0.0	0.0	0	0	0.0	0.0	0	0	F	F	
D24CUS62	258	PRE LOADER	0.0	0.0	0	0	3.0	11.3	1	4	T	T	.033

PROJECT	FREQ UNCY	NO. DRM	PNM SPD	PNM WT.	RL.TR POS PNM	NO. PAS PNM	TDM SPD	TDM WT.	RLTR POS TDM	NO. PAS TDM	RCE SP. GR.	AC MIX TYP	MAX AGG SZE	AC GRADE
D16NSH44	0		8.0	10.5	3	5	3.5	8.5	2	5	T	D	0.375	AC-20
D16RFM26	28	1	0.0	12.5	3	3	0.0	0.0	0	0	T	D	0.375	
D16RUS77B1	28	1	0.0	12.5	3	5	0.0	0.0	0	0	T	B	0.875	AC-20
D16RUS77B2	28	1	0.0	12.5	3	5	0.0	0.0	0	0	T	B	0.875	AC-20
D16RUS77L	0		0.0	12.5	3	3	0.0	0.0	0	0	T	D	0.375	AC-20
D16RUS77S	28	1	0.0	12.5	3	3	0.0	0.0	0	0	T	D	0.375	AC-20
D16SPU18B	28	2	0.0	0.0	3	5	0.0	0.0	0	0	T	B	0.875	AC-20
D16SPU18S	28	2	0.0	0.0	3	3	0.0	0.0	0	0	T	D	0.375	AC-20
D17BFM28	0		5.0	5.0	0	0	2.0	15.0	0	0	T	D	0.375	AC-20
D17BSH21	0		0.0	0.0	2	2	0.0	0.0	0	0	T	D	0.375	AC-20
D17BUS21	0		2.0	9.0	2	4	0.0	0.0	0	0	T	B	0.875	AC-20
D17BSH36TB	0		4.0	25.0	2	4	0.0	0.0	0	0	T	B	0.875	AC-20
D17BSH36TD	0		4.0	25.0	2	4	0.0	0.0	0	0	T	D	0.375	AC-20
D17GS105	22	1	4.0	13.5	2	4	0.0	0.0	0	0	T	D	0.375	AC-20
D17GSH6	23	1	4.0	9.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D17GSH6B	23	1	4.0	9.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D17GSH6C	23	1	4.0	9.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D17WUS29D	0		4.0	25.0	2	4	4.0	8.0	3	3	T	D	0.375	AC-20
D17WUS29B1	0		4.0	25.0	2	4	4.0	10.0	3	3	T	B	0.875	AC-20
D17WUS29B2	0		4.0	25.0	2	4	4.0	10.0	3	3	T	B	0.875	AC-20
D17WUS29B3	0		4.0	25.0	2	4	4.0	10.0	3	3	T	B	0.875	AC-20
D17WUS29B4	0		4.0	25.0	2	4	4.0	10.0	3	3	T	B	0.875	AC-20
D17WU29COM	22	1	4.0	25.0	2	4	0.0	0.0	0	0	T	D	0.375	AC-20
D17BSORCOM	22	1	4.0	25.0	2	4	0.0	0.0	0	0	T	D	0.375	AC-20
D17B21COM	22	1	4.0	25.0	2	4	0.0	0.0	0	0	T	D	0.375	AC-20
D17R79COM	22	1	4.0	25.0	2	4	0.0	0.0	0	0	T	D	0.375	AC-20
D17MS21COM	22	1	4.0	25.0	2	4	0.0	0.0	0	0	T	D	0.375	AC-20
D18DIH63	0	2	9.9	24.9	3	0	3.0	9.1	2	2	F	C	0.625	AC-10
D18NFM16	35	2	4.0	0.0	3	0	3.0	0.0	1	1	F	G	0.875	AC-20
D19CUS59	0	2	6.0	30.0	2	12	0.0	0.0	0	0	T	D	0.375	AC-20
D19MUS59	36	1	6.0	30.0	3	5	6.7	10.0	2	2	T	D	0.625	AC-20
D19PUS59	30	2	6.0	7.8	3	3	3.0	12.8	2	1	F	C	0.625	AC-20
D20TUS69	40	2	0.0	0.0	2	2	0.0	0.0	0	0	T	G	0.375	AC-20
D21CFM14	0		5.0	25.0	3	3	3.0	12.0	2	5	T	D	0.375	AC-20
D21HUS83	0		5.0	25.0	3	8	3.0	10.0	2	4	T	D	0.375	AC-20
D21SFM75	0		3.0	25.0	3	3	3.0	12.0	2	3	T	D	0.375	AC-20
D23BFM45	0		0.0	25.0	2	6	0.0	12.0	0	0	T	D	0.375	
D23BUS67	0		0.0	25.0	2	8	0.0	0.0	0	0	T	D	0.375	
D23EIH20A	0		5.0	0.0	2	6	0.0	0.0	0	0	T	D	0.375	
D23EIH20B	0		5.0	0.0	2	6	0.0	0.0	0	0	T	D	0.375	
D23LU190	37	2	1.5	9.5	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D23MUS87	0		0.0	10.0	2	6	0.0	10.0	1	2	T	GR4	0.375	
D24CUS62	40	2	3.0	21.4	2	3	0.0	0.0	0	0	T	D	0.375	AC-20

PROJECT	FREQ UNCY	NO. DRM	PNM SPD	PNM WT.	RL.TR POS PNM	NO. PAS PNM	TDM SPD	TDM WT.	RLTR POS TDM	NO. PAS TDM	RCE SP. GR.	AC MIX TYP	MAX AGG SZE	AC GRADE
D1FNUS82	40	2	3.0	6.0	2	2	3.0	12.0	3	1	T	D	0.375	AC-20
D1HUSH50	40	2	3.0	0.0	2	4	3.0	0.0	3	2	T	D	0.375	
D1LMSH19	44	2	4.0	0.0	2	6	3.0	0.0	3	6	T	C	0.625	AC-20
D1LMUS82	0		3.0	0.0	2	2	2.0	0.0	3	4	T	D	0.375	AC-20
D2TFM188	42	2	3.0	14.0	2	2	6.0	9.0	3	1	T	GR2	0.375	AC-10
D2TFM188B	42	2	3.0	14.0	2	2	6.0	9.0	3	1	T	GR2	0.375	AC-10
D2TFM188C	42	2	3.0	14.0	2	2	6.0	9.0	3	1	T	GR2	0.375	AC-10
D2TI20G2	42	2	2.0	4.9	3	3	2.0	8.5	4	2	T	GR2	0.375	AC-20
D3CUS287	42	2	5.0	15.9	2	2	8.0	12.8	3	3	F	D	0.375	
D3WUS82	31	2	3.0	13.3	2	4	3.0	15.7	3	4	F	D	0.375	
D4CUS60S	35	2	5.0	12.5	2	4	3.0	12.0	3	2	F	D	0.375	AC-20
D4CUS60L	35	2	5.0	12.5	2	4	3.0	12.0	3	2	F	D	0.375	AC-20
D5GAFM65	0	1	7.0	18.0	2	10	7.0	12.0	3	6	F	D	0.375	AC-5
D5HOLO44	0		7.5	25.0	3	20	2.5	9.0	4	1	T	D	0.375	AC-10
D5LSP326	0		6.0	21.0	3	9	4.0	10.8	2	1	T	D	0.375	AC-10
D5LUUS84D	42	2	2.5	25.0	2	18	0.0	0.0	0	0	T	D	0.375	AC-10
D5LUUS84C	42	2	2.5	25.0	2	18	0.0	0.0	0	0	T	C	0.625	AC-10
D5LUUS84L1	42	2	2.5	25.0	2	18	0.0	0.0	0	0	T	D	0.375	AC-10
D5LUUS84L2	42	2	2.5	25.0	2	18	0.0	0.0	0	0	T	D	0.375	AC-10
D5GAUS84	0		2.5	25.0	3	21	1.0	2.0	4	2	T	D	0.375	AC-10
D7TGS12	45	2	2.0	25.0	3	4	0.0	10.0	2	1	F	D	0.375	
D7TGU67	37	2	2.0	25.0	2	4	0.0	0.0	3	1	F	D	0.375	
D8NI20S	0		0.0	25.0	2	5	0.0	10.0	3	3	T	D	0.375	AC-20
D8NI20L	0		3.0	25.0	2	2	3.0	10.0	3	1	T	D	0.375	AC-20
D8TI20	0		3.0	25.0	2	5	3.0	10.0	3	3	T	D	0.375	AC-20
D8TYUS83	0		3.0	25.0	2	11	3.0	0.0	3	7	F	D	0.375	
D10ANU28	0		3.0	12.0	2	2	3.0	6.0	3	2	F	D	0.375	AC-20
D12GFM17	35	1	0.0	25.0	2	4	0.0	9.0	3	4	F	D	0.375	AC-10
D12GFM17B	35	1	0.0	25.0	2	4	0.0	9.0	3	4	F	D	0.375	AC-10
D12MFM13	31	2	8.0	25.0	2	0	4.0	25.0	3	0	F	D	0.375	AC-20
D12MIH45	0	2	5.0	25.0	2	10	3.0	12.0	3	1	F	D	0.375	AC-20
D13FAU77	35	2	3.0	23.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D13FAU77B	35	2	3.0	23.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D13FAU77C	35	2	3.0	23.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D13FAU77D	35	2	3.0	23.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D13GOSH8	36	1	5.0	17.0	2	2	0.0	0.0	0	0	T	D	0.375	AC-20
D13GOU87	28	1	5.0	12.1	3	2	0.0	0.0	0	0	T	D	0.375	AC-20
D13JAS11	0		4.0	28.7	3	5	3.0	8.3	2	2	T	D	0.375	AC-20
D13LAS95	35	2	3.0	23.0	2	3	0.0	0.0	0	0	T	D	0.375	AC-20
D14BSH21	42	1	5.0	25.0	4	4	6.0	13.0	2	1	T	C	0.625	AC-20
D14BSH21B	42	1	5.0	25.0	4	4	6.0	13.0	2	1	T	C	0.625	AC-20
D14BSH71	38	2	3.0	25.0	2	3	0.0	0.0	0	0	F	D	0.375	AC-20
D14BUS28	31	2	3.0	18.7	2	4	0.0	0.0	0	0	F	C	0.625	AC-20
D14LUS29	37	1	0.0	0.0	3	4	2.0	9.0	2	2	F	C	0.625	AC-30
D14TIH35	0		6.0	9.5	3	4	2.0	10.0	2	2	F	A	1.750	AC-20
D14TIH35ML	33	1	3.0	50.0	3	3	2.5	10.0	2	2	T	C	0.625	AC-20
D14TIH35FR	42	1	4.0	0.0	3	4	2.5	10.0	2	3	F	C	0.625	AC-20
D16JUS28	0		6.0	19.8	3	4	3.0	10.0	2	0	F	C	0.625	AC-20
D16JUS28B	0		6.0	19.8	3	4	3.0	10.0	2	0	F	C	0.625	AC-20

PROJECT	PRODUCER	DNS TST MTD	LOCATN DENSTY TAKEN	DAY OF TEST	DUST OVER AC	VHM CNT	VHM AVG	VHM STD	VHM MAX	VHM MIN	NO. GCGR SPLS	AVG GCGR	STD GCGR
D1FNUS82	TOTAL	C&N	WP	LATR	1.00	20	39.8	5.53	45.0	20	14	95.3	1.77
D1HUSH50		C&N	WP&BWP	SD&N	1.17	0	0.00	0.00	0.00	.00	9	92.4	1.80
D1LMSH19	TOTAL	C&N	WP&BWP	SD&N	0.87	0	0.00	0.00	0.00	.00	7	93.3	1.15
D1LMUS82	TOTAL	C&N	WP&BWP	SD&N	0.29	0	0.00	0.00	0.00	.00	0	0.0	0.00
D2TFM188	TOTAL	NUC	WP&BWP	LATR	0.29	5	47.8	4.30	51.0	41	0	0.0	0.00
D2TFM188B	TOTAL	NUC	WP&BWP	LATR	0.00	0	0.00	0.00	0.00	.00	0	0.0	0.00
D2TFM188C	TOTAL	NUC	WP&BWP	LATR	0.00	0	0.00	0.00	0.00	.00	0	0.0	0.00
D2TI20G2	LION	C&N	WP	SD&N	0.50	5	44.4	6.30	52.0	37	0	0.0	0.00
D3CUS287		C&N	WP&BWP	LATR	0.87	7	46.1	3.90	51.0	39	0	0.0	0.00
D3WUS82		C&N	WP&BWP	SD&N	0.84	8	53.8	2.30	58.0	51	7	93.9	1.51
D4CUS60S	SHAMROCK	NUC	WP&BWP	SD	0.73	8	44.0	5.50	50.0	33	0	0.0	0.00
D4CUS60L	SHAMROCK	NUC	WP	SD	0.87	6	43.0	4.80	48.0	35	0	0.0	0.00
D5GAFM65	FINA	C&N	BWP	LATR	0.30	23	44.5	3.23	50.0	39	12	92.2	0.38
D5HOLO44	FINA	NUC	OTHER	LATR	0.73	8	47.0	3.90	54.0	43	0	0.0	0.00
D5LSP326	FINA	C&N	BWP	SD&N	0.42	5	49.8	2.60	53.0	47	5	93.1	1.17
D5LUUS84D	FINA	C&N	BWP	SD&N	0.50	12	48.8	3.10	53.0	44	12	92.7	1.03
D5LUUS84C	FINA	C&N	BWP	SD&N	0.50	8	49.5	2.60	53.0	46	6	93.5	1.09
D5LUUS84L1	FINA	C&N	BWP	SD&N	0.52	6	49.5	3.10	53.0	46	6	93.3	1.74
D5LUUS84L2	FINA	C&N	BWP	SD&N	0.00	0	0.00	0.00	0.00	.00	0	0.0	0.00
D5GAUS84	FINA	COR	WP	LATR	0.71	6	42.7	5.00	49.0	37	7	91.6	3.37
D7TGS12		COR	WP	LATR	0.89	0	0.00	0.00	0.00	.00	0	0.0	0.00
D7TGU67		COR	OTHER	LATR	1.00	16	52.2	3.70	60.0	44	18	93.9	1.25
D8NI20S	FINA	NUC		SD&N	1.02	7	49.6	6.20	56.0	40	0	0.0	0.00
D8NI20L	FINA	C&N		LATR	1.00	7	46.7	6.97	55.0	38	14	93.9	0.86
D8TI20	FINA	NUC		SD&N	0.93	5	50.4	5.90	60.0	44	0	0.0	0.00
D8TYUS83		NUC	WP&BWP	LATR	1.38	8	50.5	2.90	55.0	45	0	0.0	0.00
D10ANU28	EXXON	COR	BWP	LATR	0.80	23	43.3	2.70	48.0	39	21	92.3	1.70
D12GFM17	TEXACO	COR	WP&BWP	SD	0.88	0	0.00	0.00	0.00	.00	16	93.7	1.17
D12GFM17B	TEXACO	COR	WP&BWP	SD	1.00	0	0.00	0.00	0.00	.00	0	0.0	0.00
D12MFM13	EXXON	COR	WP&BWP	LATR	1.26	12	51.4	4.90	60.0	41	13	91.5	0.65
D12MIH45	EXXON	COR	WP&BWP	LATR	0.69	7	53.6	4.00	60.0	49	5	92.3	2.04
D13FAU77	COASTAL	COR	WP	LATR	0.62	3	48.7	2.50	51.0	46	11	92.7	1.09
D13FAU77B	COASTAL	COR	WP	LATR	1.12	12	51.6	2.60	54.0	47	32	92.1	1.33
D13FAU77C	COASTAL	COR	WP	LATR	0.72	7	48.4	4.40	54.0	40	16	94.0	1.10
D13FAU77D	COASTAL	COR	WP	LATR	0.00	0	0.00	0.00	0.00	.00	0	0.0	0.00
D13GOSH8	TEXACO	COR	WP	LATR	0.76	12	51.1	4.90	56.0	44	22	90.7	1.60
D13GOU87	TEXACO	COR	WP	SD	0.74	8	52.6	4.10	56.0	45	11	90.1	1.84
D13JAS11	GULF ST		WP	LATR	1.48	31	45.2	7.10	56.0	20	21	90.6	1.89
D13LAS95	COASTAL	COR	WP	LATR	1.21	20	49.5	5.50	58.0	37	37	93.1	1.82
D14BSH21	EXXON	COR	WP&BWP	LATR	0.82	6	48.3	3.90	54.0	44	5	91.8	0.76
D14BSH21B	EXXON	COR	WP&BWP	LATR	1.00	14	45.4	5.40	55.0	30	10	91.4	0.89
D14BSH71	TFA	COR	WP	LATR	1.30	16	43.8	4.30	53.0	38	12	91.8	0.77
D14BUS28	TEXACO	COR	WP&BWP	LATR	0.98	9	49.8	5.20	60.0	42	9	92.6	1.70
D14LUS29	TX EMULS	COR	WP	LATR	0.48	6	51.3	3.70	55.0	47	6	92.6	0.79
D14TIH35	TFA				0.79	36	44.1	7.10	55.0	26	0	0.0	0.00
D14TIH35ML	TFA	COR		LATR	1.00	15	44.3	5.10	52.0	30	15	92.2	1.07
D14TIH35FR	TFA	COR	WP&BWP	LATR	1.43	12	50.8	4.00	59.0	47	15	91.8	1.00
D16JUS28	TFA	COR	WP&BWP	LATR	0.84	13	46.8	5.50	54.0	36	14	94.2	0.90
D16JUS28B	TFA	COR	WP	SD	0.78	0	0.00	0.00	0.00	.00	7	92.4	0.38

PROJECT	PRODUCER	DNS TST MTD	LOCATN DENSTY TAKEN	DAY OF TEST	DUST OVER AC	VHM CNT	VHM AVG	VHM STD	VHM MAX	VHM MIN	NO. GCGR SPLS	AVG. GCGR	STD GCGR
D16NSH44	TFA	COR	BWP	SD	0.65	10	46.0	5.10	58.0	41	10	93.7	1.40
D16RFM26		COR	WP&BWP	LATR	0.70	6	40.8	2.60	46.0	39	0	0.0	0.00
D16RUS77B1	COASTAL	COR	WP&BWP	LATR	0.60	16	37.9	2.10	40.0	34	14	94.3	0.98
D16RUS77B2	COASTAL	COR	WP&BWP	LATR	0.60	10	41.0	2.60	47.0	38	10	93.9	0.54
D16RUS77L	COASTAL	COR	WP&BWP	LATR	0.85	7	38.4	2.40	43.0	36	0	0.0	0.00
D16RUS77S	COASTAL	COR	WP&BWP	LATR	0.98	9	46.0	3.80	50.0	40	8	93.1	0.48
D16SPU18B	TFA	COR	VARIED	LATR	0.76	17	40.5	5.80	50.0	32	16	95.1	1.51
D16SPU18S	TFA	COR	VARIED	LATR	0.80	8	40.1	4.20	47.0	34	8	94.1	0.17
D17BFM28	EXXON	NUC	WP&BWP	SD&L	0.84	10	49.1	4.50	55.0	40	0	0.0	0.00
D17BSH21	EXXON	C&N		LATR	1.12	7	53.1	3.90	59.0	48	0	0.0	0.00
D17BUS21	EXXON	C&N	WP	LATR	1.11	16	44.9	8.40	54.0	28	49	93.2	1.49
D17BSH36TB	EXXON	C&N	WP&BWP	SD&N	1.35	6	47.3	4.30	54.0	42	20	95.5	1.95
D17BSH36TD	EXXON	COR	WP&BWP	LATR	0.95	6	51.3	2.40	53.0	47	9	93.3	0.94
D17GS105	EXXON	COR	WP&BWP	LATR	1.12	5	46.6	7.00	56.0	38	8	94.1	1.15
D17GSH6	EXXON	C&N	WP&BWP	SD&N	0.60	7	58.6	4.50	65.0	51	0	0.0	0.00
D17GSH6B	EXXON	C&N	WP&BWP	SD&N	0.64	0	0.00	0.00	0.00	.00	0	91.2	1.34
D17GSH6C	EXXON	C&N	WP&BWP	SD&N	0.00	0	0.00	0.00	0.00	.00	0	0.0	0.00
D17WUS29D	COASTAL	C&N	WP&BWP	SD&N	1.43	8	52.3	3.80	56.0	47	9	94.9	0.84
D17WUS29B1	COASTAL	C&N	WP&BWP	SD&N	0.89	14	45.4	5.70	55.0	38	25	94.4	1.49
D17WUS29B2	COASTAL	C&N	WP&BWP	SD&N	0.86	6	51.2	4.60	59.0	46	12	93.5	0.76
D17WUS29B3	COASTAL	C&N	WP&BWP	SD&N	1.29	7	49.3	10.2	57.0	27	7	93.9	0.93
D17WUS29B4	COASTAL	C&N	WP&BWP	SD&N	0.00	0	0.00	0.00	0.00	.00	0	0.0	0.00
D17WU29COM	EXXON	COR	WP&BWP	LATR	0.75	5	54.2	6.00	59.0	44	0	0.0	0.00
D17BSORCOM	EXXON	COR	WP&BWP	LATR	0.57	0	0.00	0.00	0.00	.00	5	91.6	1.54
D17B21COM	EXXON	COR	WP&BWP	LATR	0.62	0	0.00	0.00	0.00	.00	5	90.4	1.85
D17R79COM	EXXON	COR	WP&BWP	LATR	0.67	0	0.00	0.00	0.00	.00	6	90.8	1.61
D17MS21COM	EXXON	COR	WP&BWP	LATR	0.78	5	50.2	3.00	53.0	46	5	93.6	1.05
D18DIH63	FINA	COR	WP	LATR	0.70	14	50.1	3.50	55.0	44	6	97.7	0.52
D18NFM16	TRUMBULL	C&N	OTHER	LATR	0.43	13	39.5	2.30	44.0	36	13	97.9	0.95
D19CUS59	MCMILLAN	C&N	WP&BWP	LATR	0.77	44	46.0	4.70	64.0	41	39	94.4	1.21
D19MUS59	FINA	COR	WP&BWP	LATR	0.41	7	44.7	4.10	52.0	41	6	95.8	1.38
D19PUS59	LION	COR	WP&BWP	LATR	1.21	30	43.3	4.60	51.0	34	30	93.5	1.05
D20TUS69	TEXACO	NUC	WP&BWP	SD	1.04	18	46.4	3.50	54.0	40	0	0.0	0.00
D21CFM14	COASTAL	COR	WP	SD	0.35	5	40.4	5.20	46.0	34	7	92.3	0.77
D21HUS83		C&N	WP&BWP	SD&N	0.52	7	45.3	3.50	51.0	41	8	93.0	0.63
D21SFM75		COR	WP	SD	0.64	10	42.2	4.10	49.0	37	0	0.0	0.00
D23BFM45		COR	WP	LATR	1.50	5	46.0	2.00	49.0	44	0	0.0	0.00
D23BUS67		COR	WP	LATR	1.51	0	0.00	0.00	0.00	.00	0	0.0	0.00
D23EIH20A		C&N	BWP	LATR	1.15	12	51.4	3.30	56.0	46	0	0.0	0.00
D23EIH20B		C&N	BWP	LATR	1.66	0	0.00	0.00	0.00	.00	0	0.0	0.00
D23LU190	FINA	C&N	WP&BWP	LATR	0.88	25	51.8	2.20	57.0	48	21	92.6	1.60
D23MUS87		C&N	BWP	SD	1.69	0	0.00	0.00	0.00	.00	5	95.0	0.73
D24CUS62	FINA	NUC	WP&BWP	SD	1.04	19	49.2	3.50	54.0	38	0	0.0	0.00

PROJECT	MIN. GC/GR	MAX. GC/GR	NO. GC/GL SMPLS	AVG. GC/GL	STD. GC/GL	MIN. GC/GL	MAX. GC/GL	NO. EXT GC/GT	AVG EXT GC/GT	STD EXT GC/GT	MIN EXT GC/GT
D1FNUS82	90.1	97.3	14	97.4	2.02	91.7	99.9	14	96.0	1.78	90.7
D1HUSH50	89.1	94.8	8	94.4	1.40	92.2	96.7	8	93.0	1.93	89.7
D1LMSH19	92.3	95.3	6	95.6	1.37	94.5	97.6	7	94.4	1.16	93.4
D1LMUS82	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D2TFM188	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D2TFM188B	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D2TFM188C	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D2TI20G2	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D3CUS287	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D3WUS82	92.7	97.2	7	97.4	1.70	95.8	100.9	7	95.4	1.53	94.1
D4CUS60S	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D4CUS60L	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5GAFM65	91.7	93.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5HOL044	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5LSP326	92.3	95.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5LUUS84D	91.3	94.7	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5LUUS84C	91.8	94.6	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5LUUS84L1	91.4	95.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5LUUS84L2	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D5GAUS84	86.0	94.6	6	94.4	3.15	89.7	97.1	7	91.8	3.38	86.2
D7TGS12	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D7TGU67	92.0	96.9	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D8NI20S	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D8NI20L	93.0	94.9	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D8TI20	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D8TYUS83	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D10ANU28	88.1	94.8	21	94.3	1.78	89.5	96.7	21	92.3	1.70	88.1
D12GFM17	91.6	96.0	7	96.2	2.14	93.9	100.6	16	95.0	1.18	92.9
D12GFM17B	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D12MFM13	90.3	92.5	13	94.5	0.99	92.3	96.1	13	94.2	0.67	93.0
D12MIH45	89.5	94.9	5	97.0	2.47	93.5	100.3	5	95.9	2.11	93.0
D13FAU77	91.1	94.6	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D13FAU77B	89.4	94.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D13FAU77C	92.0	95.6	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D13FAU77D	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D13GOSH8	88.0	95.3	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D13GOU87	87.5	93.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D13JAS11	87.0	93.8	21	92.4	2.32	87.5	96.1	0	0.0	0.00	0.0
D13LAS95	88.3	96.7	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D14BSH21	90.5	92.5	5	93.8	0.53	92.8	94.1	5	93.2	0.35	92.8
D14BSH21B	90.1	93.2	10	93.5	1.29	91.7	96.2	10	92.1	1.97	86.8
D14BSH71	90.6	93.2	12	93.7	1.08	92.5	96.4	12	92.4	0.78	91.2
D14BUS28	88.8	94.7	9	94.9	1.81	90.9	97.5	9	93.5	1.58	90.7
D14LUS29	91.1	93.3	6	94.8	0.87	93.1	95.4	0	0.0	0.00	0.0
D14TIH35	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D14TIH35ML	90.6	94.9	15	94.3	1.35	92.1	97.5	0	0.0	0.00	0.0
D14TIH35FR	90.0	93.1	15	93.7	1.34	90.4	94.9	15	93.2	1.01	91.1
D16JUS28	92.6	95.7	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16JUS28B	92.0	93.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0

PROJECT	MIN. GC/GR	MAX. GC/GR	NO. GC/GL SMPLS	AVG. GC/GL	STD. GC/GL	MIN. GC/GL	MAX. GC/GL	NO. EXT GC/GT	AVG EXT GC/GT	STD EXT GC/GT	MIN EXT GC/GT
D16NSH44	91.2	95.6	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16RFM26	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16RUS77B1	92.9	96.7	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16RUS77B2	93.0	94.9	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16RUS77L	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16RUS77S	92.6	93.9	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16SPU18B	90.3	96.6	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D16SPU18S	93.9	94.3	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17BFM28	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17BSH21	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17BUS21	89.0	95.5	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17BSH36TB	90.8	98.0	6	96.9	1.51	94.7	98.3	0	0.0	0.00	0.0
D17BSH36TD	92.3	94.8	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17GS105	92.7	96.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17GSH6	0.0	0.0	7	94.1	1.17	92.3	96.1	0	0.0	0.00	0.0
D17GSH6B	88.5	93.3	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17GSH6C	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17WUS29D	93.8	96.2	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17WUS29B1	92.0	97.6	14	97.8	1.44	95.8	100.2	0	0.0	0.00	0.0
D17WUS29B2	92.2	94.5	5	98.3	1.08	96.6	99.3	0	0.0	0.00	0.0
D17WUS29B3	92.4	94.9	5	98.5	1.12	97.0	99.6	0	0.0	0.00	0.0
D17WUS29B4	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17WU29COM	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17BSORCOM	89.0	93.4	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17B21COM	88.0	92.2	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17R79COM	88.3	93.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D17MS21COM	92.2	95.1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D18DIH63	97.0	98.0	6	100.2	0.84	99.2	101.3	6	97.7	0.52	97.0
D18NFM16	96.1	99.2	13	102.3	1.05	100.7	104.0	13	97.9	0.95	96.1
D19CUS59	92.0	96.6	39	97.4	1.67	94.0	101.2	39	95.6	1.22	93.2
D19MUS59	93.5	97.5	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D19PUS59	91.5	96.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D20TUS69	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D21CFM14	91.2	93.6	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D21HUS83	92.1	94.2	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D21SFM75	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D23BFM45	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D23BUS67	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D23EIH20A	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D23EIH20B	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D23LU190	88.9	95.2	21	95.0	1.65	90.4	98.1	21	94.6	1.51	90.8
D23MUS87	94.0	95.9	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0
D24CUS62	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0

PROJECT	MAX EXT GC/GT	NO. DES GC/GT	AVG DES GC/GT	STD DES GC/GT	MIN DES GC/GT	MAX DES GC/GT	NO. GL/GR	AVG GL/GR	STD GL/GR	MIN GL/GR	MAX GL/GR
D1FNUS82	98.0	14	96.1	1.76	91.1	98.2	21	98.0	0.52	97.2	99.5
D1HUSH50	95.4	8	93.2	1.95	89.5	95.5	15	97.7	1.36	94.5	98.8
D1LMSH19	96.4	7	94.5	1.11	93.2	96.4	8	97.7	0.13	97.5	97.9
D1LMUS82	0.0	0	0.0	0.00	0.0	0.0	5	97.2	0.41	96.6	97.7
D2TFM188	0.0	0	0.0	0.00	0.0	0.0	5	96.1	0.82	95.4	97.4
D2TFM188B	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D2TFM188C	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D2TI20G2	0.0	0	0.0	0.00	0.0	0.0	5	98.0	0.45	97.2	98.3
D3CUS287	0.0	0	0.0	0.00	0.0	0.0	7	97.9	0.49	96.9	98.4
D3WUS82	98.7	7	95.7	1.60	94.4	99.1	8	95.6	0.59	95.7	97.6
D4CUS60S	0.0	0	0.0	0.00	0.0	0.0	8	97.8	0.38	97.0	98.2
D4CUS60L	0.0	0	0.0	0.00	0.0	0.0	6	97.3	1.26	95.0	98.4
D5GAFM65	0.0	0	0.0	0.00	0.0	0.0	23	96.8	0.58	95.6	97.8
D5HOLO44	0.0	0	0.0	0.00	0.0	0.0	8	96.4	0.61	95.4	97.0
D5LSP326	0.0	0	0.0	0.00	0.0	0.0	9	96.5	0.54	95.6	97.4
D5LUUS84D	0.0	0	0.0	0.00	0.0	0.0	12	96.1	0.55	95.0	96.8
D5LUUS84C	0.0	0	0.0	0.00	0.0	0.0	8	96.3	0.62	95.4	97.3
D5LUUS84L1	0.0	0	0.0	0.00	0.0	0.0	6	96.5	0.29	96.1	96.9
D5LUUS84L2	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D5GAUS84	94.8	7	92.1	3.17	87.6	94.9	6	96.6	0.81	95.9	98.0
D7TGS12	0.0	0	0.0	0.00	0.0	0.0	5	96.7	0.19	96.5	97.0
D7TGU67	0.0	0	0.0	0.00	0.0	0.0	15	96.4	0.67	95.3	97.4
D8NI20S	0.0	0	0.0	0.00	0.0	0.0	7	96.5	0.42	95.9	97.0
D8NI20L	0.0	0	0.0	0.00	0.0	0.0	8	96.8	0.57	95.8	97.4
D8TI20	0.0	0	0.0	0.00	0.0	0.0	7	96.8	0.63	95.9	97.4
D8TYUS83	0.0	0	0.0	0.00	0.0	0.0	8	96.3	0.35	95.8	96.7
D10ANU28	94.8	21	92.4	1.69	88.5	94.5	23	97.9	0.47	97.0	98.7
D12GFM17	97.3	16	95.8	2.27	93.2	102.6	9	97.4	1.07	94.7	98.3
D12GFM17B	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D12MFM13	95.2	13	94.2	0.73	93.1	95.2	13	96.9	0.81	95.6	98.7
D12MIH45	98.6	5	96.6	2.06	93.6	98.9	7	95.2	0.62	94.3	96.0
D13FAU77	0.0	0	0.0	0.00	0.0	0.0	5	96.4	0.40	95.9	96.8
D13FAU77B	0.0	0	0.0	0.00	0.0	0.0	13	95.8	0.98	93.5	96.8
D13FAU77C	0.0	0	0.0	0.00	0.0	0.0	7	97.2	0.37	96.7	97.7
D13FAU77D	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D13GOSH8	0.0	0	0.0	0.00	0.0	0.0	12	97.0	0.55	96.2	97.7
D13GOU87	0.0	0	0.0	0.00	0.0	0.0	8	96.8	0.52	96.2	97.7
D13JAS11	0.0	0	0.0	0.00	0.0	0.0	31	98.0	0.58	97.2	99.4
D13LAS95	0.0	0	0.0	0.00	0.0	0.0	20	97.3	0.62	96.3	98.5
D14BSH21	93.7	5	93.2	0.35	92.8	93.7	6	97.8	0.39	97.3	98.4
D14BSH21B	93.7	10	92.2	2.00	86.9	94.4	15	98.0	0.81	96.7	99.7
D14BSH71	93.8	12	92.3	0.80	91.1	93.7	18	97.8	0.82	96.0	98.8
D14BUS28	96.0	9	93.8	1.43	91.1	95.7	9	97.5	0.91	95.8	98.8
D14LUS29	0.0	0	0.0	0.00	0.0	0.0	6	97.7	0.39	96.9	98.0
D14TIH35	0.0	0	0.0	0.00	0.0	0.0	37	97.3	0.91	95.6	99.2
D14TIH35ML	0.0	0	0.0	0.00	0.0	0.0	15	97.7	0.65	96.8	99.0
D14TIH35FR	94.6	15	93.2	1.05	91.1	94.9	15	98.0	0.63	97.0	99.6
D16JUS28	0.0	0	0.0	0.00	0.0	0.0	14	97.9	0.14	97.7	98.2
D16JUS28B	0.0	0	0.0	0.00	0.0	0.0	7	98.1	0.16	97.9	98.3

PROJECT	MAX EXT GC/GT	NO. DES GC/GT	AVG DES GC/GT	STD DES GC/GT	MIN DES GC/GT	MAX DES GC/GT	NO. GL/GR	AVG GL/GR	STD GL/GR	MIN GL/GR	MAX GL/GR
D16NSH44	0.0	0	0.0	0.00	0.0	0.0	10	96.7	0.28	96.3	97.2
D16RFM26	0.0	0	0.0	0.00	0.0	0.0	6	97.1	0.28	96.6	97.4
D16RUS77B1	0.0	0	0.0	0.00	0.0	0.0	14	96.5	0.36	95.9	97.1
D16RUS77B2	0.0	0	0.0	0.00	0.0	0.0	10	96.1	0.23	95.8	96.5
D16RUS77L	0.0	0	0.0	0.00	0.0	0.0	7	96.6	0.20	96.4	96.9
D16RUS77S	0.0	0	0.0	0.00	0.0	0.0	10	97.3	0.43	96.7	98.1
D16SPU18B	0.0	0	0.0	0.00	0.0	0.0	18	97.3	0.58	96.0	98.1
D16SPU18S	0.0	0	0.0	0.00	0.0	0.0	8	97.5	0.28	97.4	98.2
D17BFM28	0.0	0	0.0	0.00	0.0	0.0	10	95.9	0.83	94.7	96.8
D17BSH21	0.0	0	0.0	0.00	0.0	0.0	10	97.1	0.61	96.1	98.0
D17BUS21	0.0	0	0.0	0.00	0.0	0.0	18	96.8	0.54	95.3	97.6
D17BSH36TB	0.0	0	0.0	0.00	0.0	0.0	6	97.0	0.36	96.4	97.4
D17BSH36TD	0.0	0	0.0	0.00	0.0	0.0	6	96.3	0.36	95.9	96.9
D17GS105	0.0	0	0.0	0.00	0.0	0.0	6	96.7	0.92	95.1	97.7
D17GSH6	0.0	0	0.0	0.00	0.0	0.0	7	97.3	0.40	96.6	97.9
D17GSH6B	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D17GSH6C	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D17WUS29D	0.0	0	0.0	0.00	0.0	0.0	8	96.8	0.64	95.6	97.5
D17WUS29B1	0.0	0	0.0	0.00	0.0	0.0	14	96.7	0.48	96.0	97.5
D17WUS29B2	0.0	0	0.0	0.00	0.0	0.0	6	95.1	0.43	94.3	95.5
D17WUS29B3	0.0	0	0.0	0.00	0.0	0.0	7	95.4	1.01	94.5	97.6
D17WUS29B4	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D17WU29COM	0.0	0	0.0	0.00	0.0	0.0	5	95.0	0.33	94.8	95.6
D17BSORCOM	0.0	0	0.0	0.00	0.0	0.0	6	94.9	0.65	94.1	95.6
D17B21COM	0.0	0	0.0	0.00	0.0	0.0	8	94.4	0.89	93.1	95.6
D17R79COM	0.0	0	0.0	0.00	0.0	0.0	5	94.5	0.84	93.6	95.6
D17MS21COM	0.0	0	0.0	0.00	0.0	0.0	5	95.8	0.43	95.3	96.4
D18DIH63	98.0	6	97.7	0.47	96.9	98.1	14	97.7	0.50	96.7	98.5
D18NFM16	99.2	13	97.8	0.91	96.2	99.1	13	95.7	0.64	95.0	97.6
D19CUS59	97.9	39	95.7	1.32	92.6	98.4	44	96.8	0.88	95.5	98.0
D19MUS59	0.0	0	0.0	0.00	0.0	0.0	7	97.4	0.38	96.9	97.9
D19PUS59	0.0	0	0.0	0.00	0.0	0.0	30	97.5	0.79	95.7	98.5
D20TUS69	0.0	0	0.0	0.00	0.0	0.0	19	97.7	0.42	96.9	98.5
D21CFM14	0.0	0	0.0	0.00	0.0	0.0	7	97.1	0.72	96.5	98.5
D21HUS83	0.0	0	0.0	0.00	0.0	0.0	7	97.2	0.46	96.3	97.8
D21SFM75	0.0	0	0.0	0.00	0.0	0.0	10	97.9	0.52	97.1	98.9
D23BFM45	0.0	0	0.0	0.00	0.0	0.0	5	97.4	0.30	97.0	97.8
D23BUS67	0.0	0	0.0	0.00	0.0	0.0	5	97.3	0.22	97.0	97.6
D23EIH20A	0.0	0	0.0	0.00	0.0	0.0	16	98.0	0.82	95.8	99.0
D23EIH20B	0.0	0	0.0	0.00	0.0	0.0	6	97.2	1.03	96.0	98.7
D23LU190	97.3	21	94.6	1.54	90.6	97.4	25	97.3	0.62	96.1	98.6
D23MUS87	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0
D24CUS62	0.0	0	0.0	0.00	0.0	0.0	20	95.8	0.73	95.1	97.5

PROJECT	NO. EXT GL/GT	AVG EXT GL/GT	STD EXT GL/GT	MIN EXT GL/GT	MAX EXT GL/GT	NO. DES GL/GT	AVG DES GL/GT	STD DES GL/GT	MIN DES GL/GT	MAX DES GL/GT	NO. DES AC
D1FNUS82	21	98.7	0.52	97.9	100.2	21	98.8	0.55	97.7	100.1	3
D1HUSH50	15	98.3	1.37	95.1	99.4	15	98.7	1.31	95.6	100.0	1
D1LMSH19	8	98.8	0.13	98.6	99.0	8	98.8	0.20	98.5	99.1	1
D1LMUS82	5	98.5	0.41	97.9	99.0	5	98.7	0.42	98.2	99.3	1
D2TFM188	5	98.2	0.83	97.5	99.6	5	98.3	0.68	97.8	99.2	1
D2TFM188B	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0
D2TFM188C	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0
D2TI20G2	5	98.4	0.45	97.7	98.8	5	98.8	0.43	98.1	99.1	1
D3CUS287	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	3
D3WUS82	8	97.9	0.60	97.2	99.1	8	98.2	0.53	97.6	99.4	1
D4CUS60S	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D4CUS60L	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D5GAFM65	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D5HOLO44	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D5LSP326	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D5LUUS84D	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D5LUUS84C	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D5LUUS84L1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D5LUUS84L2	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0
D5GAUS84	6	96.8	0.81	96.1	98.2	6	97.1	0.89	96.0	98.2	2
D7TGS12	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D7TGU67	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D8NI20S	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D8NI20L	8	101.5	0.71	100.3	102.5	8	102.3	3.38	100.3	110.6	3
D8TI20	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D8TYUS83	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D10ANU28	23	97.9	0.49	97.0	98.7	23	97.9	0.50	97.0	98.8	1
D12GFM17	8	98.7	1.16	96.0	99.7	8	99.2	1.29	96.4	100.9	1
D12GFM17B	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D12MFM13	13	99.7	0.82	98.4	101.6	13	99.7	0.66	98.5	100.9	1
D12MIH45	7	99.0	0.63	98.1	99.8	7	99.4	0.60	98.6	100.2	1
D13FAU77	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D13FAU77B	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D13FAU77C	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D13FAU77D	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0
D13GOSH8	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D13GOU87	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D13JAS11	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D13LAS95	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D14BSH21	6	99.4	0.39	98.9	100.0	6	99.3	0.43	98.9	100.0	1
D14BSH21B	15	99.0	1.66	94.2	101.3	15	99.0	1.53	94.3	101.0	2
D14BSH71	18	98.5	0.82	96.7	99.5	18	98.4	0.69	96.9	99.2	2
D14BUS28	9	98.6	1.13	96.9	100.2	9	98.9	0.93	97.6	100.3	2
D14LUS29	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D14TIH35	36	97.9	0.91	96.2	99.8	36	97.9	0.81	96.5	99.7	2
D14TIH35ML	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D14TIH35FR	15	99.4	0.99	97.7	102.0	15	99.5	0.79	98.2	101.5	1
D16JUS28	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D16JUS28B	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1

PROJECT	NO. EXT GL/GT	AVG EXT GL/GT	STD EXT GL/GT	MIN EXT GL/GT	MAX EXT GL/GT	NO. DES GL/GT	AVG DES GL/GT	STD DES GL/GT	MIN DES GL/GT	MAX DES GL/GT	NO. DES AC
D16NSH44	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D16RFM26	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D16RUS77B1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D16RUS77B2	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D16RUS77L	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D16RUS77S	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D16SPU18B	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	3
D16SPU18S	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17BFM28	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17BSH21	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17BUS21	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D17BSH36TB	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17BSH36TD	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17GS105	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D17GSH6	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17GSH6B	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17GSH6C	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0
D17WUS29D	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17WUS29B1	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17WUS29B2	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17WUS29B3	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D17WUS29B4	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0
D17WU29COM	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D17BSORCOM	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	3
D17B21COM	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	3
D17R79COM	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D17MS21COM	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D18DIH63	14	97.7	0.50	96.7	98.5	14	97.8	0.52	96.7	98.6	1
D18NFM16	13	95.7	0.64	95.0	97.6	13	95.6	0.59	95.0	97.3	1
D19CUS59	14	98.0	0.89	96.7	99.3	44	98.2	0.69	97.1	99.4	1
D19MUS59	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D19PUS59	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D20TUS69	19	98.9	0.42	98.0	99.6	19	99.0	0.38	98.3	99.6	2
D21CFM14	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D21HUS83	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D21SFM75	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D23BFM45	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D23BUS67	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D23EIH20A	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2
D23EIH20B	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D23LU190	25	99.5	0.63	98.2	100.8	25	99.5	0.56	98.4	100.8	2
D23MUS87	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	1
D24CUS62	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	2

PROJECT	DES AC	EXT AC	STD EXT AC	DES.AC (-) EXT.AC	SD.DES AC - EXT.AC	NO.OF VMA CORES	AVG. VMA CORES	STD VMA CORES	MIN VMA CORES	MAX VMA CORES	NO. PVF CORS	AVG. CORE PVF
D1FNUS82	5.6	5.5	0.34	0.10	0.31	14	16.4	1.65	14.4	20.9	14	71.8
D1HUSH50	5.6	5.3	0.27	0.30	0.26	8	18.5	1.73	16.5	21.9	8	59.6
D1LMSH19	5.3	5.3	0.08	0.00	0.08	7	17.4	0.94	15.8	18.4	7	62.0
D1LMUS82	5.8	5.6	0.15	0.20	0.15	0	0.0	0.00	0.0	0.0	0	0.0
D2TFM188	7.6	7.5	0.34	0.10	0.34	0	0.0	0.00	0.0	0.0	0	0.0
D2TFM188B	0.0	0.0	0.00	0.00	0.00	0	0.0	0.00	0.0	0.0	0	0.0
D2TFM188C	0.0	0.0	0.00	0.00	0.00	0	0.0	0.00	0.0	0.0	0	0.0
D2TI20G2	5.4	5.2	0.21	0.20	0.21	0	0.0	0.00	0.0	0.0	0	0.0
D3CUS287	4.8	4.8	0.22	0.00	0.15	0	0.0	0.00	0.0	0.0	0	0.0
D3WUS82	5.1	4.9	0.16	0.20	0.16	7	16.1	1.45	13.0	17.4	7	62.8
D4CUS60S	4.8	4.8	0.09	0.00	0.09	0	0.0	0.00	0.0	0.0	0	0.0
D4CUS60L	5.2	5.3	0.31	0.00	0.28	0	0.0	0.00	0.0	0.0	0	0.0
D5GAFM65	4.2	4.3	0.22	0.00	0.26	0	0.0	0.00	0.0	0.0	0	0.0
D5HOLO44	4.8	5.1	0.16	-0.30	0.10	0	0.0	0.00	0.0	0.0	0	0.0
D5LSP326	6.7	6.6	0.17	0.10	0.13	0	0.0	0.00	0.0	0.0	0	0.0
D5LUUS84D	4.7	4.6	0.17	0.10	0.17	0	0.0	0.00	0.0	0.0	0	0.0
D5LUUS84C	4.5	4.4	0.25	0.10	0.25	0	0.0	0.00	0.0	0.0	0	0.0
D5LUUS84L1	5.0	4.8	0.10	0.20	0.10	0	0.0	0.00	0.0	0.0	0	0.0
D5LUUS84L2	0.0	0.0	0.00	0.00	0.00	0	0.0	0.00	0.0	0.0	0	0.0
D5GAUS84	5.1	5.2	0.46	-0.10	0.16	7	19.3	2.68	16.6	2.5	7	57.7
D7TGS12	5.4	5.4	0.25	0.00	0.26	0	0.0	0.00	0.0	0.0	0	0.0
D7TGU67	5.4	5.6	0.27	-0.20	0.27	0	0.0	0.00	0.0	0.0	0	0.0
D8NI20S	5.5	5.6	0.22	-0.20	0.23	0	0.0	0.00	0.0	0.0	0	0.0
D8NI20L	5.5	5.6	0.25	-0.10	0.24	0	0.0	0.00	0.0	0.0	0	0.0
D8TI20	5.8	5.9	0.23	-0.10	0.23	0	0.0	0.00	0.0	0.0	0	0.0
D8TYUS83	4.7	4.8	0.22	-0.10	0.22	0	0.0	0.00	0.0	0.0	0	0.0
D10ANU28	5.4	5.4	0.17	0.10	0.17	21	19.5	1.49	17.4	22.7	0	0.0
D12GFM17	5.2	4.9	0.35	0.30	0.35	15	16.0	1.48	13.5	18.7	15	61.2
D12GFM17B	4.9	5.0	0.35	-0.10	0.36	0	0.0	0.00	0.0	0.0	0	0.0
D12MFM13	5.3	5.3	0.27	0.10	0.27	13	17.0	0.75	16.0	18.3	13	50.3
D12MIH45	5.6	5.2	0.45	0.40	0.45	5	15.2	1.81	13.4	17.8	5	49.7
D13FAU77	6.0	6.1	0.18	-0.10	0.18	0	0.0	0.00	0.0	0.0	0	0.0
D13FAU77B	5.5	5.9	0.27	-0.40	0.34	0	0.0	0.00	0.0	0.0	0	0.0
D13FAU77C	6.0	6.0	0.27	0.00	0.27	0	0.0	0.00	0.0	0.0	0	0.0
D13FAU77D	0.0	0.0	0.00	0.00	0.00	0	0.0	0.00	0.0	0.0	0	0.0
D13GOSH8	4.7	4.6	0.19	0.10	0.13	0	0.0	0.00	0.0	0.0	0	0.0
D13GOU87	4.7	4.6	0.16	0.10	0.13	0	0.0	0.00	0.0	0.0	0	0.0
D13JAS11	4.5	4.6	0.17	-0.10	0.17	0	0.0	0.00	0.0	0.0	0	0.0
D13LAS95	5.7	6.1	0.24	-0.40	0.24	0	0.0	0.00	0.0	0.0	0	0.0
D14BSH21	4.5	4.5	0.07	0.00	0.07	5	17.1	0.33	16.6	17.4	5	52.0
D14BSH21B	4.5	4.5	0.15	0.00	0.15	10	17.9	1.82	15.5	22.6	10	51.9
D14BSH71	5.0	5.0	0.25	0.00	0.19	12	18.6	0.70	17.2	19.4	12	55.9
D14BUS28	4.8	4.6	0.30	0.20	0.30	9	16.5	1.15	15.1	18.7	9	55.5
D14LUS29	4.9	5.0	0.12	-0.10	0.12	0	0.0	0.00	0.0	0.0	0	0.0
D14TIH35	4.3	4.3	0.26	0.00	0.26	0	0.0	0.00	0.0	0.0	0	0.0
D14TIH35ML	4.8	4.7	0.21	0.10	0.21	0	0.0	0.00	0.0	0.0	0	0.0
D14TIH35FR	4.7	4.7	0.24	0.10	0.24	15	16.9	1.01	15.3	18.8	15	51.6
D16JUS28	4.9	4.9	0.09	0.10	0.09	0	0.0	0.00	0.0	0.0	0	0.0
D16JUS28B	4.9	4.9	0.08	0.00	0.08	0	0.0	0.00	0.0	0.0	0	0.0

PROJECT	DES AC	EXT AC	STD EXT AC	DES.AC (-) EXT.AC	SD.DES AC - EXT.AC	NO.OF VMA CORES	AVG. VMA CORES	STD VMA CORES	MIN VMA CORES	MAX VMA CORES	NO. PVF CORS	AVG. CORE PVF
D16NSH44	4.8	4.8	0.11	0.00	0.11	0	0.0	0.00	0.0	0.0	0	0.0
D16RFM26	5.4	5.3	0.13	0.10	0.12	0	0.0	0.00	0.0	0.0	0	0.0
D16RUS77B1	4.9	4.8	0.12	0.10	0.10	0	0.0	0.00	0.0	0.0	0	0.0
D16RUS77B2	4.8	4.7	0.07	0.10	0.07	0	0.0	0.00	0.0	0.0	0	0.0
D16RUS77L	5.4	5.3	0.06	0.10	0.06	0	0.0	0.00	0.0	0.0	0	0.0
D16RUS77S	5.5	5.5	0.15	0.00	0.11	0	0.0	0.00	0.0	0.0	0	0.0
D16SPU18B	4.5	4.5	0.14	0.00	0.12	0	0.0	0.00	0.0	0.0	0	0.0
D16SPU18S	5.0	5.0	0.03	0.00	0.03	0	0.0	0.00	0.0	0.0	0	0.0
D17BFM28	5.8	5.8	0.34	0.00	0.34	0	0.0	0.00	0.0	0.0	0	0.0
D17BSH21	5.8	5.7	0.27	0.10	0.26	0	0.0	0.00	0.0	0.0	0	0.0
D17BUS21	5.6	5.5	0.21	0.10	0.27	0	0.0	0.00	0.0	0.0	0	0.0
D17BSH36TB	5.6	5.5	0.26	0.10	0.26	0	0.0	0.00	0.0	0.0	0	0.0
D17BSH36TD	6.8	5.5	0.17	0.30	0.17	0	0.0	0.00	0.0	0.0	0	0.0
D17GS105	5.1	4.9	0.55	0.20	0.40	0	0.0	0.00	0.0	0.0	0	0.0
D17GSH6	5.8	5.7	0.25	0.10	0.25	0	0.0	0.00	0.0	0.0	0	0.0
D17GSH6B	5.8	5.5	0.12	0.30	0.12	0	0.0	0.00	0.0	0.0	0	0.0
D17GSH6C	0.0	0.0	0.00	0.00	0.00	0	0.0	0.00	0.0	0.0	0	0.0
D17WUS29D	4.2	4.2	0.08	0.00	0.10	0	0.0	0.00	0.0	0.0	0	0.0
D17WUS29B1	3.7	3.7	0.12	0.10	0.12	0	0.0	0.00	0.0	0.0	0	0.0
D17WUS29B2	3.7	3.6	0.25	0.10	0.25	0	0.0	0.00	0.0	0.0	0	0.0
D17WUS29B3	3.7	3.8	0.30	-0.10	0.28	0	0.0	0.00	0.0	0.0	0	0.0
D17WUS29B4	0.0	0.0	0.00	0.00	0.00	0	0.0	0.00	0.0	0.0	0	0.0
D17WU29COM	6.2	5.9	0.35	0.30	0.35	0	0.0	0.00	0.0	0.0	0	0.0
D17BSORCOM	5.4	5.6	0.79	-0.12	0.60	0	0.0	0.00	0.0	0.0	0	0.0
D17B21COM	5.3	5.0	0.71	0.30	0.33	0	0.0	0.00	0.0	0.0	0	0.0
D17R79COM	6.1	5.8	0.59	0.30	0.56	0	0.0	0.00	0.0	0.0	0	0.0
D17MS21COM	6.0	6.0	0.24	0.00	0.24	0	0.0	0.00	0.0	0.0	0	0.0
D18DIH63	4.5	4.4	0.19	0.10	0.19	6	12.7	0.47	12.3	13.6	0	0.0
D18NFM16	4.6	4.6	0.16	0.00	0.16	13	13.0	0.81	11.9	14.5	0	0.0
D19CUS59	4.8	4.7	0.23	0.10	0.23	39	15.0	1.27	12.3	18.1	39	62.8
D19MUS59	5.7	5.6	0.33	0.10	0.33	0	0.0	0.00	0.0	0.0	0	0.0
D19PUS59	4.6	4.7	0.31	-0.10	0.31	0	0.0	0.00	0.0	0.0	0	0.0
D20TUS69	4.7	4.6	0.15	0.10	0.14	0	0.0	0.00	0.0	0.0	0	0.0
D21CFM14	5.0	5.1	0.05	-0.10	0.35	0	0.0	0.00	0.0	0.0	0	0.0
D21HUS83	4.0	4.0	0.07	0.10	0.07	0	0.0	0.00	0.0	0.0	0	0.0
D21SFM75	4.8	4.7	0.46	0.10	0.09	0	0.0	0.00	0.0	0.0	0	0.0
D23BFM45	4.0	4.0	0.12	0.00	0.08	0	0.0	0.00	0.0	0.0	0	0.0
D23BUS67	3.9	3.9	0.10	0.00	0.10	0	0.0	0.00	0.0	0.0	0	0.0
D23EIH20A	4.1	4.1	0.12	0.00	0.10	0	0.0	0.00	0.0	0.0	0	0.0
D23EIH20B	4.0	4.1	0.12	-0.10	0.12	0	0.0	0.00	0.0	0.0	0	0.0
D23LU190	5.1	5.2	0.17	-0.10	0.11	21	16.6	1.40	14.1	20.3	21	55.5
D23MUS87	3.9	3.9	0.22	0.00	0.22	0	0.0	0.00	0.0	0.0	0	0.0
D24CUS62	5.0	4.9	0.28	0.00	0.24	0	0.0	0.00	0.0	0.0	0	0.0

PROJECT	STD. COR. PVF.	MIN. COR. PVF.	MAX. COR. PVF.	NO. LAB VMA	AVG LAB VMA	STD LAB VMA	MIN LAB VMA	MAX LAB VMA	NO. LAB PVF	AVG LAB PVF	STD LAB PVF	MIN LAB PVF	MAX LAB PVF	AVG PAS 3/8
D1FNUS82	7.26	52.6	82.5	21	14.3	0.58	13.5	15.4	21	85.9	3.63	80.0	96.3	95
D1HUSH50	6.52	50.3	68.6	15	13.6	1.51	12.4	16.2	15	83.6	8.03	66.1	90.6	95
D1LMSH19	4.78	58.2	70.2	8	13.6	0.23	13.3	14.0	8	82.9	0.75	82.2	84.4	84
D1LMUS82	0.00	0.0	0.0	5	14.5	0.42	14.1	15.0	5	80.8	2.45	77.2	83.6	95
D2TFM188	0.00	0.0	0.0	5	14.8	0.55	14.0	15.3	5	73.5	5.05	69.3	82.1	98
D2TFM188B	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	99
D2TFM188C	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D2TI20G2	0.00	0.0	0.0	5	13.1	0.41	12.7	13.7	5	84.5	3.03	79.6	86.7	96
D3CUS287	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	98
D3WUS82	7.13	57.1	78.5	8	13.9	0.53	12.6	14.3	8	74.6	3.55	70.0	81.0	99
D4CUS60S	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	94
D4CUS60L	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	94
D5GAFM65	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D5HOLO44	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	98
D5LSP326	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	98
D5LUUS84D	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	100
D5LUUS84C	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	72
D5LUUS84L1	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D5LUUS84L2	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D5GAUS84	10.76	40.5	70.3	6	15.0	0.21	14.7	15.3	6	77.4	5.48	72.2	86.9	98
D7TGS12	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	98
D7TGU67	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D8NI20S	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D8NI20L	0.00	0.0	0.0	7	11.3	0.36	10.9	11.8	7	71.4	4.34	64.3	76.7	97
D8TI20	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D8TYUS83	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D10ANU28	0.00	0.0	0.0	23	14.7	0.51	13.6	15.5	0	0.0	0.00	0.0	0.0	95
D12GFM17	5.03	50.6	70.3	8	12.5	1.30	10.5	15.1	8	79.3	6.53	64.8	86.2	93
D12GFM17B	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D12MFM13	2.42	45.0	53.3	13	12.2	0.53	11.5	13.1	13	74.5	5.88	65.6	88.7	96
D12MIH45	8.37	41.1	61.8	7	12.9	0.80	12.1	13.9	7	63.0	5.44	52.7	68.4	94
D13FAU77	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D13FAU77B	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D13FAU77C	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D13FAU77D	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D13GOSH8	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	94
D13GOU87	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	94
D13JAS11	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D13LAS95	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D14BSH21	3.83	45.3	54.9	6	11.7	0.42	11.0	12.1	6	80.8	3.39	77.0	85.9	76
D14BSH21B	2.81	48.0	56.2	15	11.9	1.28	10.3	15.9	15	83.7	6.32	74.0	97.1	77
D14BSH71	2.84	51.6	61.2	18	13.1	0.38	12.6	14.1	18	83.2	5.70	71.4	90.6	92
D14BUS28	7.04	40.1	65.2	9	12.0	0.79	10.5	13.1	9	79.8	6.54	67.6	89.6	78
D14LUS29	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	76
D14TIH35	0.00	0.0	0.0	36	12.0	0.74	10.5	13.6	36	77.7	6.63	65.2	92.4	58
D14TIH35ML	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	79
D14TIH35FR	3.15	46.3	55.2	15	11.4	0.61	9.9	12.1	15	82.1	4.97	74.9	96.0	72
D16JUS28	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	79
D16JUS28B	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	79

PROJECT	STD. COR. PVF.	MIN. COR. PVF.	MAX. COR. PVF.	NO. LAB VMA	AVG LAB VMA	STD LAB VMA	MIN LAB VMA	MAX LAB VMA	NO. LAB PVF	AVG LAB PVF	STD LAB PVF	MIN LAB PVF	MAX LAB PVF	AVG PAS 3/8
D16NSH44	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	91
D16RFM26	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	92
D16RUS77B1	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	74
D16RUS77B2	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	76
D16RUS77L	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	93
D16RUS77S	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	91
D16SPU18B	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	77
D16SPU18S	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	88
D17BFM28	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D17BSH21	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D17BUS21	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	73
D17BSH36TB	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	76
D17BSH36TD	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D17GS105	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D17GSH6	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D17GSH6B	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D17GSH6C	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D17WUS29D	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	89
D17WUS29B1	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	72
D17WUS29B2	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	74
D17WUS29B3	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	73
D17WUS29B4	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	72
D17WU29COM	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D17BSORCOM	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D17B21COM	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	94
D17R79COM	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	97
D17MS21COM	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95
D18DIH63	0.00	0.0	0.0	14	12.6	0.53	11.7	13.7	0	0.0	0.00	0.0	0.0	75
D18NFM16	0.00	0.0	0.0	13	15.0	0.52	13.6	15.7	0	0.0	0.00	0.0	0.0	68
D19CUS59	5.29	53.4	72.6	44	12.8	0.54	11.7	13.6	44	75.2	6.08	66.2	83.7	96
D19MUS59	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	69
D19PUS59	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	79
D20TUS69	0.00	0.0	0.0	19	11.8	0.35	11.3	12.4	19	80.9	3.15	74.8	87.0	95
D21CFM14	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	96
D21HUS83	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	92
D21SFM75	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	89
D23BFM45	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	100
D23BUS67	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	100
D23EIH20A	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	94
D23EIH20B	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	94
D23LU190	5.30	45.4	66.9	24	12.3	0.51	11.2	13.2	24	78.5	4.52	70.6	87.5	94
D23MUS87	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	51
D24CUS62	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	0	0.0	0.00	0.0	0.0	95

PROJECT	P3/8 .45- AVG	P10 AVG	P10 DES- AVG	P10 .45- AVG	P40 AVG	P40 DES- AVG	P40 .45- AVG	P80 AVG	P80 DES- AVG	P80 .45- AVG	P200 AVG.	P200 DES- AVG	P200 .45- AVG
D1FNUS82	4.9	40.1	0.9	9.4	27.9	1.5	-3.4	14.5	1.0	2.2	5.5	-1.0	5.7
D1HUSH50	4.8	37.0	2.2	12.5	25.8	0.7	-1.3	17.6	-0.5	-0.9	6.2	-0.4	5.0
D1LMSH19	-4.3	41.3	0.4	-1.9	23.9	1.8	-4.4	13.1	0.9	0.1	4.6	1.6	4.3
D1LMUS82	5.3	36.4	3.9	13.1	24.7	3.3	-0.2	12.4	0.8	4.3	1.6	0.4	9.6
D2TFM188	1.5	42.8	3.6	6.7	21.3	4.3	3.2	8.6	1.0	8.1	2.2	0.6	9.0
D2TFM188B	1.4	45.9	-0.8	3.6	31.8	-4.2	-7.3	14.2	-8.5	2.5	3.5	-2.3	7.7
D2TFM188C	2.6	45.7	-1.5	3.8	30.2	-2.4	-5.7	11.6	-4.1	5.1	2.0	0.1	9.2
D2TI20G2	3.5	36.4	-0.6	13.1	18.1	1.3	6.4	8.2	-2.0	8.5	2.6	-0.9	8.6
D3CUS287	1.6	40.0	-0.6	9.5	24.8	0.8	-0.3	12.4	-0.2	4.3	4.2	-2.9	7.0
D3WUS82	1.2	41.6	-1.1	7.9	29.4	0.6	-4.9	15.3	1.8	1.4	4.1	-1.6	7.1
D4CUS60S	5.6	40.5	0.1	9.0	18.9	0.4	5.6	10.2	0.2	6.5	3.5	1.0	7.7
D4CUS60L	5.9	39.7	0.9	9.8	18.5	0.8	6.0	10.3	0.1	6.4	4.6	-0.1	6.6
D5GAFM65	3.2	36.1	-1.6	13.4	17.8	2.4	6.7	6.3	2.6	10.4	1.3	2.0	9.9
D5HOLO44	1.9	37.6	0.8	11.9	20.8	-1.2	3.7	10.1	-1.6	6.6	3.7	-2.0	7.5
D5LSP326	2.5	38.8	0.1	10.7	23.0	0.0	1.5	10.1	-0.7	6.6	2.8	-0.9	8.4
D5LUUS84D	0.5	38.4	-0.1	11.1	21.2	0.5	3.3	10.0	2.4	6.7	2.3	1.8	8.9
D5LUUS84C	7.8	35.5	0.8	3.9	20.1	0.7	-0.6	9.1	1.0	4.1	2.2	1.1	6.7
D5LUUS84L1	4.2	39.8	-0.6	9.7	21.9	-1.7	2.6	10.1	-1.6	6.6	2.5	-0.2	8.7
D5LUUS84L2	4.6	36.6	-1.4	12.9	20.4	-0.6	4.1	10.1	-0.8	6.6	2.2	0.5	9.0
D5GAUS84	1.6	39.2	-0.8	10.3	21.9	-2.3	2.6	11.8	-3.3	4.9	3.7	-2.0	7.5
D7TGS12	2.2	38.1	3.1	11.4	22.5	1.4	2.0	9.5	1.9	7.2	4.8	0.8	6.4
D7TGU67	3.1	39.2	2.0	10.3	23.2	0.7	1.3	10.6	0.8	6.1	5.6	0.0	5.6
D8NI20S	2.6	37.7	0.4	11.8	26.1	-1.7	-1.6	15.3	-3.7	1.4	5.7	-1.8	5.5
D8NI20L	3.4	37.4	0.7	12.1	26.1	-1.7	-1.6	15.1	-3.5	1.6	5.6	-1.7	5.6
D8TI20	4.3	38.3	-0.2	11.2	26.1	-1.7	-1.6	14.7	-3.1	2.0	5.5	-1.6	5.7
D8TYUS83	3.7	41.0	-1.1	8.5	22.5	1.9	2.0	12.4	-0.5	4.3	6.6	-1.7	4.6
D10ANU28	5.2	35.9	-0.3	13.6	26.2	-1.9	-1.7	14.4	-1.2	2.3	4.3	-1.3	6.9
D12GFM17	6.8	36.4	-1.9	13.1	25.3	-1.6	-0.8	9.9	-3.7	6.8	4.3	-1.3	6.9
D12GFM17B	4.8	39.9	-3.7	9.6	27.1	-1.8	-2.6	11.4	-1.5	5.3	5.0	-0.7	6.2
D12MFM13	3.8	41.2	-0.4	8.3	29.7	-2.4	-5.2	13.4	-2.6	3.3	6.7	-1.4	4.5
D12MIH45	6.0	40.1	-0.1	9.4	27.9	1.1	-3.4	9.5	2.0	7.2	3.6	1.4	7.6
D13FAU77	3.5	38.6	-0.2	10.9	23.7	-0.2	0.8	11.7	-0.1	5.0	3.8	0.3	7.4
D13FAU77B	4.1	39.6	-0.1	9.9	26.7	0.4	-2.2	14.1	0.4	2.6	6.6	-0.7	4.6
D13FAU77C	5.0	40.0	0.1	9.5	25.9	0.8	-1.4	12.9	-0.3	3.8	4.3	-1.8	6.9
D13FAU77D	3.0	38.8	-0.8	10.7	23.8	0.7	0.7	11.4	1.8	5.3	3.8	-0.6	7.4
D13GOSH8	6.5	38.5	-0.4	11.0	26.1	0.5	-1.6	11.3	-1.5	5.4	3.5	0.2	7.7
D13GOU87	6.5	38.2	-0.1	11.3	25.8	0.8	1.3	11.0	-1.2	5.7	3.4	0.3	7.8
D13JAS11	3.0	41.0	-3.3	8.5	27.3	-3.9	-2.8	16.4	-2.6	0.3	6.8	-1.8	4.4
D13LAS95	5.3	41.2	-1.7	8.3	28.1	-1.0	-3.6	16.9	-2.4	-0.2	7.4	-1.5	3.8
D14BSH21	3.5	35.5	-1.0	3.9	17.9	-2.9	1.6	9.4	-3.2	3.8	3.7	-1.7	5.2
D14BSH21B	2.8	37.5	-2.0	1.9	19.6	-1.7	-0.1	10.2	-0.8	3.0	4.5	-0.8	4.4
D14BSH71	8.3	35.8	-1.0	13.7	21.9	-0.2	2.6	14.6	-0.2	2.1	6.5	-0.5	4.7
D14BUS28	1.9	38.1	0.3	1.3	25.4	1.2	-5.9	12.7	0.2	0.5	4.5	-0.8	4.4
D14LUS29	3.7	37.0	-0.1	2.4	19.8	-2.3	-0.3	6.8	-2.2	6.4	2.4	-1.0	6.5
D14TIH35	10.7	29.2	-0.5	4.6	17.5	-1.9	-0.8	6.7	0.7	4.7	3.4	0.0	4.3
D14TIH35ML	0.7	38.2	0.2	1.2	26.0	0.6	-6.5	13.5	-0.6	-0.3	4.7	-1.0	4.2
D14TIH35FR	7.9	34.8	-2.1	4.6	21.9	-1.3	-2.4	14.6	-1.7	-1.4	6.7	-1.5	2.2
D16JUS28	0.8	38.6	1.3	0.8	23.7	0.0	-4.2	15.5	-0.6	-2.3	4.1	0.1	4.8
D16JUS28B	0.7	40.2	0.3	-0.8	23.8	0.0	-4.3	13.9	-2.3	-0.7	3.8	-1.5	5.1

PROJECT	P3/8 .45-AVG	P10 AVG	P10 DES-AVG	P10 .45-AVG	P40 AVG	P40 DES-AVG	P40 .45-AVG	P80 AVG	P80 DES-AVG	P80 .45-AVG	P200 AVG.	P200 DES-AVG	P200 .45-AVG
D16NSH44	9.4	41.1	-0.6	8.4	19.3	-1.3	5.2	7.6	-2.6	9.1	3.1	-1.7	8.1
D16RFM26	7.7	35.1	-0.7	14.4	19.7	-0.4	4.8	11.6	-0.7	5.1	3.7	-0.9	7.5
D16RUS77B1	-5.6	32.4	1.5	1.4	19.3	0.0	-2.6	11.6	0.0	-0.2	2.9	1.0	4.8
D16RUS77B2	-7.8	32.8	-0.9	1.0	19.8	-0.5	-3.1	11.8	-0.3	-0.4	2.8	0.0	4.9
D16RUS77L	6.6	35.6	-1.2	13.9	20.0	-0.7	4.5	12.1	-1.2	4.6	4.5	-1.7	6.7
D16RUS77S	9.3	39.2	-0.4	10.3	26.9	-0.3	-2.4	20.9	-0.1	-4.2	5.4	-0.1	5.8
D16SPU18B	-8.9	35.8	1.1	-2.0	23.9	-0.1	-7.2	10.3	0.2	1.1	3.4	0.3	4.3
D16SPU18S	11.8	42.0	-0.3	7.5	20.6	0.2	3.9	8.3	0.0	8.4	4.0	-1.2	7.2
D17BFM28	4.1	40.0	0.0	9.5	28.6	-1.6	-4.1	15.5	0.5	1.2	4.9	0.1	6.3
D17BSH21	4.0	40.0	0.0	9.5	27.5	-0.5	-3.0	17.7	-1.7	-1.0	6.4	-1.4	4.8
D17BUS21	-5.1	37.5	-0.5	-3.7	26.7	0.3	-10	15.7	1.3	-4.3	6.1	-0.1	1.6
D17BSH36TB	-8.2	41.8	-2.3	-8.0	28.9	-2.1	-12	17.2	-2.9	-5.8	7.4	-1.7	0.3
D17BSH36TD	4.7	40.9	-0.9	8.6	29.3	-2.3	-4.8	16.4	-0.4	3.0	5.2	-0.2	6.0
D17GS105	4.7	36.4	3.6	13.1	24.2	2.8	0.3	13.7	0.3	3.0	5.5	-0.5	5.7
D17GSH6	4.3	36.5	-0.3	13.0	21.1	0.1	3.4	8.6	-0.4	8.1	3.4	-0.4	7.8
D17GSH6B	3.9	39.1	-0.2	10.4	21.5	-0.2	3.0	8.8	-0.1	7.9	3.5	0.2	7.7
D17GSH6C	3.8	38.7	0.2	10.8	21.9	-0.6	2.6	7.8	0.9	8.9	2.9	0.8	8.3
D17WUS29D	10.7	39.5	-0.1	10.0	26.3	-1.6	-1.8	15.2	-1.7	1.5	6.0	-1.6	5.2
D17WUS29B1	-3.7	37.1	-1.1	-3.3	24.3	-1.3	-7.6	12.6	-1.6	-1.2	3.3	-0.3	4.4
D17WUS29B2	-5.6	34.8	1.2	-1.0	22.6	0.4	-5.9	12.4	-1.4	-1.0	3.1	-0.1	4.6
D17WUS29B3	-4.7	38.3	-2.3	-4.5	24.9	-1.9	-8.2	14.2	-3.2	-2.8	4.9	-1.9	2.8
D17WUS29B4	-3.3	35.0	1.0	-1.2	23.3	-0.3	-6.6	12.8	-1.8	-1.4	4.4	-1.4	3.3
D17WU29COM	2.6	38.3	1.7	11.2	25.5	0.5	-1.0	20.1	-1.1	-3.4	4.4	0.6	6.8
D17BSORCOM	5.1	39.9	0.1	9.6	27.1	-1.1	-2.6	18.5	-1.5	-1.8	3.2	1.8	8.0
D17B21COM	5.8	38.9	1.1	10.6	25.1	0.9	-0.6	16.1	0.9	0.6	3.1	1.9	8.1
D17R79COM	2.6	40.4	-0.4	9.1	27.2	-1.2	-2.7	19.1	-2.1	-2.4	3.9	1.1	7.3
D17MS21COM	5.4	39.6	0.4	9.9	25.3	0.7	-0.8	14.8	1.2	1.9	4.7	1.3	6.5
D18DIH63	4.7	37.3	-1.0	2.1	24.3	-1.5	-4.8	8.7	-2.9	4.5	3.1	-1.9	5.8
D18NFM16	11.7	41.5	-0.4	-2.1	25.6	1.9	-6.1	0.0	0.0	0.0	2.0	-1.4	6.9
D19CUS59	3.6	41.6	-0.1	7.9	22.2	0.3	2.3	8.8	-1.6	7.9	3.6	-1.1	7.6
D19MUS59	10.4	38.8	3.3	0.6	25.1	2.0	-5.6	14.0	0.3	-0.8	2.3	-0.4	6.6
D19PUS59	0.5	39.5	-0.9	-0.1	25.8	0.8	-6.3	19.2	-1.0	-6.0	5.7	-2.3	3.2
D20TUS69	5.2	42.1	-3.0	7.5	27.2	-3.6	-2.7	9.5	-1.8	7.2	4.8	-1.1	6.4
D21CFM14	4.4	36.6	3.8	12.9	23.3	2.7	1.2	8.2	2.4	8.5	1.8	0.0	9.4
D21HUS83	8.4	38.8	1.8	10.7	25.8	1.0	-1.3	10.1	1.5	6.6	2.1	0.8	9.1
D21SFM75	10.6	38.5	-0.3	11.0	26.6	1.3	-2.1	10.6	-2.9	6.1	3.0	-2.4	8.2
D23BFM45	0.3	38.0	-2.1	11.5	24.6	-3.5	-0.1	13.8	-7.9	2.9	6.0	-3.1	5.2
D23BUS67	0.2	36.8	-0.9	12.7	23.5	-2.4	1.0	13.5	-7.6	3.2	5.9	-3.0	5.3
D23EIH20A	6.0	36.0	-0.1	13.5	23.1	-2.0	1.4	9.2	-3.3	7.5	4.7	-1.8	6.5
D23EIH20B	6.4	34.3	2.2	15.2	21.6	1.5	2.9	9.4	1.3	7.3	6.8	-2.1	4.4
D23LU190	5.7	34.1	0.1	15.4	24.9	-1.3	-0.4	16.9	-7.0	-0.2	4.6	-2.2	6.6
D23MUS87	36.8	34.6	1.9	8.9	17.5	2.2	4.0	11.1	1.1	3.6	6.6	-0.2	3.3
D24CUS62	4.6	39.1	0.2	10.4	19.2	0.9	5.3	12.0	-0.4	4.7	5.1	-1.8	6.1

PROJECT	COURSE AGGREG TYPE	INTERM AGGREG TYPE	SCRNG TYPE	FIELD SAND TYPE	PCT. CRSE AGRG	PCT. INTM AGRG	PCT. SCRG	PCT. FLD. SAND
D1FNUS82	SANDSTONE		SANDSTONE		55.0		30.0	15.0
D1HUSH50	SANDSTONE		SANDSTONE		60.0		25.0	15.0
D1LMSH19	SANDSTONE	SANDSTONE	SANDSTONE	RIVER SAND	50.0		40.0	10.0
D1LMUS82	SAND STONE		SANDSTONE	L.S. GRAVL	55.0		30.0	15.0
D2TFM188			LIMESTONE	CYCLONIC	49.0		41.0	10.0
D2TFM188B					50.0		25.0	25.0
D2TFM188C					0.0			0.0
D2TI20G2			LIMESTONE		60.0		30.0	10.0
D3CUS287	LIMESTONE	LIMESTONE	LIMESTONE		45.0	13	22.0	20.0
D3WUS82	LIMESTONE	SANDSTONE	LIMESTONE					0.0
D4CUS60S	LIMESTONE		LIMESTONE					0.0
D4CUS60L								0.0
D5GAFM65	LS&SIL. SD		LS&SIL. SD				32.7	8.2
D5HOL044	CALICHE				56.5		38.5	5.0
D5LSP326	SIL. SAND		SIL. SAND		55.1		33.8	11.1
D5LUUS84D	CALICHE		LS&SIL. SD		54.5		40.5	5.0
D5LUUS84C					37.6	20	35.7	7.1
D5LUUS84L1					61.3		30.6	8.1
D5LUUS84L2								0.0
D5GAUS84	CALICHE		CALICHE		56.5		38.5	5.0
D7TGS12								0.0
D7TGU67								0.0
D8NI20S	LIMESTONE	LIMESTONE	LIMESTONE		34.0	29	25.0	12.0
D8NI20L								0.0
D8TI20	LJK870010T	LJK870011T	LKK870012T	LBK870013T	30.0	30	30.0	10.0
D8TYUS83								0.0
D10ANU28	SANDSTONE		SANDSTONE		62.0		38.0	0.0
D12GFM17	LIMESTONE		LIMESTONE		62.0		10.0	28.0
D12GFM17B					65.0		15.0	20.0
D12MFM13	SANDSTONE	LIMESTONE	LIMESTONE		64.0		10.0	26.0
D12MIH45	LIMESTONE	LIMESTONE	LIMESTONE		30.0	30	20.0	20.0
D13FAU77	LIMESTONE	LIMESTONE	LIMESTONE		47.0	14	22.0	17.0
D13FAU77B					47.0	14	22.0	17.0
D13FAU77C					58.0		24.0	18.0
D13FAU77D					47.0	14	22.0	17.0
D13GOSH8	LIMESTONE	LIMESTONE	LIMESTONE	SILICA	37.0	25	16.0	22.0
D13GOU87	LIMESTONE	LIMESTONE	LIMESTONE	SILICA	37.0	25	16.0	22.0
D13JAS11	LIMESTONE	LIMESTONE	LIMESTONE		42.0	10	26.0	22.0
D13LAS95	LIMESTONE	LIMESTONE	LIMESTONE		47.0	14	22.0	17.0
D14BSH21	SANDSTONE	DOLOMITE	DOLOMITE					0.0
D14BSH21B								0.0
D14BSH71	SANDSTONE	LIMESTONE	LIMESTONE		52.0	16	16.0	16.0
D14BUS28	SANDSTONE		LIMESTONE	SILICA	36.0	26	15.0	23.0
D14LUS29	SANDSTONE	SANDSTONE	SANDSTONE	LIMESTONE				0.0
D14TIH35	SANDSTONE	LIMESTONE	LIMESTONE	LIMESTONE				0.0
D14TIH35ML					47.0	17	17.0	19.0
D14TIH35FR								0.0
D16JUS28	LIMESTONE	LIMESTONE	LIMSTN SCR		65.0		20.0	15.0
D16JUS28B								0.0

PROJECT	COURSE AGGREG TYPE	INTERM AGGREG TYPE	SCRNG TYPE	FIELD SAND TYPE	PCT. CRSE AGRG	PCT. INTM AGRG	PCT. SCRG	PCT. FLD. SAND
D16NSH44	SANDSTONE	CR. GRAVEL	DOLYTE/GR.	FIELD	55.0		20.0	25.0
D16RFM26								0.0
D16RUS77B1	CR. GRAVEL	CR. GRAVEL						0.0
D16RUS77B2								0.0
D16RUS77L					65.0		20.0	15.0
D16RUS77S					53.0		28.0	19.0
D16SPU18B	LIMSTN #78	CR. GRAVEL	SIL. GR.	SIL. GR.	60.0		25.0	15.0
D16SPU18S								0.0
D17BFM28	LIMESTONE		LIMESTONE		62.0		28.0	10.0
D17BSH21	LIMESTONE		LIMESTONE		62.0		28.0	10.0
D17BUS21	CONC. AGG.	LIMESTONE	LIMESTONE		68.0		22.0	10.0
D17BSH36TB	LIMESTONE		LIMESTONE		68.0		22.0	10.0
D17BSH36TD					58.0		30.0	12.0
D17GS105	LIMESTONE	LIMESTONE			62.0		25.0	13.0
D17GSH6	LIMESTONE		SIL. GRAVE		61.0		25.0	14.0
D17GSH6B								0.0
D17GSH6C								0.0
D17WUS29D					56.0		25.0	19.0
D17WUS29B1								0.0
D17WUS29B2								0.0
D17WUS29B3								0.0
D17WUS29B4								0.0
D17WU29COM	LIMESTONE				61.0		25.0	14.0
D17BSORCOM	LIMESTONE				61.0		25.0	14.0
D17B21COM	LIMESTONE				61.0		25.0	14.0
D17R79COM	LIMESTONE		SIL. GR.		61.0		25.0	14.0
D17MS21COM	LIMESTONE				61.0		25.0	14.0
D18DIH63	LIMESTONE	PEA GRAVEL			35.0	25	20.0	20.0
D18NFM16	PIT RUN	LIMESTONE			27.0	50	12.0	11.0
D19CUS59	SANDSTONE	SANDSTONE	SANDSTONE		55.0		20.0	25.0
D19MUS59	SIL. GR.	SIL. GR.	SIL. GR.		60.0		20.0	20.0
D19PUS59	SIL. GR.	SIL. GR.	SIL. GR.		60.0		20.0	20.0
D20TUS69	LIMESTONE	LIMESTONE	LIMESTONE		41.0	26	11.0	22.0
D21CFM14					40.0	20	25.0	15.0
D21HUS83	GRAVEL	GRAVEL	CONC. SAND		40.0	18	22.0	20.0
D21SFM75	GRAVEL	GRAVEL	CONC. SAND		35.0	20	25.0	20.0
D23BFM45	LIMESTONE							0.0
D23BUS67								0.0
D23EIH20A	LIMESTONE				40.8	21		0.0
D23EIH20B								0.0
D23LU190	LIMESTONE	LIMESTONE	LIMESTONE	SIL. SAND	38.0	27	13.0	20.0
D23MUS87	LIMESTONE						0.0	0.0
D24CUS62					62.0		25.0	13.0

PROJECT	AVERAGE MINIMUM AIR TEMP.	AVERAGE MAXIMUM AIR TEMP.
D1FNUS82	67.40	91.40
D1HUSH50	70.00	90.00
D1LMSH19	42.00	71.00
D1LMUS82	71.00	93.00
D2TFM188	70.20	87.20
D2TFM188B	0.00	0.00
D2TFM188C	0.00	0.00
D2TI20G2	70.40	89.60
D3CUS287	60.00	96.00
D3WUS82	74.00	97.00
D4CUS60S	62.00	90.00
D4CUS60L	60.00	83.00
D5GAFM65	56.00	82.00
D5HOLO44	71.00	95.00
D5LSP326	63.20	86.50
D5LUUS84D	59.00	86.00
D5LUUS84C	68.00	90.00
D5LUUS84L1	70.00	95.00
D5LUUS84L2	0.00	0.00
D5GAUS84	67.00	93.00
D7TGS12	69.00	95.40
D7TGU67	62.78	85.63
D8NI20S	0.00	0.00
D8NI20L	0.00	0.00
D8TI20	0.00	0.00
D8TYUS83	0.00	0.00
D10ANU28	69.13	91.87
D12GFM17	0.00	0.00
D12GFM17B	78.80	86.00
D12MFM13	73.15	91.77
D12MIH45	68.57	88.57
D13FAU77	73.75	98.25
D13FAU77B	73.56	96.30
D13FAU77C	76.00	100.80
D13FAU77D	0.00	0.00
D13GOSH8	0.00	0.00
D13GOU87	0.00	0.00
D13JAS11	74.58	94.69
D13LAS95	73.10	106.30
D14BSH21	68.17	83.83
D14BSH21B	63.50	82.80
D14BSH71	57.00	75.17
D14BUS28	69.67	90.89
D14LUS29	68.17	86.50
D14TIH35	0.00	0.00
D14TIH35ML	0.00	0.00
D14TIH35FR	68.36	80.64
D16JUS28	77.69	93.31
D16JUS28B	78.14	95.57
D16NSH44	76.50	90.10

PROJECT	AVERAGE MINIMUM AIR TEMP.	AVERAGE MAXIMUM AIR TEMP.
D16RFM26	73.83	91.33
D16RUS77B1	77.57	93.21
D16RUS77B2	77.00	92.10
D16RUS77L	75.71	91.00
D16RUS77S	76.44	93.22
D16SPU18B	77.50	92.88
D16SPU18S	75.00	90.13
D17BFM28	67.60	90.80
D17BSH21	71.90	89.90
D17BUS21	67.88	91.88
D17BSH36TB	71.50	98.00
D17BSH36TD	74.83	98.50
D17GS105	77.50	99.75
D17GSH6	71.43	91.71
D17GSH6B	71.75	94.75
D17GSH6C	0.00	0.00
D17WUS29D	77.63	93.25
D17WUS29B1	75.50	96.50
D17WUS29B2	64.00	85.86
D17WUS29B3	0.00	0.00
D17WUS29B4	0.00	0.00
D17WU29COM	73.40	95.60
D17BSORCOM	71.00	91.00
D17B21COM	70.40	90.40
D17R79COM	71.40	95.40
D17MS21COM	79.00	99.80
D18DIH63	71.57	86.93
D18NFM16	73.85	91.08
D19CUS59	69.54	89.46
D19MUS59	69.29	92.14
D19PUS59	69.62	94.03
D20TUS69	71.63	95.42
D21CFM14	0.00	0.00
D21HUS83	76.14	87.00
D21SFM75	80.10	96.00
D23BFM45	85.00	103.50
D23BUS67	85.33	102.00
D23EIH20A	73.65	94.75
D23EIH20B	75.50	99.83
D23LU190	76.76	99.20
D23MUS87	0.00	0.00
D24CUS62	70.18	97.73

APPENDIX H

Summary of Asphalt Content
Data by mixture type for each project.

ASPHALT CONTENT DATA
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
1	FANNIN	US 82	D LEVEL UP	DS3	57	5.6	5.5	0.34	0.1	0.31
1	HUNT	SH 50	D SURFACE	DS3	29	5.6	5.3	0.27	0.3	0.26
1	LAMAR	SH 19	C SURFACE	DS3	26	5.3	5.3	0.08	0.0	0.08
1	LAMAR	US 82	D SURFACE	1	5	5.8	5.6	0.15	0.2	0.15
2	TARRANT	FM 1886	G SURFACE	631	10	7.6	7.5	0.34	0.1	0.34
2	TARRANT	IH 20	G SURFACE	662	11	5.4	5.2	0.21	0.2	0.21
3	CLAY	US 287	D LEVEL UP	1	15	4.8	4.8	0.22	0.0	0.15
3	WICHITA	US 82	D SURFACE	4	18	5.1	4.9	0.16	0.2	0.16
4	CARSON	US 60	D SURFACE	1	8	4.8	4.8	0.09	0.0	0.09
4	CARSON	US 60	D LEVEL UP	9	6	5.2	5.3	0.31	0.0	0.28
5	GARZA	FM 651	D LEVEL UP	3	48	4.2	4.3	0.22	0.0	0.26
5	HOCKLEY	FM 300	D SURFACE	2	15	4.8	5.1	0.16	-0.3	0.10
5	LUBBOCK	SPUR 326	D SURFACE	1	14	6.7	6.6	0.17	0.1	0.13
5	LUBBOCK	US 84	D SURFACE	1	19	4.7	4.6	0.17	0.1	0.17
5	LUBBOCK	US 84	C SURFACE	1	9	4.5	4.4	0.25	0.1	0.25
5	LUBBOCK	US 84	D LEVEL UP	3	12	5.0	4.8	0.10	0.2	0.10
5	GARZA	US 84	D SURFACE	1	7	5.1	5.2	0.46	-0.1	0.16
7	TOM GREEN	FM 388	D SURFACE		5	5.4	5.4	0.25	0.0	0.26
7	TOM GREEN	US 67	D SURFACE		18	5.4	5.6	0.27	-0.2	0.27
8	NOLAN	IH 20	D SURFACE	1	6	5.5	5.6	0.22	-0.2	0.23
8	NOLAN	IH 20	D LEVEL UP		20	5.5	5.6	0.25	-0.1	0.24
8	TAYLOR	IH 20	D SURFACE	1	12	5.8	5.9	0.23	-0.1	0.23
8	TAYLOR	US 83	D SURFACE	DS3	24	4.7	4.8	0.22	-0.1	0.22
10	ANDERSON	US 287	D SURFACE	DS3	25	5.4	5.4	0.17	0.1	0.17
12	GALVESTON	FM 1764	D LEVEL UP	D1	19	5.2	4.9	0.35	0.3	0.35
12	GALVESTON	FM 1764	D LEVEL UP	D2-3	11	4.9	5.0	0.35	-0.1	0.36
12	MONTGOMERY	FM 1314	D SURFACE	DS1	28	5.3	5.3	0.27	0.1	0.27
12	MONTGOMERY	IH 45	D SURFACE	DS1	14	5.6	5.2	0.45	0.4	0.45
13	FAYETTE	US 77	D SURFACE	DW4	8	6.0	6.1	0.18	-0.1	0.18
13	FAYETTE	US 77	D SURFACE	DW5	19	5.5	5.9	0.27	-0.4	0.34
13	FAYETTE	US 77	D SURFACE	DW6	11	6.0	6.0	0.27	0.0	0.27
13	GONZALES	SH 80	D SURFACE	DS3	27	4.7	4.6	0.19	0.1	0.13
13	GONZALES	US 87	D SURFACE	DS3	19	4.7	4.6	0.16	0.1	0.13
13	JACKSON	SH 111	D SURFACE	86-184	35	4.5	4.6	0.17	-0.1	0.17
13	LAVACA	SH 95	D SURFACE	DW5	28	5.7	6.1	0.24	-0.4	0.24
14	BASTROP	SH 21	C SURFACE	1	8	4.5	4.5	0.07	0.0	0.07
14	BASTROP	SH 21	C SURFACE	2	22	4.5	4.5	0.15	0.0	0.15
14	BASTROP	SH 71	D SURFACE	2	27	5.0	5.0	0.25	0.0	0.19
14	BLANCO	US 281	C SURFACE	DS3	23	4.8	4.6	0.30	0.2	0.30
14	LEE	US 290	C SURFACE	1	10	4.9	5.0	0.12	-0.1	0.12
14	TRAVIS	IH 35	A LEVEL UP	2	37	4.3	4.3	0.26	0.0	0.26
14	TRAVIS	IH35-MAIN	C SURFACE	DS3	38	4.8	4.7	0.21	0.1	0.21
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	22	4.7	4.7	0.24	0.1	0.24
16	JIM WELL	US 281	C SURFACE	4	31	4.9	4.9	0.09	0.1	0.09
16	JIM WELL	US 281	C SURFACE	6	14	4.9	4.9	0.08	0.0	0.08
16	NUECES	SH 44	D SURFACE	DS1	17	4.8	4.8	0.11	0.0	0.11
16	REFUGIO	FM 2678	D LEVEL UP		6	5.4	5.3	0.13	0.1	0.12
16	REFUGIO	US 77	B BASE	1	41	4.9	4.8	0.12	0.1	0.10

ASPHALT CONTENT DATA - (cont.)
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
16	REFUGIO	US 77	B BASE	3D	19	4.8	4.7	0.07	0.1	0.07
16	REFUGIO	US 77	D LEVEL UP	1	7	5.4	5.3	0.06	0.1	0.06
16	REFUGIO	US 77	D SURFACE	1A	14	5.5	5.5	0.15	0.0	0.11
16	SAN PATRICIO	US 181	B BASE		25	4.5	4.5	0.14	0.0	0.12
16	SAN PATRICIO	US 181	D SURFACE	5D	11	5.0	5.0	0.03	0.0	0.03
17	BRAZOS	FM 2818	D SURFACE		10	5.8	5.8	0.34	0.0	0.34
17	BRAZOS	SH 21	D SURFACE	1	13	5.8	5.7	0.27	0.1	0.26
17	BURLESON	SH 21	B SURFACE		26	5.6	5.5	0.21	0.1	0.27
17	BURLESON	SH 36	B SURFACE		6	5.6	5.5	0.26	0.1	0.26
17	BURLESON	SH 36	D SURFACE		7	5.8	5.5	0.17	0.3	0.17
17	GRIMES	SH 105	D SURFACE		5	5.1	4.9	0.55	0.2	0.40
17	GRIMES	SH 6	D SURFACE	5	12	5.8	5.7	0.25	0.1	0.25
17	GRIMES	SH 6	D SURFACE	7	9	5.8	5.5	0.12	0.3	0.12
17	WASHINGTON	US 290	D SURFACE	1	10	4.2	4.2	0.08	0.0	0.10
17	WASHINGTON	US 290	B BASE	7	33	3.7	3.7	0.12	0.1	0.12
17	WASHINGTON	US 290	B BASE	8	16	3.7	3.6	0.25	0.1	0.25
17	WASHINGTON	US 290	B BASE	10	17	3.7	3.8	0.30	-0.1	0.28
17	WASHINGTON	US 290	D SURFACE		5	6.2	5.9	0.35	0.3	0.35
17	BRAZOS	SH30/OSR	D SURFACE		6	5.4	5.6	0.79	-0.1	0.60
17	BRAZOS	SH30/21	D SURFACE		10	5.3	5.0	0.71	0.3	0.33
17	ROBERTSON	US 79	D SURFACE		5	6.1	5.8	0.59	0.3	0.56
17	MADISON	SH 21	D SURFACE		5	6.0	6.0	0.24	0.0	0.24
18	DALLAS	IH 635	C LEVEL UP	2449-B	37	4.5	4.4	0.19	0.1	0.19
18	NAVARRO	FM 1603	G BASE/SURF	G3	19	4.6	4.6	0.16	0.0	0.16
19	CASS	SH 59	D 4 COURSES	1	44	4.8	4.7	0.23	0.1	0.23
19	MARION	US 59	D 3 COURSES	2	13	5.7	5.6	0.33	0.1	0.33
19	PANOLA	US 59	C BASE	2C	57	4.6	4.7	0.31	-0.1	0.31
20	TYLER	US 69	G SURFACE	1	37	4.7	4.6	0.15	0.1	0.14
21	CAMERON	FM 1419	D SURFACE	1D	14	5.0	5.1	0.05	-0.1	0.35
21	HIDALGO	US 83	D SURFACE	1D	13	4.0	4.0	0.07	0.1	0.07
21	STARR	FM 755	D SURFACE	1D	20	4.8	4.7	0.46	0.1	0.09
23	BROWN	FM 45	D SURFACE		6	4.0	4.0	0.12	0.0	0.08
23	BROWN	US 67	D SURFACE		7	3.9	3.9	0.10	0.0	0.10
23	EASTLAND	IH 20	D SURFACE	1	18	4.1	4.1	0.12	0.0	0.10
23	EASTLAND	IH 20	D SURFACE	4	6	4.0	4.1	0.12	-0.1	0.12
23	LAMPASAS	US 190	D SURFACE	1D	25	5.1	5.2	0.17	-0.1	0.11
23	McCULLOCH	US 87	G SURFACE	1D	7	3.9	3.9	0.22	0.0	0.22
24	CULBERSON	US62/180	D SURF/LEVEL		50	5.0	4.9	0.28	0.0	0.24
			COUNT =		86	86	86	86	86	86
			MAX =		57	7.6	7.5	0.79	0.4	0.60
			MIN =		5	3.7	3.6	0.03	-0.4	0.03
			AVG =		18	5.1	5.0	0.23	0.0	0.21
			STD =		12	0.7	0.7	0.14	0.1	0.11

ASPHALT CONTENT DATA
TYPE A MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
14	TRAVIS	IH 35	A LEVEL UP	2	37	4.3	4.3	0.26	0.0	0.26
			COUNT =		1	1	1	1	1	1
			MAX =		37	4.3	4.3	0.26	0.0	0.26
			MIN =		37	4.3	4.3	0.26	0.0	0.26
			AVG =		37	4.3	4.3	0.26	0.0	0.26
			STD =		0	0.0	0.0	0.00	0.0	0.00

ASPHALT CONTENT DATA
TYPE B MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
16	REFUGIO	US 77	B BASE	1	41	4.9	4.8	0.12	0.1	0.10
16	REFUGIO	US 77	B BASE	3D	19	4.8	4.7	0.07	0.1	0.07
16	SAN PATRICIO	US 181	B BASE		25	4.5	4.5	0.14	0.0	0.12
17	BURLESON	SH 21	B SURFACE		26	5.6	5.5	0.21	0.1	0.27
17	BURLESON	SH 36	B SURFACE		6	5.6	5.5	0.26	0.1	0.26
17	WASHINGTON	US 290	B BASE	7	33	3.7	3.7	0.12	0.1	0.12
17	WASHINGTON	US 290	B BASE	8	16	3.7	3.6	0.25	0.1	0.25
17	WASHINGTON	US 290	B BASE	10	17	3.7	3.8	0.30	-0.1	0.28
			COUNT =		8	8	8	8	8	8
			MAX =		41	5.6	5.5	0.30	0.1	0.28
			MIN =		6	3.7	3.6	0.07	-0.1	0.07
			AVG =		23	4.6	4.5	0.18	0.1	0.18
			STD =		11	0.8	0.8	0.08	0.1	0.09

ASPHALT CONTENT DATA
TYPE C MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
1	LAMAR	SH 19	C SURFACE	DS3	26	5.3	5.3	0.08	0.0	0.08
5	LUBBOCK	US 84	C SURFACE	1	9	4.5	4.4	0.25	0.1	0.25
14	BASTROP	SH 21	C SURFACE	1	8	4.5	4.5	0.07	0.0	0.07
14	BASTROP	SH 21	C SURFACE	2	22	4.5	4.5	0.15	0.0	0.15
14	BLANCO	US 281	C SURFACE	DS3	23	4.8	4.6	0.30	0.2	0.30
14	LEE	US 290	C SURFACE	1	10	4.9	5.0	0.12	-0.1	0.12
14	TRAVIS	IH35-MAIN	C SURFACE	DS3	38	4.8	4.7	0.21	0.1	0.21
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	22	4.7	4.7	0.24	0.1	0.24
16	JIM WELL	US 281	C SURFACE	4	31	4.9	4.9	0.09	0.1	0.09
16	JIM WELL	US 281	C SURFACE	6	14	4.9	4.9	0.08	0.0	0.08
18	DALLAS	IH 635	C LEVEL UP	2449-B	37	4.5	4.4	0.19	0.1	0.19
19	PANOLA	US 59	C BASE	2C	57	4.6	4.7	0.31	-0.1	0.31
			COUNT =		12	12	12	12	12	12
			MAX =		57	5.3	5.3	0.31	0.2	0.31
			MIN =		8	4.5	4.4	0.07	-0.1	0.07
			AVG =		25	4.7	4.7	0.17	0.0	0.17
			STD =		14	0.2	0.3	0.09	0.1	0.09

ASPHALT CONTENT DATA
TYPE D MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
1	FANNIN	US 82	D LEVEL UP	DS3	57	5.6	5.5	0.34	0.1	0.31
1	HUNT	SH 50	D SURFACE	DS3	29	5.6	5.3	0.27	0.3	0.26
1	LAMAR	US 82	D SURFACE	1	5	5.8	5.6	0.15	0.2	0.15
3	CLAY	US 287	D LEVEL UP	1	15	4.8	4.8	0.22	0.0	0.15
3	WICHITA	US 82	D SURFACE	4	18	5.1	4.9	0.16	0.2	0.16
4	CARSON	US 60	D SURFACE	1	8	4.8	4.8	0.09	0.0	0.09
4	CARSON	US 60	D LEVEL UP	9	6	5.2	5.3	0.31	0.0	0.28
5	GARZA	FM 651	D LEVEL UP	3	48	4.2	4.3	0.22	0.0	0.26
5	HOCKLEY	FM 300	D SURFACE	2	15	4.8	5.1	0.16	-0.3	0.10
5	LUBBOCK	SPUR 326	D SURFACE	1	14	6.7	6.6	0.17	0.1	0.13
5	LUBBOCK	US 84	D SURFACE	1	19	4.7	4.6	0.17	0.1	0.17
5	LUBBOCK	US 84	D LEVEL UP	3	12	5.0	4.8	0.10	0.2	0.10
5	GARZA	US 84	D SURFACE	1	7	5.1	5.2	0.46	-0.1	0.16
7	TOM GREEN	FM 388	D SURFACE		5	5.4	5.4	0.25	0.0	0.26
7	TOM GREEN	US 67	D SURFACE		18	5.4	5.6	0.27	-0.2	0.27
8	NOLAN	IH 20	D SURFACE	1	6	5.5	5.6	0.22	-0.2	0.23
8	NOLAN	IH 20	D LEVEL UP		20	5.5	5.6	0.25	-0.1	0.24
8	TAYLOR	IH 20	D SURFACE	1	12	5.8	5.9	0.23	-0.1	0.23
8	TAYLOR	US 83	D SURFACE	DS3	24	4.7	4.8	0.22	-0.1	0.22
10	ANDERSON	US 287	D SURFACE	DS3	25	5.4	5.4	0.17	0.1	0.17
12	GALVESTON	FM 1764	D LEVEL UP	D1	19	5.2	4.9	0.35	0.3	0.35
12	GALVESTON	FM 1764	D LEVEL UP	D2-3	11	4.9	5.0	0.35	-0.1	0.36
12	MONTGOMERY	FM 1314	D SURFACE	DS1	28	5.3	5.3	0.27	0.1	0.27
12	MONTGOMERY	IH 45	D SURFACE	DS1	14	5.6	5.2	0.45	0.4	0.45
13	FAYETTE	US 77	D SURFACE	DW4	8	6.0	6.1	0.18	-0.1	0.18
13	FAYETTE	US 77	D SURFACE	DW5	19	5.5	5.9	0.27	-0.4	0.34
13	FAYETTE	US 77	D SURFACE	DW6	11	6.0	6.0	0.27	0.0	0.27
13	GONZALES	SH 80	D SURFACE	DS3	27	4.7	4.6	0.19	0.1	0.13
13	GONZALES	US 87	D SURFACE	DS3	19	4.7	4.6	0.16	0.1	0.13
13	JACKSON	SH 111	D SURFACE	86-184	35	4.5	4.6	0.17	-0.1	0.17
13	LAVACA	SH 95	D SURFACE	DW5	28	5.7	6.1	0.24	-0.4	0.24
14	BASTROP	SH 71	D SURFACE	2	27	5.0	5.0	0.25	0.0	0.19
16	NUECES	SH 44	D SURFACE	DS1	17	4.8	4.8	0.11	0.0	0.11
16	REFUGIO	FM 2678	D LEVEL UP		6	5.4	5.3	0.13	0.1	0.12
16	REFUGIO	US 77	D LEVEL UP	1	7	5.4	5.3	0.06	0.1	0.06
16	REFUGIO	US 77	D SURFACE	1A	14	5.5	5.5	0.15	0.0	0.11
16	SAN PATRICIO	US 181	D SURFACE	5D	11	5.0	5.0	0.03	0.0	0.03
17	BRAZOS	FM 2818	D SURFACE		10	5.8	5.8	0.34	0.0	0.34
17	BRAZOS	SH 21	D SURFACE	1	13	5.8	5.7	0.27	0.1	0.26
17	BURLESON	SH 36	D SURFACE		7	5.8	5.5	0.17	0.3	0.17
17	GRIMES	SH 105	D SURFACE		5	5.1	4.9	0.55	0.2	0.40
17	GRIMES	SH 6	D SURFACE	5	12	5.8	5.7	0.25	0.1	0.25
17	GRIMES	SH 6	D SURFACE	7	9	5.8	5.5	0.12	0.3	0.12
17	WASHINGTON	US 290	D SURFACE	1	10	4.2	4.2	0.08	0.0	0.10
17	WASHINGTON	US 290	D SURFACE		5	6.2	5.9	0.35	0.3	0.35
17	BRAZOS	SH30/OSR	D SURFACE		6	5.4	5.6	0.79	-0.1	0.60
17	BRAZOS	SH30/21	D SURFACE		10	5.3	5.0	0.71	0.3	0.33
17	ROBERTSON	US 79	D SURFACE		5	6.1	5.8	0.59	0.3	0.56

ASPHALT CONTENT DATA - (cont.)
TYPE D MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
17	MADISON	SH 21	D SURFACE		5	6.0	6.0	0.24	0.0	0.24
19	CASS	SH 59	D 4 COURSES	1	44	4.8	4.7	0.23	0.1	0.23
19	MARION	US 59	D 3 COURSES	2	13	5.7	5.6	0.33	0.1	0.33
21	CAMERON	FM 1419	D SURFACE	1D	14	5.0	5.1	0.05	-0.1	0.35
21	HIDALGO	US 83	D SURFACE	1D	13	4.0	4.0	0.07	0.1	0.07
21	STARR	FM 755	D SURFACE	1D	20	4.8	4.7	0.46	0.1	0.09
23	BROWN	FM 45	D SURFACE		6	4.0	4.0	0.12	0.0	0.08
23	BROWN	US 67	D SURFACE		7	3.9	3.9	0.10	0.0	0.10
23	EASTLAND	IH 20	D SURFACE	1	18	4.1	4.1	0.12	0.0	0.10
23	EASTLAND	IH 20	D SURFACE	4	6	4.0	4.1	0.12	-0.1	0.12
23	LAMPASAS	US 190	D SURFACE	1D	25	5.1	5.2	0.17	-0.1	0.11
24	CULBERSON	US62/180	D SURF/LEVEL		50	5.0	4.9	0.28	0.0	0.24
			COUNT =		60	60	60	60	60	60
			MAX =		57	6.7	6.6	0.79	0.4	0.60
			MIN =		5	3.9	3.9	0.03	-0.4	0.03
			AVG =		16	5.2	5.2	0.24	0.0	0.22
			STD =		12	0.6	0.6	0.15	0.2	0.12

ASPHALT CONTENT DATA
TYPE G MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	DESIGN % AC	EXT AC AVG	EXT AC STD	DES-EXT AVG	DES-EXT STD
2	TARRANT	FM 1886	G SURFACE	631	10	7.6	7.5	0.34	0.1	0.34
2	TARRANT	IH 20	G SURFACE	662	11	5.4	5.2	0.21	0.2	0.21
18	NAVARRO	FM 1603	G BASE/SURF	G3	19	4.6	4.6	0.16	0.0	0.16
20	TYLER	US 69	G SURFACE	1	37	4.7	4.6	0.15	0.1	0.14
23	McCULLOCH	US 87	G SURFACE	1D	7	3.9	3.9	0.22	0.0	0.22
			COUNT =		5	5	5	5	5	5
			MAX =		37	7.6	7.5	0.34	0.2	0.34
			MIN =		7	3.9	3.9	0.15	0.0	0.14
			AVG =		17	5.2	5.2	0.22	0.1	0.21
			STD =		12	1.4	1.4	0.08	0.1	0.08

APPENDIX I

Percentage of Densities within 92.0%-97.0%
Data by mixture type for each project.

CORE DENSITY (Gc/Gr) BETWEEN 92.0%-97.0%, LESS THAN 92 %, AND MORE 97 %

ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG.	STD.	% WITHIN 92-97	% LESS THAN 92	% MORE THAN 97
1	FANNIN	US 82	D LEVEL UP	DS3	14	95.3	1.77	80	3	17
1	HUNT	SH 50	D SURFACE	DS3	9	92.4	1.80	58	41	1
1	LAMAR	SH 19	C SURFACE	DS3	7	93.3	1.15	87	13	0
3	WICHITA	US 82	D SURFACE	4	7	93.9	1.51	87	10	2
5	GARZA	FM 651	D LEVEL UP	3	12	92.2	0.38	70	30	0
5	LUBBOCK	SPUR 326	D SURFACE	1	5	93.1	1.17	83	17	0
5	LUBBOCK	US 84	D SURFACE	1	12	92.7	1.03	75	25	0
5	LUBBOCK	US 84	C SURFACE	1	6	93.5	1.09	92	8	0
5	LUBBOCK	US 84	D LEVEL UP	3	6	93.3	1.74	75	23	2
5	GARZA	US 84	D SURFACE	1	7	91.6	3.37	40	55	5
7	TOM GREEN	US 67	D SURFACE		18	93.9	1.25	93	6	1
10	ANDERSON	US 287	D SURFACE	DS3	21	92.3	1.70	57	43	0
12	GALVESTON	FM 1764	D LEVEL UP	D1	16	93.7	1.17	92	7	0
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	91.5	0.65	22	78	0
12	MONTGOMERY	IH 45	D SURFACE	DS1	5	92.3	2.04	55	44	1
13	FAYETTE	US 77	D SURFACE	DW4	11	92.7	1.09	74	26	0
13	FAYETTE	US 77	D SURFACE	DW5	32	92.1	1.33	53	47	0
13	FAYETTE	US 77	D SURFACE	DW6	16	94.0	1.10	96	4	0
13	GONZALES	SH 80	D SURFACE	DS3	22	90.7	1.66	22	78	0
13	GONZALES	US 87	D SURFACE	DS3	11	90.1	1.84	15	85	0
13	JACKSON	SH 111	D SURFACE	86-184	21	90.6	1.89	23	77	0
13	LAVACA	SH 95	D SURFACE	DW5	37	93.1	1.82	71	27	2
14	BASTROP	SH 21	C SURFACE	1	5	91.8	0.76	40	60	0
14	BASTROP	SH 21	C SURFACE	2	10	91.4	0.89	25	75	0
14	BASTROP	SH 71	D SURFACE	2	12	91.8	0.77	40	60	0
14	BLANCO	US 281	C SURFACE	DS3	9	92.6	1.70	63	36	1
14	LEE	US 290	C SURFACE	1	6	92.6	0.79	78	22	0
14	TRAVIS	IH35-MAIN	C SURFACE	DS3	15	92.2	1.07	57	43	0
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	91.8	1.00	42	58	0
16	JIM WELL	US 281	C SURFACE	4	14	94.2	0.90	60	40	0
16	JIM WELL	US 281	C SURFACE	6	7	92.4	0.38	85	15	0
16	NUECES	SH 44	D SURFACE	DS1	10	93.7	1.40	88	11	1
16	REFUGIO	US 77	B BASE	1	14	94.3	0.98	98	1	0
16	REFUGIO	US 77	B BASE	3D	10	93.9	0.54	100	0	0
16	REFUGIO	US 77	D SURFACE	1A	8	93.1	0.48	99	1	0
16	SAN PATRICIO	US 181	B BASE		16	95.1	1.51	87	2	10
16	SAN PATRICIO	US 181	D SURFACE	5D	8	94.1	0.17	100	0	0
17	BURLESON	SH 21	B SURFACE		49	93.2	1.49	78	21	1
17	BURLESON	SH 36	B SURFACE		20	95.5	1.95	74	4	22
17	BURLESON	SH 36	D SURFACE		9	93.3	0.94	92	8	0
17	GRIMES	SH 105	D SURFACE		8	94.1	1.15	96	3	1

CORE DENSITY (Gc/Gr) BETWEEN 92.0%-97.0%, LESS THAN 92 %, AND MORE THAN 97 %

ALL MIXTURES- (cont.)

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG.	STD.	% WITHIN 92-97	% LESS THAN 92	% MORE THAN 97
17	GRIMES	SH 6	D SURFACE	7	17	91.2	1.34	28	72	0
17	WASHINGTON	US 290	D SURFACE	1	9	94.9	0.84	99	0	1
17	WASHINGTON	US 290	B BASE	7	25	94.4	1.49	90	5	4
17	WASHINGTON	US 290	B BASE	8	12	93.5	0.76	98	2	0
17	WASHINGTON	US 290	B BASE	10	7	93.9	0.93	98	2	0
17	BRAZOS	SH30/OSR	D SURFACE		5	91.6	1.72	41	59	0
17	BRAZOS	SH30/21	D SURFACE		5	90.4	1.85	19	81	0
17	ROBERTSON	US 79	D SURFACE		6	90.8	1.61	23	77	0
17	MADISON	SH 21	D SURFACE		5	93.6	1.05	94	6	0
19	CASS	SH 59	D 4 COURSES	1	39	94.4	1.21	96	2	2
19	MARION	US 59	D 3 COURSES	2	6	95.8	1.38	80	0	19
19	PANOLA	US 59	C BASE	2C	30	93.5	1.05	92	8	0
21	CAMERON	FM 1419	D SURFACE	1D	7	92.3	0.77	65	35	0
21	HIDALGO	US 83	D SURFACE	1D	8	93.0	0.63	94	6	0
23	LAMPASAS	US 190	D SURFACE	1D	21	92.6	1.60	64	35	0
23	McCULLOCH	US 87	G SURFACE	1D	5	95.0	0.73	100	0	0
			COUNT =		57	57	57	57	57	57
			MAX =		49	95.8	3.37	100	85	22
			MIN =		5	90.1	0.17	15	0	0
			AVG =		13	93.0	1.23	70	28	2
			STD =		9	1.3	0.54	26	27	5

CORE DENSITY (Gc/Gr) BETWEEN 92.0%-97.0%, LESS THAN 92 %, AND MORE THAN 97 %

TYPE B MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG.	STD.	% WITHIN 92-97	% LESS THAN 92	% MORE THAN 97
16	REFUGIO	US 77	BASE	1	14	94.3	0.98	98	1	0
16	REFUGIO	US 77	BASE	3D	10	93.9	0.54	100	0	0
16	SAN PATRICIO	US 181	BASE		16	95.1	1.51	87	2	10
17	BURLESON	SH 21	SURFACE		49	93.2	1.49	78	21	1
17	BURLESON	SH 36	SURFACE		20	95.5	1.95	74	4	22
17	WASHINGTON	US 290	BASE	7	25	94.4	1.49	90	5	4
17	WASHINGTON	US 290	BASE	8	12	93.5	0.76	98	2	0
17	WASHINGTON	US 290	BASE	10	7	93.9	0.93	98	2	0
			COUNT =		8	8	8	8	8	8
			MAX =		49	95.5	1.95	100.00	21.04	22.10
			MIN =		7	93.2	0.54	74.21	0.00	0.00
			AVG =		19	94.2	1.21	90.52	4.77	4.71
			STD =		13	0.8	0.47	9.84	6.77	7.90

CORE DENSITY (Gc/Gr) BETWEEN 92.0%-97.0%, LESS THAN 92 %, AND MORE THAN 97 %

TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG.	STD.	% WITHIN 92-97	% LESS THAN 92	% MORE THAN 97
1	LAMAR	SH 19	SURFACE	DS3	7	93.3	1.15	87	13	0
5	LUBBOCK	US 84	SURFACE	1	6	93.5	1.09	92	8	0
14	BASTROP	SH 21	SURFACE	1	5	91.8	0.76	40	60	0
14	BASTROP	SH 21	SURFACE	2	10	91.4	0.89	25	75	0
14	BLANCO	US 281	SURFACE	DS3	9	92.6	1.70	63	36	1
14	LEE	US 290	SURFACE	1	6	92.6	0.79	78	22	0
14	TRAVIS	IH35-MAIN	SURFACE	DS3	15	92.2	1.07	57	43	0
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	91.8	1.00	42	58	0
16	JIM WELL	US 281	SURFACE	4	14	94.2	0.90	60	40	0
16	JIM WELL	US 281	SURFACE	6	7	92.4	0.38	85	15	0
19	PANOLA	US 59	BASE	2C	30	93.5	1.05	92	8	0
			COUNT =		11	11	11	11	11	11
			MAX =		30	94.2	1.70	92.31	74.99	0.58
			MIN =		5	91.4	0.38	25.01	7.69	0.00
			AVG =		11	92.7	0.98	65.53	34.42	0.05
			STD =		7	0.9	0.32	23.16	23.16	0.17

CORE DENSITY (Gc/Gr) BETWEEN 92.0%-97.0%, LESS THAN 92 %, AND MORE 97 %

TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG.	STD.	% WITHIN 92-97	% LESS THAN 92	% MORE THAN 97
1	FANNIN	US 82	LEVEL UP	DS3	14	95.3	1.77	80	3	17
1	HUNT	SH 50	SURFACE	DS3	9	92.4	1.80	58	41	1
3	WICHITA	US 82	SURFACE	4	7	93.9	1.51	87	10	2
5	GARZA	FM 651	LEVEL UP	3	12	92.2	0.38	70	30	0
5	LUBBOCK	SPUR 326	SURFACE	1	5	93.1	1.17	83	17	0
5	LUBBOCK	US 84	SURFACE	1	12	92.7	1.03	75	25	0
5	LUBBOCK	US 84	LEVEL UP	3	6	93.3	1.74	75	23	2
5	GARZA	US 84	SURFACE	1	7	91.6	3.37	40	55	5
7	TOM GREEN	US 67	SURFACE		18	93.9	1.25	93	6	1
10	ANDERSON	US 287	SURFACE	DS3	21	92.3	1.70	57	43	0
12	GALVESTON	FM 1764	LEVEL UP	D1	16	93.7	1.17	92	7	0
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	91.5	0.65	22	78	0
12	MONTGOMERY	IH 45	SURFACE	DS1	5	92.3	2.04	55	44	1
13	FAYETTE	US 77	SURFACE	DW4	11	92.7	1.09	74	26	0
13	FAYETTE	US 77	SURFACE	DW5	32	92.1	1.33	53	47	0
13	FAYETTE	US 77	SURFACE	DW6	16	94.0	1.10	96	4	0
13	GONZALES	SH 80	SURFACE	DS3	22	90.7	1.66	22	78	0
13	GONZALES	US 87	SURFACE	DS3	11	90.1	1.84	15	85	0
13	JACKSON	SH 111	SURFACE	86-184	21	90.6	1.89	23	77	0
13	LAVACA	SH 95	SURFACE	DW5	37	93.1	1.82	71	27	2
13	LAVACA	SH 95	SURFACE	DW5	37	93.1	1.82	71.04	27	2
14	BASTROP	SH 71	SURFACE	2	12	91.8	0.77	40	60	0
16	NUECES	SH 44	SURFACE	DS1	10	93.7	1.40	88	11	1
16	REFUGIO	US 77	SURFACE	1A	8	93.1	0.48	99	1	0
16	SAN PATRICIO	US 181	SURFACE	5D	8	94.1	0.17	100	0	0
17	BURLESON	SH 36	SURFACE		9	93.3	0.94	92	8	0
17	GRIMES	SH 105	SURFACE		8	94.1	1.15	96	3	1
17	GRIMES	SH 6	SURFACE	7	17	91.2	1.34	28	72	0
17	WASHINGTON	US 290	SURFACE	1	9	94.9	0.84	99	0	1
17	BRAZOS	SH30/OSR	SURFACE		5	91.6	1.72	41	59	0
17	BRAZOS	SH30/21	SURFACE		5	90.4	1.85	19	81	0
17	ROBERTSON	US 79	SURFACE		6	90.8	1.61	23	77	0
17	MADISON	SH 21	SURFACE		5	93.6	1.05	94	6	0
19	CASS	SH 59	4 COURSES	1	39	94.4	1.21	96	2	2
19	MARION	US 59	3 COURSES	2	6	95.8	1.38	80	0	19
21	CAMERON	FM 1419	SURFACE	1D	7	92.3	0.77	65	35	0
21	HIDALGO	US 83	SURFACE	1D	8	93.0	0.63	94	6	0
23	LAMPASAS	US 190	SURFACE	1D	21	92.6	1.60	64	35	0
			COUNT =		38	38	38	38	38	38
			MAX =		39	95.8	3.37	100.00	84.89	19.24
			MIN =		5	90.1	0.17	15.11	0.00	0.00
			AVG =		14	92.8	1.34	66.56	31.94	1.50
			STD =		9	1.4	0.58	27.45	28.28	4.09

CORE DENSITY (Gc/Gr) BETWEEN 92.0%-97.0%, LESS THAN 92 %, AND MORE THAN 97 %

TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG.	STD.	% WITHIN 92-97	% LESS THAN 92	% MORE THAN 97
23	McCULLOCH	US 87	SURFACE	1D	5	95.0	0.73	100	0	0
			COUNT =		1	1	1	1	1	1
			MAX =		5	95.0	0.73	100	0	0
			MIN =		5	95.0	0.73	100	0	0
			AVG =		5	95.0	0.73	100	0	0
			STD =		0	0.0	0.00	0	0	0

APPENDIX J

Gc/Gr
Data by mixture type for each project.

CORE DENSITY DATA (Gc/Gr)
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	D LEVEL UP	DS3	14	95.3	1.77	90.1	97.3
1	HUNT	SH 50	D SURFACE	DS3	9	92.4	1.80	89.1	94.8
1	LAMAR	SH 19	C SURFACE	DS3	7	93.3	1.15	92.3	95.3
3	WICHITA	US 82	D SURFACE	4	7	93.9	1.51	92.7	97.2
5	GARZA	FM 651	D LEVEL UP	3	12	92.2	0.38	91.7	93.1
5	LUBBOCK	SPUR 326	D SURFACE	1	5	93.1	1.17	92.3	95.1
5	LUBBOCK	US 84	D SURFACE	1	12	92.7	1.03	91.3	94.7
5	LUBBOCK	US 84	C SURFACE	1	6	93.5	1.09	91.8	94.6
5	LUBBOCK	US 84	D LEVEL UP	3	6	93.3	1.74	91.4	95.1
5	GARZA	US 84	D SURFACE	1	7	91.6	3.37	86.0	94.6
7	TOM GREEN	US 67	D SURFACE		18	93.9	1.25	92.0	96.9
10	ANDERSON	US 287	D SURFACE	DS3	21	92.3	1.70	88.1	94.8
12	GALVESTON	FM 1764	D LEVEL UP	D1	16	93.7	1.17	91.6	96.0
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	91.5	0.65	90.3	92.5
12	MONTGOMERY	IH 45	D SURFACE	DS1	5	92.3	2.04	89.5	94.9
13	FAYETTE	US 77	D SURFACE	DW4	11	92.7	1.09	91.1	94.6
13	FAYETTE	US 77	D SURFACE	DW5	32	92.1	1.33	89.4	94.1
13	FAYETTE	US 77	D SURFACE	DW6	16	94.0	1.10	92.0	95.6
13	GONZALES	SH 80	D SURFACE	DS3	22	90.7	1.66	88.0	95.3
13	GONZALES	US 87	D SURFACE	DS3	11	90.1	1.84	87.5	93.1
13	JACKSON	SH 111	D SURFACE	86-184	21	90.6	1.89	87.0	93.8
13	LAVACA	SH 95	D SURFACE	DW5	37	93.1	1.82	88.3	96.7
14	BASTROP	SH 21	C SURFACE	1	5	91.8	0.76	90.5	92.5
14	BASTROP	SH 21	C SURFACE	2	10	91.4	0.89	90.1	93.2
14	BASTROP	SH 71	D SURFACE	2	12	91.8	0.77	90.6	93.2
14	BLANCO	US 281	C SURFACE	DS3	9	92.6	1.70	88.8	94.7
14	LEE	US 290	C SURFACE	1	6	92.6	0.79	91.1	93.3
14	TRAVIS	IH35-MAIN	C SURFACE	DS3	15	92.2	1.07	90.6	94.9
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	91.8	1.00	90.0	93.1
16	JIM WELL	US 281	C SURFACE	4	14	94.2	0.90	92.6	95.7
16	JIM WELL	US 281	C SURFACE	6	7	92.4	0.38	92.0	93.1
16	NUECES	SH 44	D SURFACE	DS1	10	93.7	1.40	91.2	95.6
16	REFUGIO	US 77	B BASE	1	14	94.3	0.98	92.9	96.7
16	REFUGIO	US 77	B BASE	3D	10	93.9	0.54	93.0	94.9
16	REFUGIO	US 77	D SURFACE	1A	8	93.1	0.48	92.6	93.9
16	SAN PATRICIO	US 181	B BASE		16	95.1	1.51	90.3	96.6
16	SAN PATRICIO	US 181	D SURFACE	5D	8	94.1	0.17	93.9	94.3
17	BURLESON	SH 21	B SURFACE		49	93.2	1.49	89.0	95.5
17	BURLESON	SH 36	B SURFACE		20	95.5	1.95	90.8	98.0
17	BURLESON	SH 36	D SURFACE		9	93.3	0.94	92.3	94.8
17	GRIMES	SH 105	D SURFACE		8	94.1	1.15	92.7	96.0
17	GRIMES	SH 6	D SURFACE	7	17	91.2	1.34	88.5	93.3
17	WASHINGTON	US 290	D SURFACE	1	9	94.9	0.84	93.8	96.2
17	WASHINGTON	US 290	B BASE	7	25	94.4	1.49	92.0	97.6
17	WASHINGTON	US 290	B BASE	8	12	93.5	0.76	92.2	94.5

CORE DENSITY DATA (Gc/Gr) - (cont.)
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
17	WASHINGTON	US 290	B BASE	10	7	93.9	0.93	92.4	94.9
17	BRAZOS	SH30/OSR	D SURFACE		5	91.6	1.72	89.0	93.4
17	BRAZOS	SH30/21	D SURFACE		5	90.4	1.85	88.0	92.2
17	ROBERTSON	US 79	D SURFACE		6	90.8	1.61	88.3	93.1
17	MADISON	SH 21	D SURFACE		5	93.6	1.05	92.2	95.1
19	CASS	SH 59	D 4 COURSES	1	39	94.4	1.21	92.0	96.6
19	MARION	US 59	D 3 COURSES	2	6	95.8	1.38	93.5	97.5
19	PANOLA	US 59	C BASE	2C	30	93.5	1.05	91.5	96.0
21	CAMERON	FM 1419	D SURFACE	1D	7	92.3	0.77	91.2	93.6
21	HIDALGO	US 83	D SURFACE	1D	8	93.0	0.63	92.1	94.2
23	LAMPASAS	US 190	D SURFACE	1D	21	92.6	1.60	88.9	95.2
23	McCULLOCH	US 87	G SURFACE	1D	5	95.0	0.73	94.0	95.9
				COUNT =	57	57	57	57	57
				MAX =	49	95.8	3.37	94.0	98.0
				MIN =	5	90.1	0.17	86.0	92.2
				AVG =	13	93.0	1.23	90.8	94.9
				STD =	.9	1.3	0.54	1.9	1.4

CORE DENSITY DATA (Gc/Gr)
TYPE B MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
16	REFUGIO	US 77	BASE	1	14	94.3	0.98	92.9	96.7
16	REFUGIO	US 77	BASE	3D	10	93.9	0.54	93.0	94.9
16	SAN PATRICIO	US 181	BASE		16	95.1	1.51	90.3	96.6
17	BURLESON	SH 21	SURFACE		49	93.2	1.49	89.0	95.5
17	BURLESON	SH 36	SURFACE		20	95.5	1.95	90.8	98.0
17	WASHINGTON	US 290	BASE	7	25	94.4	1.49	92.0	97.6
17	WASHINGTON	US 290	BASE	8	12	93.5	0.76	92.2	94.5
17	WASHINGTON	US 290	BASE	10	7	93.9	0.93	92.4	94.9
				COUNT =	8	8	8	8	8
				MAX =	49	95.5	1.95	93.0	98.0
				MIN =	7	93.2	0.54	89.0	94.5
				AVG =	19	94.2	1.21	91.6	96.1
				STD =	13	0.8	0.47	1.4	1.3

CORE DENSITY DATA (Gc/Gr)
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	LAMAR	SH 19	SURFACE	DS3	7	93.3	1.15	92.3	95.3
5	LUBBOCK	US 84	SURFACE	1	6	93.5	1.09	91.8	94.6
14	BASTROP	SH 21	SURFACE	1	5	91.8	0.76	90.5	92.5
14	BASTROP	SH 21	SURFACE	2	10	91.4	0.89	90.1	93.2
14	BLANCO	US 281	SURFACE	DS3	9	92.6	- 1.70	88.8	94.7
14	LEE	US 290	SURFACE	1	6	92.6	0.79	91.1	93.3
14	TRAVIS	IH35-MAIN	SURFACE	DS3	15	92.2	1.07	90.6	94.9
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	91.8	1.00	90.0	93.1
16	JIM WELL	US 281	SURFACE	4	14	94.2	0.90	92.6	95.7
16	JIM WELL	US 281	SURFACE	6	7	92.4	0.38	92.0	93.1
19	PANOLA	US 59	BASE	2C	30	93.5	1.05	91.5	96.0
				COUNT =	11	11	11	11	11
				MAX =	30	94.2	1.70	92.6	96.0
				MIN =	5	91.4	0.38	88.8	92.5
				AVG =	11	92.7	0.98	91.0	94.2
				STD =	7	0.9	0.32	1.1	1.2

CORE DENSITY DATA (Gc/Gr)
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	LEVEL UP	DS3	14	95.3	1.77	90.1	97.3
1	HUNT	SH 50	SURFACE	DS3	9	92.4	1.80	89.1	94.8
3	WICHITA	US 82	SURFACE	4	7	93.9	1.51	92.7	97.2
5	GARZA	FM 651	LEVEL UP	3	12	92.2	0.38	91.7	93.1
5	LUBBOCK	SPUR 326	SURFACE	1	5	93.1	1.17	92.3	95.1
5	LUBBOCK	US 84	SURFACE	1	12	92.7	1.03	91.3	94.7
5	LUBBOCK	US 84	LEVEL UP	3	6	93.3	1.74	91.4	95.1
5	GARZA	US 84	SURFACE	1	7	91.6	3.37	86.0	94.6
7	TOM GREEN	US 67	SURFACE		18	93.9	1.25	92.0	96.9
10	ANDERSON	US 287	SURFACE	DS3	21	92.3	1.70	88.1	94.8
12	GALVESTON	FM 1764	LEVEL UP	D1	16	93.7	1.17	91.6	96.0
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	91.5	0.65	90.3	92.5
12	MONTGOMERY	IH 45	SURFACE	DS1	5	92.3	2.04	89.5	94.9
13	FAYETTE	US 77	SURFACE	DW4	11	92.7	1.09	91.1	94.6
13	FAYETTE	US 77	SURFACE	DW5	32	92.1	1.33	89.4	94.1
13	FAYETTE	US 77	SURFACE	DW6	16	94.0	1.10	92.0	95.6
13	GONZALES	SH 80	SURFACE	DS3	22	90.7	1.66	88.0	95.3
13	GONZALES	US 87	SURFACE	DS3	11	90.1	1.84	87.5	93.1
13	JACKSON	SH 111	SURFACE	86-184	21	90.6	1.89	87.0	93.8
13	LAVACA	SH 95	SURFACE	DW5	37	93.1	1.82	88.3	96.7
14	BASTROP	SH 71	SURFACE	2	12	91.8	0.77	90.6	93.2
16	NUECES	SH 44	SURFACE	DS1	10	93.7	1.40	91.2	95.6
16	REFUGIO	US 77	SURFACE	1A	8	93.1	0.48	92.6	93.9
16	SAN PATRICIO	US 181	SURFACE	5D	8	94.1	0.17	93.9	94.3
17	BURLESON	SH 36	SURFACE		9	93.3	0.94	92.3	94.8
17	GRIMES	SH 105	SURFACE		8	94.1	1.15	92.7	96.0
17	GRIMES	SH 6	SURFACE	7	17	91.2	1.34	88.5	93.3
17	WASHINGTON	US 290	SURFACE	1	9	94.9	0.84	93.8	96.2
17	BRAZOS	SH30/OSR	SURFACE		5	91.6	1.72	89.0	93.4
17	BRAZOS	SH30/21	SURFACE		5	90.4	1.85	88.0	92.2
17	ROBERTSON	US 79	SURFACE		6	90.8	1.61	88.3	93.1
17	MADISON	SH 21	SURFACE		5	93.6	1.05	92.2	95.1
19	CASS	SH 59	4 COURSES	1	39	94.4	1.21	92.0	96.6
19	MARION	US 59	3 COURSES	2	6	95.8	1.38	93.5	97.5
21	CAMERON	FM 1419	SURFACE	1D	7	92.3	0.77	91.2	93.6
21	HIDALGO	US 83	SURFACE	1D	8	93.0	0.63	92.1	94.2
23	LAMPASAS	US 190	SURFACE	1D	21	92.6	1.60	88.9	95.2
				COUNT =	37	37	37	37	37
				MAX =	39	95.8	3.37	93.9	97.5
				MIN =	5	90.1	0.17	86.0	92.2
				AVG =	13	92.8	1.33	90.5	94.8
				STD =	9	1.4	0.58	2.1	1.4

CORE DENSITY DATA (Gc/Gr)
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
23	McCULLOCH	US 87	SURFACE	1D	5	95.0	0.73	94.0	95.9
			COUNT =		1	1	1	1	1
			MAX =		5	95.0	0.73	94.0	95.9
			MIN =		5	95.0	0.73	94.0	95.9
			AVG =		5	95.0	0.73	94.0	95.9
			STD =		0	0.0	0.00	0.0	0.0

APPENDIX K

Gc/Gl, Gc/Gt EXT., and Gc/Gt DES.
Data by mixture type for each project.

CORE DENSITY DATA (Gc/Gl)
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	D LEVEL UP	DS3	14	97.4	2.02	91.7	99.9
1	HUNT	SH 50	D SURFACE	DS3	8	94.4	1.40	92.2	96.7
1	LAMAR	SH 19	C SURFACE	DS3	6	95.6	1.37	94.5	97.6
3	WICHITA.	US 82	D SURFACE	4	7	97.4	1.70	95.8	100.9
5	GARZA	US 84	D SURFACE	1	6	94.4	3.15	89.7	97.1
10	ANDERSON	US 287	D SURFACE	DS3	21	94.3	1.78	89.5	96.7
12	GALVESTON	FM 1764	D LEVEL UP	D1	7	96.2	2.14	93.9	100.6
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	94.5	0.99	92.3	96.1
12	MONTGOMERY	IH 45	D SURFACE	DS1	5	97.0	2.47	93.5	100.3
13	JACKSON	SH 111	D SURFACE	86-184	21	92.4	2.32	87.5	96.1
14	BASTROP	SH 21	C SURFACE	1	5	93.8	0.53	92.8	94.1
14	BASTROP	SH 21	C SURFACE	2	10	93.5	1.29	91.7	96.2
14	BASTROP	SH 71	D SURFACE	2	12	93.7	1.08	92.5	96.4
14	BLANCO	US 281	C SURFACE	DS3	9	94.9	1.81	90.9	97.5
14	LEE	US 290	C SURFACE	1	6	94.8	0.87	93.1	95.4
14	TRAVIS	IH35-MAIN	C SURFACE	DS3	15	94.3	1.35	92.1	97.5
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	93.7	1.34	90.4	94.9
17	BURLESON	SH 36	B SURFACE		6	96.9	1.51	94.7	98.3
17	GRIMES	SH 6	D SURFACE	5	7	94.1	1.17	92.3	96.1
17	WASHINGTON	US 290	B BASE	7	14	97.8	1.44	95.8	100.2
17	WASHINGTON	US 290	B BASE	8	5	98.3	1.08	96.6	99.3
17	WASHINGTON	US 290	B BASE	10	5	98.5	1.12	97.0	99.6
18	DALLAS	IH 635	C LEVEL UP	2449-B	6	100.2	0.84	99.2	101.3
18	NAVARRO	FM 1603	G BASE/SURF	G3	13	102.3	1.05	100.7	104.0
19	CASS	SH 59	D 4 COURSES	1	39	97.4	1.67	94.0	101.2
23	LAMPASAS	US 190	D SURFACE	1D	21	95.0	1.65	90.4	98.1
				COUNT =	26	26	26	26	26
				MAX =	39	102.3	3.15	100.7	104.0
				MIN =	5	92.4	0.53	87.5	94.1
				AVG =	11	95.9	1.51	93.3	98.2
				STD =	8	2.3	0.57	3.0	2.4

CORE DENSITY DATA (Gc/Gl)
TYPE B MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
17	BURLESON	SH 36	SURFACE		6	96.9	1.51	94.7	98.3
17	WASHINGTON	US 290	BASE	7	14	97.8	1.44	95.8	100.2
17	WASHINGTON	US 290	BASE	8	5	98.3	1.08	96.6	99.3
17	WASHINGTON	US 290	BASE	10	5	98.5	1.12	97.0	99.6
			COUNT =		4	4	4	4	4
			MAX =		14	98.5	1.51	97.0	100.2
			MIN =		5	96.9	1.08	94.7	98.3
			AVG =		8	97.9	1.29	96.0	99.4
			STD =		4	0.7	0.22	1.0	0.8

CORE DENSITY DATA (Gc/Gl)
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	LAMAR	SH 19	SURFACE	DS3	6	95.6	1.37	94.5	97.6
14	BASTROP	SH 21	SURFACE	1	5	93.8	0.53	92.8	94.1
14	BASTROP	SH 21	SURFACE	2	10	93.5	1.29	91.7	96.2
14	BLANCO	US 281	SURFACE	DS3	9	94.9	1.81	90.9	97.5
14	LEE	US 290	SURFACE	1	6	94.8	0.87	93.1	95.4
14	TRAVIS	IH35-MAIN	SURFACE	DS3	15	94.3	1.35	92.1	97.5
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	93.7	1.34	90.4	94.9
18	DALLAS	IH 635	LEVEL UP	2449-B	6	100.2	0.84	99.2	101.3
			COUNT =		8	8	8	8	8
			MAX =		15	100.2	1.81	99.2	101.3
			MIN =		5	93.5	0.53	90.4	94.1
			AVG =		9	95.1	1.18	93.1	96.8
			STD =		4	2.2	0.40	2.8	2.2

CORE DENSITY DATA (Gc/Gl)
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	LEVEL UP	DS3	14	97.4	2.02	91.7	99.9
1	HUNT	SH 50	SURFACE	DS3	8	94.4	1.40	92.2	96.7
3	WICHITA	US 82	SURFACE	4	7	97.4	1.70	95.8	100.9
5	GARZA	US 84	SURFACE	1	6	94.4	3.15	89.7	97.1
10	ANDERSON	US 287	SURFACE	DS3	21	94.3	1.78	89.5	96.7
12	GALVESTON	FM 1764	LEVEL UP	D1	7	96.2	2.14	93.9	100.6
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	94.5	0.99	92.3	96.1
12	MONTGOMERY	IH 45	SURFACE	DS1	5	97.0	2.47	93.5	100.3
13	JACKSON	SH 111	SURFACE	86-184	21	92.4	2.32	87.5	96.1
14	BASTROP	SH 71	SURFACE	2	12	93.7	1.08	92.5	96.4
17	GRIMES	SH 6	SURFACE	5	7	94.1	1.17	92.3	96.1
19	CASS	SH 59	4 COURSES	1	39	97.4	1.67	94.0	101.2
23	LAMPASAS	US 190	SURFACE	1D	21	95.0	1.65	90.4	98.1
			COUNT =		13	13	13	13	13
			MAX =		39	97.4	3.15	95.8	101.2
			MIN =		5	92.4	0.99	87.5	96.1
			AVG =		14	95.2	1.81	91.9	98.2
			STD =		10	1.6	0.61	2.2	2.1

CORE DENSITY DATA (Gc/Gl)
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
18	NAVARRO	FM 1603	BASE/SURF	G3	13	102.3	1.05	100.7	104.0
			COUNT =		1	1	1	1	1
			MAX =		13	102.3	1.05	100.7	104.0
			MIN =		13	102.3	1.05	100.7	104.0
			AVG =		13	102.3	1.05	100.7	104.0
			STD =		0	0.0	0.00	0.0	0.0

CORE DENSITY DATA (Gc/Gt)-EXTRACTION
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	D LEVEL UP	DS3	14	96.0	1.78	90.7	98.0
1	HUNT	SH 50	D SURFACE	DS3	8	93.0	1.93	89.7	95.4
1	LAMAR	SH 19	C SURFACE	DS3	7	94.4	1.16	93.4	96.4
3	WICHITA	US 82	D SURFACE	4	7	95.4	1.53	94.1	98.7
5	GARZA	US 84	D SURFACE	1	7	91.8	3.38	86.2	94.8
10	ANDERSON	US 287	D SURFACE	DS3	21	92.3	1.70	88.1	94.8
12	GALVESTON	FM 1764	D LEVEL UP	D1	16	95.0	1.18	92.9	97.3
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	94.2	0.67	93.0	95.2
12	MONTGOMERY	IH 45	D SURFACE	DS1	5	95.9	2.11	93.0	98.6
14	BASTROP	SH 21	C SURFACE	1	5	93.2	0.35	92.8	93.7
14	BASTROP	SH 21	C SURFACE	2	10	92.1	1.97	86.8	93.7
14	BASTROP	SH 71	D SURFACE	2	12	92.4	0.78	91.2	93.8
14	BLANCO	US 281	C SURFACE	DS3	9	93.5	1.58	90.7	96.0
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	93.2	1.01	91.1	94.6
18	DALLAS	IH 635	C LEVEL UP	2449-B	6	97.7	0.52	97.0	98.0
18	NAVARRO	FM 1603	G BASE/SURF	G3	13	97.9	0.95	96.1	99.2
19	CASS	SH 59	D 4 COURSES	1	39	95.6	1.22	93.2	97.9
23	LAMPASAS	US 190	D SURFACE	1D	21	94.6	1.51	90.8	97.3
				COUNT =	18	18	18	18	18
				MAX =	39	97.9	3.38	97.0	99.2
				MIN =	5	91.8	0.35	86.2	93.7
				AVG =	13	94.3	1.41	91.7	96.3
				STD =	8	1.8	0.71	2.9	1.9

CORE DENSITY DATA (Gc/Gt)-EXTRACTION
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	LAMAR	SH 19	SURFACE	DS3	7	94.4	1.16	93.4	96.4
14	BASTROP	SH 21	SURFACE	1	5	93.2	0.35	92.8	93.7
14	BASTROP	SH 21	SURFACE	2	10	92.1	1.97	86.8	93.7
14	BLANCO	US 281	SURFACE	DS3	9	93.5	1.58	90.7	96.0
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	93.2	1.01	91.1	94.6
18	DALLAS	IH 635	LEVEL UP	2449-B	6	97.7	0.52	97.0	98.0
			COUNT =		6	6	6	6	6
			MAX =		15	97.7	1.97	97.0	98.0
			MIN =		5	92.1	0.35	86.8	93.7
			AVG =		9	94.0	1.10	92.0	95.4
			STD =		4	1.9	0.62	3.4	1.7

CORE DENSITY DATA (Gc/Gt)-EXTRACTION
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	LEVEL UP	DS3	14	96.0	1.78	90.7	98.0
1	HUNT	SH 50	SURFACE	DS3	8	93.0	1.93	89.7	95.4
3	WICHITA	US 82	SURFACE	4	7	95.4	1.53	94.1	98.7
5	GARZA	US 84	SURFACE	1	7	91.8	3.38	86.2	94.8
10	ANDERSON	US 287	SURFACE	DS3	21	92.3	1.70	88.1	94.8
12	GALVESTON	FM 1764	LEVEL UP	D1	16	95.0	1.18	92.9	97.3
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	94.2	0.67	93.0	95.2
12	MONTGOMERY	IH 45	SURFACE	DS1	5	95.9	2.11	93.0	98.6
14	BASTROP	SH 71	SURFACE	2	12	92.4	0.78	91.2	93.8
19	CASS	SH 59	4 COURSES	1	39	95.6	1.22	93.2	97.9
23	LAMPASAS	US 190	SURFACE	1D	21	94.6	1.51	90.8	97.3
				COUNT =	11	11	11	11	11
				MAX =	39	96.0	3.38	94.1	98.7
				MIN =	5	91.8	0.67	86.2	93.8
				AVG =	15	94.2	1.62	91.2	96.5
				STD =	10	1.6	0.74	2.4	1.8

CORE DENSITY DATA (Gc/Gt)-EXTRACTION
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
18	NAVARRO	FM 1603	BASE/SURF	G3	13	97.9	0.95	96.1	99.2
			COUNT =		1	1	1	1	1
			MAX =		13	97.9	0.95	96.1	99.2
			MIN =		13	97.9	0.95	96.1	99.2
			AVG =		13	97.9	0.95	96.1	99.2
			STD =		0	0.0	0.00	0.0	0.0

CORE DENSITY DATA (Gc/Gt)-DESIGN
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	D LEVEL UP	DS3	14	96.1	1.76	91.1	98.2
1	HUNT	SH 50	D SURFACE	DS3	8	93.2	1.95	89.5	95.5
1	LAMAR	SH 19	C SURFACE	DS3	7	94.5	1.11	93.2	96.4
3	WICHITA	US 82	D SURFACE	4	7	95.7	1.60	94.4	99.1
5	GARZA	US 84	D SURFACE	1	7	92.1	3.17	87.6	94.9
10	ANDERSON	US 287	D SURFACE	DS3	21	92.4	1.69	88.5	94.5
12	GALVESTON	FM 1764	D LEVEL UP	D1	16	95.8	2.27	93.2	102.6
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	94.2	0.73	93.1	95.2
12	MONTGOMERY	IH 45	D SURFACE	DS1	5	96.6	2.06	93.6	98.9
14	BASTROP	SH 21	C SURFACE	1	5	93.2	0.35	92.8	93.7
14	BASTROP	SH 21	C SURFACE	2	10	92.2	2.00	86.9	94.4
14	BASTROP	SH 71	D SURFACE	2	12	92.3	0.80	91.1	93.7
14	BLANCO	US 281	C SURFACE	DS3	9	93.8	1.43	91.1	95.7
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	93.2	1.05	91.1	94.9
18	DALLAS	IH 635	C LEVEL UP	2449-B	6	97.7	0.47	96.9	98.1
18	NAVARRO	FM 1603	G BASE/SURF	G3	13	97.8	0.91	96.2	99.1
19	CASS	SH 59	D 4 COURSES	1	39	95.7	1.32	92.6	98.4
23	LAMPASAS	US 190	D SURFACE	1D	21	94.6	1.54	90.6	97.4
				COUNT =	18	18	18	18	18
				MAX =	39	97.8	3.17	96.9	102.6
				MIN =	5	92.1	0.35	86.9	93.7
				AVG =	13	94.5	1.46	91.9	96.7
				STD =	8	1.9	0.70	2.7	2.4

CORE DENSITY DATA (Gc/Gt)-DESIGN
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	LAMAR	SH 19	SURFACE	DS3	7	94.5	1.11	93.2	96.4
14	BASTROP	SH 21	SURFACE	1	5	93.2	0.35	92.8	93.7
14	BASTROP	SH 21	SURFACE	2	10	92.2	2.00	86.9	94.4
14	BLANCO	US 281	SURFACE	DS3	9	93.8	1.43	91.1	95.7
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	93.2	1.05	91.1	94.9
18	DALLAS	IH 635	LEVEL UP	2449-B	6	97.7	0.47	96.9	98.1
			COUNT =		6	6	6	6	6
			MAX =		15	97.7	2.00	96.9	98.1
			MIN =		5	92.2	0.35	86.9	93.7
			AVG =		9	94.1	1.07	92.0	95.5
			STD =		4	1.9	0.61	3.3	1.6

CORE DENSITY DATA (Gc/Gt)-DESIGN
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	LEVEL UP	DS3	14	96.1	1.76	91.1	98.2
1	HUNT	SH 50	SURFACE	DS3	8	93.2	1.95	89.5	95.5
3	WICHITA	US 82	SURFACE	4	7	95.7	1.60	94.4	99.1
5	GARZA	US 84	SURFACE	1	7	92.1	3.17	87.6	94.9
10	ANDERSON	US 287	SURFACE	DS3	21	92.4	1.69	88.5	94.5
12	GALVESTON	FM 1764	LEVEL UP	D1	16	95.8	2.27	93.2	102.6
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	94.2	0.73	93.1	95.2
12	MONTGOMERY	IH 45	SURFACE	DS1	5	96.6	2.06	93.6	98.9
14	BASTROP	SH 71	SURFACE	2	12	92.3	0.80	91.1	93.7
19	CASS	SH 59	4 COURSES	1	39	95.7	1.32	92.6	98.4
23	LAMPASAS	US 190	SURFACE	1D	21	94.6	1.54	90.6	97.4
			COUNT	=	11	11	11	11	11
			MAX	=	39	96.6	3.17	94.4	102.6
			MIN	=	5	92.1	0.73	87.6	93.7
			AVG	=	15	94.4	1.72	91.4	97.1
			STD	=	10	1.7	0.68	2.2	2.6

CORE DENSITY DATA (Gc/Gt)-DESIGN
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
18	NAVARRO	FM 1603	BASE/SURF	G3	13	97.8	0.91	96.2	99.1
			COUNT =		1	1	1	1	1
			MAX =		13	97.8	0.91	96.2	99.1
			MIN =		13	97.8	0.91	96.2	99.1
			AVG =		13	97.8	0.91	96.2	99.1
			STD =		0	0.0	0.00	0.0	0.0

APPENDIX L

Core VMA and PVF
Data by mixture type for each project.

CORE VMA & % VOIDS FILLED DATA
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	VMA DATA AVG.	STD.	MIN.	MAX.	% VOIDS FILLED AVG.	STD.	MIN.	MAX.
1	FANNIN	US 82	D LEVEL UP	DS3	14	16.4	1.65	14.4	20.9	71.8	7.26	52.6	82.5
1	HUNT	SH 50	D SURFACE	DS3	8	18.5	1.73	16.5	21.9	59.6	6.52	50.3	68.6
1	LAMAR	SH 19	C SURFACE	DS3	7	17.4	0.94	15.8	18.4	62.0	4.78	58.2	70.2
3	WICHITA	US 82	D SURFACE	4	7	16.1	1.45	13.0	17.4	62.8	7.13	57.1	78.5
5	GARZA	US 84	D SURFACE	1	7	19.3	2.68	16.6	23.5	57.7	10.76	40.5	70.3
10	ANDERSON	US 287	D SURFACE	DS3	21	19.5	1.49	17.4	22.7				
12	GALVESTON	FM 1764	D LEVEL UP	D1	15	16.0	1.48	13.5	18.7	61.2	5.03	50.6	70.3
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	17.0	0.75	16.0	18.3	50.3	2.42	45.0	53.3
12	MONTGOMERY	IH 45	D SURFACE	DS1	5	15.2	1.81	13.4	17.8	49.7	8.37	41.1	61.8
14	BASTROP	SH 21	C SURFACE	1	5	17.1	0.33	16.6	17.4	52.0	3.83	45.3	54.9
14	BASTROP	SH 21	C SURFACE	2	10	17.9	1.82	15.5	22.6	51.9	2.81	48.0	56.2
14	BASTROP	SH 71	D SURFACE	2	12	18.6	0.70	17.2	19.4	55.9	2.84	51.6	61.2
14	BLANCO	US 281	C SURFACE	DS3	9	16.5	1.15	15.1	18.7	55.5	7.04	40.1	65.2
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	16.9	1.01	15.3	18.8	51.6	3.15	46.3	55.2
18	DALLAS	IH 635	C LEVEL UP	2449-B	6	12.7	0.47	12.3	13.6				
18	NAVARRO	FM 1603	G BASE/SURF	G3	13	13.0	0.81	11.9	14.5				
19	CASS	SH 59	D 4 COURSES	1	39	15.0	1.27	12.3	18.1	62.8	5.29	53.4	72.6
23	LAMPASAS	US 190	D SURFACE	1D	21	16.6	1.40	14.1	20.3	55.5	5.30	45.4	66.9
				COUNT =	18	18	18	18	18	15	15	15	15
				MAX =	39	19.5	2.68	17.4	23.5	71.8	10.76	58.2	82.5
				MIN =	5	12.7	0.33	11.9	13.6	49.7	2.42	40.1	53.3
				AVG =	13	16.7	1.27	14.8	19.1	57.4	5.50	48.4	65.8
				STD =	8	1.9	0.57	1.8	2.6	6.1	2.36	5.7	8.8

CORE VMA & % VOIDS FILLED DATA
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	VMA DATA AVG.	VMA DATA STD.	VMA DATA MIN.	VMA DATA MAX.	% VOIDS FILLED AVG.	% VOIDS FILLED STD.	% VOIDS FILLED MIN.	% VOIDS FILLED MAX.
1	LAMAR	SH 19	SURFACE	DS3	7	17.4	0.94	15.8	18.4	62.0	4.78	58.2	70.2
14	BASTROP	SH 21	SURFACE	1	5	17.1	0.33	16.6	17.4	52.0	3.83	45.3	54.9
14	BASTROP	SH 21	SURFACE	2	10	17.9	1.82	15.5	22.6	51.9	2.81	48.0	56.2
14	BLANCO	US 281	SURFACE	DS3	9	16.5	1.15	15.1	18.7	55.5	7.04	40.1	65.2
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	16.9	1.01	15.3	18.8	51.6	3.15	46.3	55.2
18	DALLAS	IH 635	LEVEL UP	2449-B	6	12.7	0.47	12.3	13.6				
				COUNT =	6	6	6	6	6	5	5	5	5
				MAX =	15	17.9	1.82	16.6	22.6	62.0	7.04	58.2	70.2
				MIN =	5	12.7	0.33	12.3	13.6	51.6	2.81	40.1	54.9
				AVG =	9	16.4	0.95	15.1	18.3	54.6	4.32	47.6	60.3
				STD =	4	1.9	0.53	1.5	2.9	4.4	1.70	6.6	7.0

CORE VMA & % VOIDS FILLED DATA
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	VMA DATA AVG.	STD.	MIN.	MAX.	% VOIDS FILLED AVG.	STD.	MIN.	MAX.
1	FANNIN	US 82	LEVEL UP	DS3	14	16.4	1.65	14.4	20.9	71.8	7.26	52.6	82.5
1	HUNT	SH 50	SURFACE	DS3	8	18.5	1.73	16.5	21.9	59.6	6.52	50.3	68.6
3	WICHITA	US 82	SURFACE	4	7	16.1	1.45	13.0	17.4	62.8	7.13	57.1	78.5
5	GARZA	US 84	SURFACE	1	7	19.3	2.68	16.6	23.5	57.7	10.76	40.5	70.3
10	ANDERSON	US 287	SURFACE	DS3	21	19.5	1.49	17.4	22.7				
12	GALVESTON	FM 1764	LEVEL UP	D1	15	16.0	1.48	13.5	18.7	61.2	5.03	50.6	70.3
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	17.0	0.75	16.0	18.3	50.3	2.42	45.0	53.3
12	MONTGOMERY	IH 45	SURFACE	DS1	5	15.2	1.81	13.4	17.8	49.7	8.37	41.1	61.8
14	BASTROP	SH 71	SURFACE	2	12	18.6	0.70	17.2	19.4	55.9	2.84	51.6	61.2
19	CASS	SH 59	4 COURSES	1	39	15.0	1.27	12.3	18.1	62.8	5.29	53.4	72.6
23	LAMPASAS	US 190	SURFACE	1D	21	16.6	1.40	14.1	20.3	55.5	5.30	45.4	66.9
				COUNT =	11	11	11	11	11	10	10	10	10
				MAX =	39	19.5	2.68	17.4	23.5	71.8	10.76	57.1	82.5
				MIN =	5	15.0	0.70	12.3	17.4	49.7	2.42	40.5	53.3
				AVG =	15	17.1	1.49	14.9	19.9	58.7	6.09	48.8	68.6
				STD =	10	1.6	0.53	1.8	2.1	6.5	2.50	5.5	8.5

CORE VMA & % VOIDS FILLED DATA
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	VMA DATA AVG.	STD.	MIN.	MAX.	% VOIDS FILLED AVG.	STD.	MIN.	MAX.
18	NAVARRO	FM 1603	BASE/SURF	G3	13	13.0	0.81	11.9	14.5				
			COUNT =		1	1	1	1	1				
			MAX =		13	13.0	0.81	11.9	14.5				
			MIN =		13	13.0	0.81	11.9	14.5				
			AVG =		13	13.0	0.81	11.9	14.5				
			STD =		0	0.0	0.00	0.0	0.0				

APPENDIX M

Gl/Gte
Data by mixture type for each project.

LAB DENSITY DATA (Gl/Gte)
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	D LEVEL UP	DS3	21	98.0	0.52	97.2	99.5
1	HUNT	SH 50	D SURFACE	DS3	15	97.7	1.36	94.5	98.8
1	LAMAR	SH 19	C SURFACE	DS3	8	97.7	0.13	97.5	97.9
1	LAMAR	US 82	D SURFACE	1	5	97.2	0.41	96.6	97.7
2	TARRANT	FM 1886	G SURFACE	631	5	96.1	0.82	95.4	97.4
2	TARRANT	IH 20	G SURFACE	662	5	98.0	0.45	97.2	98.3
3	CLAY	US 287	D LEVEL UP	1	7	97.9	0.49	96.9	98.4
3	WICHITA	US 82	D SURFACE	4	8	95.6	0.59	95.7	97.6
4	CARSON	US 60	D SURFACE	1	8	97.8	0.38	97.0	98.2
4	CARSON	US 60	D LEVEL UP	9	6	97.3	1.26	95.0	98.4
5	GARZA	FM 651	D LEVEL UP	3	23	96.8	0.58	95.6	97.8
5	HOCKLEY	FM 300	D SURFACE	2	8	96.4	0.61	95.4	97.0
5	LUBBOCK	SPUR 326	D SURFACE	1	9	96.5	0.54	95.6	97.4
5	LUBBOCK	US 84	D SURFACE	1	12	96.1	0.55	95.0	96.8
5	LUBBOCK	US 84	C SURFACE	1	8	96.3	0.62	95.4	97.3
5	LUBBOCK	US 84	D LEVEL UP	3	6	96.5	0.29	96.1	96.9
5	GARZA	US 84	D SURFACE	1	6	96.6	0.81	95.9	98.0
7	TOM GREEN	FM 388	D SURFACE		5	96.7	0.19	96.5	97.0
7	TOM GREEN	US 67	D SURFACE		15	96.4	0.67	95.3	97.4
8	NOLAN	IH 20	D SURFACE	1	7	96.5	0.42	95.9	97.0
8	NOLAN	IH 20	D LEVEL UP		8	96.8	0.57	95.8	97.4
8	TAYLOR	IH 20	D SURFACE	1	7	96.8	0.63	95.9	97.4
8	TAYLOR	US 83	D SURFACE	DS3	8	96.3	0.35	95.8	96.7
10	ANDERSON	US 287	D SURFACE	DS3	23	97.9	0.47	97.0	98.7
12	GALVESTON	FM 1764	D LEVEL UP	D1	9	97.4	1.07	94.7	98.3
12	GALVESTON	FM 1764	D LEVEL UP	D2-3	5	97.9	0.23	97.6	98.1
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	96.9	0.81	95.6	98.7
12	MONTGOMERY	IH 45	D SURFACE	DS1	7	95.2	0.62	94.3	96.0
13	FAYETTE	US 77	D SURFACE	DW4	5	96.4	0.40	95.9	96.8
13	FAYETTE	US 77	D SURFACE	DW5	13	95.8	0.98	93.5	96.8
13	FAYETTE	US 77	D SURFACE	DW6	7	97.2	0.37	96.7	97.7
13	GONZALES	SH 80	D SURFACE	DS3	12	97.0	0.55	96.2	97.7
13	GONZALES	US 87	D SURFACE	DS3	8	96.8	0.52	96.2	97.7
13	JACKSON	SH 111	D SURFACE	86-184	31	98.0	0.58	97.2	99.4
13	LAVACA	SH 95	D SURFACE	DW5	20	97.3	0.62	96.3	98.5
14	BASTROP	SH 21	C SURFACE	1	6	97.8	0.39	97.3	98.4
14	BASTROP	SH 21	C SURFACE	2	15	98.0	0.81	96.7	99.7
14	BASTROP	SH 71	D SURFACE	2	18	97.8	0.82	96.0	98.8
14	BLANCO	US 281	C SURFACE	DS3	9	97.5	0.91	95.8	98.8
14	LEE	US 290	C SURFACE	1	6	97.7	0.39	96.9	98.0
14	TRAVIS	IH 35	A LEVEL UP	2	37	97.3	0.91	95.6	99.2
14	TRAVIS	IH35-MAIN	C SURFACE	DS3	15	97.7	0.65	96.8	99.0
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	98.0	0.63	97.0	99.6
16	JIM WELL	US 281	C SURFACE	4	14	97.9	0.14	97.7	98.2
16	JIM WELL	US 281	C SURFACE	6	7	98.1	0.16	97.9	98.3

LAB DENSITY DATA (G1/Gte) - (cont.)
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
16	NUECES	SH 44	D SURFACE	DS1	10	96.7	0.28	96.3	97.2
16	REFUGIO	FM 2678	D LEVEL UP		6	97.1	0.28	96.6	97.4
16	REFUGIO	US 77	B BASE	1	14	96.5	0.36	95.9	97.1
16	REFUGIO	US 77	B BASE	3D	10	96.1	0.23	95.8	96.5
16	REFUGIO	US 77	D LEVEL UP	1	7	96.6	0.20	96.4	96.9
16	REFUGIO	US 77	D SURFACE	1A	10	97.3	0.43	96.7	98.1
16	SAN PATRICIO	US 181	B BASE		18	97.3	0.58	96.0	98.1
16	SAN PATRICIO	US 181	D SURFACE	5D	8	97.5	0.28	97.4	98.2
17	BRAZOS	FM 2818	D SURFACE		10	95.9	0.83	94.7	96.8
17	BRAZOS	SH 21	D SURFACE	1	10	97.1	0.61	96.1	98.0
17	BURLESON	SH 21	B SURFACE		18	96.8	0.54	95.3	97.6
17	BURLESON	SH 36	B SURFACE		6	97.0	0.36	96.4	97.4
17	BURLESON	SH 36	D SURFACE		6	96.3	0.36	95.9	96.9
17	GRIMES	SH 105	D SURFACE		6	96.7	0.92	95.1	97.7
17	GRIMES	SH 6	D SURFACE	5	7	97.3	0.40	96.6	97.9
17	WASHINGTON	US 290	D SURFACE	1	8	96.8	0.64	95.6	97.5
17	WASHINGTON	US 290	B BASE	7	14	96.7	0.48	96.0	97.5
17	WASHINGTON	US 290	B BASE	8	6	95.1	0.43	94.3	95.5
17	WASHINGTON	US 290	B BASE	10	7	95.4	1.01	94.5	97.6
17	WASHINGTON	US 290	D SURFACE		5	95.0	0.33	94.8	95.6
17	BRAZOS	SH30/OSR	D SURFACE		6	94.9	0.71	94.1	95.6
17	BRAZOS	SH30/21	D SURFACE		8	94.4	0.89	93.1	95.6
17	ROBERTSON	US 79	D SURFACE		5	94.5	0.84	93.6	95.6
17	MADISON	SH 21	D SURFACE		5	95.8	0.43	95.3	96.4
19	CASS	SH 59	D 4 COURSES	1	44	96.8	0.88	95.5	98.0
19	MARION	US 59	D 3 COURSES	2	7	97.4	0.38	96.9	97.9
19	PANOLA	US 59	C BASE	2C	30	97.5	0.79	95.7	98.5
20	TYLER	US 69	G SURFACE	1	19	97.7	0.42	96.9	98.5
21	CAMERON	FM 1419	D SURFACE	1D	7	97.1	0.72	96.5	98.5
21	HIDALGO	US 83	D SURFACE	1D	7	97.2	0.46	96.3	97.8
21	STARR	FM 755	D SURFACE	1D	10	97.9	0.52	97.1	98.9
23	BROWN	FM 45	D SURFACE		5	97.4	0.30	97.0	97.8
23	BROWN	US 67	D SURFACE		5	97.3	0.22	97.0	97.6
23	EASTLAND	IH 20	D SURFACE	1	16	98.0	0.82	95.8	99.0
23	EASTLAND	IH 20	D SURFACE	4	6	97.2	1.03	96.0	98.7
23	LAMPASAS	US 190	D SURFACE	1D	25	97.3	0.62	96.1	98.6
24	CULBERSON	US62/180	D SURF/LEVEL		20	95.8	0.73	95.1	97.5
			COUNT	=	82	82	82	82	82
			MAX	=	44	98.1	1.36	97.9	99.7
			MIN	=	5	94.4	0.13	93.1	95.5
			AVG	=	11	96.9	0.57	96.0	97.7
			STD	=	8	0.9	0.26	1.0	0.9

LAB DENSITY DATA (G1/Gte)
TYPE A MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
14	TRAVIS	IH 35	LEVEL UP	2	37	97.3	0.91	95.6	99.2
			COUNT =		1	1	1	1	1
			MAX =		37	97.3	0.91	95.6	99.2
			MIN =		37	97.3	0.91	95.6	99.2
			AVG =		37	97.3	0.91	95.6	99.2
			STD =		0	0.0	0.00	0.0	0.0

LAB DENSITY DATA (Gl/Gte)
TYPE B MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
16	REFUGIO	US 77	BASE	1	14	96.5	0.36	95.9	97.1
16	REFUGIO	US 77	BASE	3D	10	96.1	0.23	95.8	96.5
16	SAN PATRICIO	US 181	BASE		18	97.3	0.58	96.0	98.1
17	BURLESON	SH 21	SURFACE		18	96.8	0.54	95.3	97.6
17	BURLESON	SH 36	SURFACE		6	97.0	0.36	96.4	97.4
17	WASHINGTON	US 290	BASE	7	14	96.7	0.48	96.0	97.5
17	WASHINGTON	US 290	BASE	8	6	95.1	0.43	94.3	95.5
17	WASHINGTON	US 290	BASE	10	7	95.4	1.01	94.5	97.6
				COUNT =	8	8	8	8	8
				MAX =	18	97.3	1.01	96.4	98.1
				MIN =	6	95.1	0.23	94.3	95.5
				AVG =	12	96.4	0.50	95.5	97.2
				STD =	5	0.8	0.23	0.8	0.8

LAB DENSITY DATA (Gl/Gte)
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	LAMAR	SH 19	SURFACE	DS3	8	97.7	.13	97.5	97.9
5	LUBBOCK	US 84	SURFACE	1	8	96.3	0.62	95.4	97.3
14	BASTROP	SH 21	SURFACE	1	6	97.8	0.39	97.3	98.4
14	BASTROP	SH 21	SURFACE	2	15	98.0	0.81	96.7	99.7
14	BLANCO	US 281	SURFACE	DS3	9	97.5	0.91	95.8	98.8
14	LEE	US 290	SURFACE	1	6	97.7	0.39	96.9	98.0
14	TRAVIS	IH35-MAIN	SURFACE	DS3	15	97.7	0.65	96.8	99.0
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	98.0	0.63	97.0	99.6
16	JIM WELL	US 281	SURFACE	4	14	97.9	0.14	97.7	98.2
16	JIM WELL	US 281	SURFACE	6	7	98.1	0.16	97.9	98.3
19	PANOLA	US 59	BASE	2C	30	97.5	0.79	95.7	98.5
				COUNT =	11	11	11	11	11
				MAX =	30	98.1	0.91	97.9	99.7
				MIN =	6	96.3	0.13	95.4	97.3
				AVG =	12	97.7	0.51	96.8	98.5
				STD =	7	0.5	0.28	0.8	0.7

LAB DENSITY DATA (Gl/Gte)
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	LEVEL UP	DS3	21	98.0	0.52	97.2	99.5
1	HUNT	SH 50	SURFACE	DS3	15	97.7	1.36	94.5	98.8
1	LAMAR	US 82	SURFACE	1	5	97.2	0.41	96.6	97.7
3	CLAY	US 287	LEVEL UP	1	7	97.9	0.49	96.9	98.4
3	WICHITA	US 82	SURFACE	4	8	95.6	0.59	95.7	97.6
4	CARSON	US 60	SURFACE	1	8	97.8	0.38	97.0	98.2
4	CARSON	US 60	LEVEL UP	9	6	97.3	1.26	95.0	98.4
5	GARZA	FM 651	LEVEL UP	3	23	96.8	0.58	95.6	97.8
5	HOCKLEY	FM 300	SURFACE	2	8	96.4	0.61	95.4	97.0
5	LUBBOCK	SPUR 326	SURFACE	1	9	96.5	0.54	95.6	97.4
5	LUBBOCK	US 84	SURFACE	1	12	96.1	0.55	95.0	96.8
5	LUBBOCK	US 84	LEVEL UP	3	6	96.5	0.29	96.1	96.9
5	GARZA	US 84	SURFACE	1	6	96.6	0.81	95.9	98.0
7	TOM GREEN	FM 388	SURFACE		5	96.7	0.19	96.5	97.0
7	TOM GREEN	US 67	SURFACE		15	96.4	0.67	95.3	97.4
8	NOLAN	IH 20	SURFACE	1	7	96.5	0.42	95.9	97.0
8	NOLAN	IH 20	LEVEL UP		8	96.8	0.57	95.8	97.4
8	TAYLOR	IH 20	SURFACE	1	7	96.8	0.63	95.9	97.4
8	TAYLOR	US 83	SURFACE	DS3	8	96.3	0.35	95.8	96.7
10	ANDERSON	US 287	SURFACE	DS3	23	97.9	0.47	97.0	98.7
12	GALVESTON	FM 1764	LEVEL UP	D1	9	97.4	1.07	94.7	98.3
12	GALVESTON	FM 1764	LEVEL UP	D2-3	5	97.9	0.23	97.6	98.1
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	96.9	0.81	95.6	98.7
12	MONTGOMERY	IH 45	SURFACE	DS1	7	95.2	0.62	94.3	96.0
13	FAYETTE	US 77	SURFACE	DW4	5	96.4	0.40	95.9	96.8
13	FAYETTE	US 77	SURFACE	DW5	13	95.8	0.98	93.5	96.8
13	FAYETTE	US 77	SURFACE	DW6	7	97.2	0.37	96.7	97.7
13	GONZALES	SH 80	SURFACE	DS3	12	97.0	0.55	96.2	97.7
13	GONZALES	US 87	SURFACE	DS3	8	96.8	0.52	96.2	97.7
13	JACKSON	SH 111	SURFACE	86-184	31	98.0	0.58	97.2	99.4
13	LAVACA	SH 95	SURFACE	DW5	20	97.3	0.62	96.3	98.5
14	BASTROP	SH 71	SURFACE	2	18	97.8	0.82	96.0	98.8
16	NUECES	SH 44	SURFACE	DS1	10	96.7	0.28	96.3	97.2
16	REFUGIO	FM 2678	LEVEL UP		6	97.1	0.28	96.6	97.4
16	REFUGIO	US 77	LEVEL UP	1	7	96.6	0.20	96.4	96.9
16	REFUGIO	US 77	SURFACE	1A	10	97.3	0.43	96.7	98.1
16	SAN PATRICIO	US 181	SURFACE	5D	8	97.5	0.28	97.4	98.2
17	BRAZOS	FM 2818	SURFACE		10	95.9	0.83	94.7	96.8
17	BRAZOS	SH 21	SURFACE	1	10	97.1	0.61	96.1	98.0
17	BURLESON	SH 36	SURFACE		6	96.3	0.36	95.9	96.9
17	GRIMES	SH 105	SURFACE		6	96.7	0.92	95.1	97.7
17	GRIMES	SH 6	SURFACE	5	7	97.3	0.40	96.6	97.9
17	WASHINGTON	US 290	SURFACE	1	8	96.8	0.64	95.6	97.5
17	WASHINGTON	US 290	SURFACE		5	95.0	0.33	94.8	95.6

LAB DENSITY DATA (Gl/Gte) - (cont.)
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
17	BRAZOS	SH30/OSR	SURFACE		6	94.9	0.71	94.1	95.6
17	BRAZOS	SH30/21	SURFACE		8	94.4	0.89	93.1	95.6
17	ROBERTSON	US 79	SURFACE		5	94.5	0.84	93.6	95.6
17	MADISON	SH 21	SURFACE		5	95.8	0.43	95.3	96.4
19	CASS	SH 59	4 COURSES	1	44	96.8	0.88	95.5	98.0
19	MARION	US 59	3 COURSES	2	7	97.4	0.38	96.9	97.9
21	CAMERON	FM 1419	SURFACE	1D	7	97.1	0.72	96.5	98.5
21	HIDALGO	US 83	SURFACE	1D	7	97.2	0.46	96.3	97.8
21	STARR	FM 755	SURFACE	1D	10	97.9	0.52	97.1	98.9
23	BROWN	FM 45	SURFACE		5	97.4	0.30	97.0	97.8
23	BROWN	US 67	SURFACE		5	97.3	0.22	97.0	97.6
23	EASTLAND	IH 20	SURFACE	1	16	98.0	0.82	95.8	99.0
23	EASTLAND	IH 20	SURFACE	4	6	97.2	1.03	96.0	98.7
23	LAMPASAS	US 190	SURFACE	1D	25	97.3	0.62	96.1	98.6
24	CULBERSON	US62/180	SURF/LEVEL		20	95.8	0.73	95.1	97.5
			COUNT =		59	59	59	59	59
			MAX =		44	98.0	1.36	97.6	99.5
			MIN =		5	94.4	0.19	93.1	95.6
			AVG =		11	96.8	0.58	95.9	97.6
			STD =		7	0.9	0.26	1.0	0.9

LAB DENSITY DATA (Gl/Gte)
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
2	TARRANT	FM 1886	SURFACE	631	5	96.1	0.82	95.4	97.4
2	TARRANT	IH 20	SURFACE	662	5	98.0	0.45	97.2	98.3
20	TYLER	US 69	SURFACE	1	19	97.7	0.42	96.9	98.5
			COUNT =		3	3	3	3	3
			MAX =		19	98.0	0.82	97.2	98.5
			MIN =		5	96.1	0.42	95.4	97.4
			AVG =		10	97.3	0.56	96.5	98.1
			STD =		8	1.0	0.22	1.0	0.6

APPENDIX N

Gl/Gt EXT. and Gl/Gt DES.
Data by mixture type for each project.

LAB DENSITY DATA (Gl/Gt)-EXTRACTION
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	D LEVEL UP	DS3	21	98.7	0.52	97.9	100.2
1	HUNT	SH 50	D SURFACE	DS3	15	98.3	1.37	95.1	99.4
1	LAMAR	SH 19	C SURFACE	DS3	8	98.8	0.13	98.6	99.0
1	LAMAR	US 82	D SURFACE	1	5	98.5	0.41	97.9	99.0
2	TARRANT	FM 1886	G SURFACE	631	5	98.2	0.83	97.5	99.6
2	TARRANT	IH 20	G SURFACE	662	5	98.4	0.45	97.7	98.8
3	WICHITA	US 82	D SURFACE	4	8	97.9	0.60	97.2	99.1
5	GARZA	US 84	D SURFACE	1	6	96.8	0.81	96.1	98.2
8	NOLAN	IH 20	D LEVEL UP		8	101.5	0.71	100.3	102.5
10	ANDERSON	US 287	D SURFACE	DS3	23	97.9	0.49	97.0	98.7
12	GALVESTON	FM 1764	D LEVEL UP	D1	8	98.7	1.16	96.0	99.7
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	99.7	0.82	98.4	101.6
12	MONTGOMERY	IH 45	D SURFACE	DS1	7	99.0	0.63	98.1	99.8
14	BASTROP	SH 21	C SURFACE	1	6	99.4	0.39	98.9	100.0
14	BASTROP	SH 21	C SURFACE	2	15	99.0	1.66	94.2	101.3
14	BASTROP	SH 71	D SURFACE	2	18	98.5	0.82	96.7	99.5
14	BLANCO	US 281	C SURFACE	DS3	9	98.6	1.13	96.9	100.2
14	TRAVIS	IH 35	A LEVEL UP	2	37	97.9	0.91	96.2	99.8
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	99.4	0.99	97.7	102.0
18	DALLAS	IH 635	C LEVEL UP	2449-B	14	97.7	0.50	96.7	98.5
18	NAVARRO	FM 1603	G BASE/SURF	G3	13	95.7	0.64	95.0	97.6
19	CASS	SH 59	D 4 COURSES	1	44	98.0	0.89	96.7	99.3
20	TYLER	US 69	G SURFACE	1	19	98.9	0.42	98.0	99.6
23	LAMPASAS	US 190	D SURFACE	1D	25	99.5	0.63	98.2	100.8
				COUNT =	24	24	24	24	24
				MAX =	44	101.5	1.66	100.3	102.5
				MIN =	5	95.7	0.13	94.2	97.6
				AVG =	14	98.5	0.75	97.2	99.8
				STD =	10	1.1	0.34	1.4	1.2

LAB DENSITY DATA (Gl/Gt)-EXTRACTION
TYPE A MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
14	TRAVIS	IH 35	A LEVEL UP	2	37	97.9	0.91	96.2	99.8
			COUNT =		1	1	1	1	1
			MAX =		37	97.9	0.91	96.2	99.8
			MIN =		37	97.9	0.91	96.2	99.8
			AVG =		37	97.9	0.91	96.2	99.8
			STD =		0	0.0	0.00	0.0	0.0

LAB DENSITY DATA (Gl/Gt)-EXTRACTION
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	LAMAR	SH 19	SURFACE	DS3	8	98.8	0.13	98.6	99.0
14	BASTROP	SH 21	SURFACE	1	6	99.4	0.39	98.9	100.0
14	BASTROP	SH 21	SURFACE	2	15	99.0	1.66	94.2	101.3
14	BLANCO	US 281	SURFACE	DS3	9	98.6	1.13	96.9	100.2
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	99.4	0.99	97.7	102.0
18	DALLAS	IH 635	LEVEL UP	2449-B	14	97.7	0.50	96.7	98.5
			COUNT =		6	6	6	6	6
			MAX =		15	99.4	1.66	98.9	102.0
			MIN =		6	97.7	0.13	94.2	98.5
			AVG =		11	98.8	0.80	97.2	100.2
			STD =		4	0.6	0.56	1.7	1.3

LAB DENSITY DATA (G1/Gt)-EXTRACTION
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	LEVEL UP	DS3	21	98.7	0.52	97.9	100.2
1	HUNT	SH 50	SURFACE	DS3	15	98.3	1.37	95.1	99.4
1	LAMAR	US 82	SURFACE	1	5	98.5	0.41	97.9	99.0
3	WICHITA	US 82	SURFACE	4	8	97.9	0.60	97.2	99.1
5	GARZA	US 84	SURFACE	1	6	96.8	0.81	96.1	98.2
8	NOLAN	IH 20	LEVEL UP		8	101.5	0.71	100.3	102.5
10	ANDERSON	US 287	SURFACE	DS3	23	97.9	0.49	97.0	98.7
12	GALVESTON	FM 1764	LEVEL UP	D1	8	98.7	1.16	96.0	99.7
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	99.7	0.82	98.4	101.6
12	MONTGOMERY	IH 45	SURFACE	DS1	7	99.0	0.63	98.1	99.8
14	BASTROP	SH 71	SURFACE	2	18	98.5	0.82	96.7	99.5
19	CASS	SH 59	4 COURSES	1	44	98.0	0.89	96.7	99.3
23	LAMPASAS	US 190	SURFACE	1D	25	99.5	0.63	98.2	100.8
			COUNT =		13	13	13	13	13
			MAX =		44	101.5	1.37	100.3	102.5
			MIN =		5	96.8	0.41	95.1	98.2
			AVG =		15	98.7	0.76	97.4	99.8
			STD =		11	1.1	0.27	1.3	1.2

LAB DENSITY DATA (Gl/Gt)-EXTRACTION
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
2	TARRANT	FM 1886	SURFACE	631	5	98.2	0.83	97.5	99.6
2	TARRANT	IH 20	SURFACE	662	5	98.4	0.45	97.7	98.8
18	NAVARRO	FM 1603	BASE/SURF	G3	13	95.7	0.64	95.0	97.6
20	TYLER	US 69	SURFACE	1	19	98.9	0.42	98.0	99.6
			COUNT =		4	4	4	4	4
			MAX =		19	98.9	0.83	98.0	99.6
			MIN =		5	95.7	0.42	95.0	97.6
			AVG =		11	97.8	0.59	97.1	98.9
			STD =		7	1.4	0.19	1.4	0.9

LAB DENSITY DATA (G1/Gt)-DESIGN

ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	D LEVEL UP	DS3	21	98.8	0.55	97.7	100.1
1	HUNT	SH 50	D SURFACE	DS3	15	98.7	1.31	95.6	100.0
1	LAMAR	SH 19	C SURFACE	DS3	8	98.8	0.20	98.5	99.1
1	LAMAR	US 82	D SURFACE	1	5	98.7	0.42	98.2	99.3
2	TARRANT	FM 1886	G SURFACE	631	5	98.3	0.68	97.8	99.2
2	TARRANT	IH 20	G SURFACE	662	5	98.8	0.43	98.1	99.1
3	WICHITA	US 82	D SURFACE	4	8	98.2	0.53	97.6	99.4
5	GARZA	US 84	D SURFACE	1	6	97.1	0.89	96.0	98.2
8	NOLAN	IH 20	D LEVEL UP		8	102.3	3.38	100.3	110.6
10	ANDERSON	US 287	D SURFACE	DS3	23	97.9	0.50	97.0	98.8
12	GALVESTON	FM 1764	D LEVEL UP	D1	8	99.2	1.29	96.4	100.9
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	99.7	0.66	98.5	100.9
12	MONTGOMERY	IH 45	D SURFACE	DS1	7	99.4	0.60	98.6	100.2
14	BASTROP	SH 21	C SURFACE	1	6	99.3	0.43	98.9	100.0
14	BASTROP	SH 21	C SURFACE	2	15	99.0	1.53	94.3	101.0
14	BASTROP	SH 71	D SURFACE	2	18	98.4	0.69	96.9	99.2
14	BLANCO	US 281	C SURFACE	DS3	9	98.9	0.33	97.6	100.3
14	TRAVIS	IH 35	A LEVEL UP	2	37	97.9	0.81	96.5	99.7
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	99.5	0.79	98.2	101.5
18	DALLAS	IH 635	C LEVEL UP	2449-B	14	97.8	0.52	96.7	98.6
18	NAVARRO	FM 1603	G BASE/SURF	G3	13	95.6	0.59	95.0	97.3
19	CASS	SH 59	D 4 COURSES	1	44	98.2	0.69	97.1	99.4
20	TYLER	US 69	G SURFACE	1	19	99.0	0.38	98.3	99.6
23	LAMPASAS	US 190	D SURFACE	1D	25	99.5	0.56	98.4	100.8
			COUNT =		24	24	24	24	24
			MAX =		44	102.3	3.38	100.3	110.6
			MIN =		5	95.6	0.20	94.3	97.3
			AVG =		14	98.7	0.81	97.4	100.1
			STD =		10	1.2	0.63	1.3	2.4

LAB DENSITY DATA (Gl/Gt)-DESIGN
TYPE A MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
14	TRAVIS	IH 35	A LEVEL UP	2	37	97.9	0.81	96.5	99.7
			COUNT =		1	1	1	1	1
			MAX =		37	97.9	0.81	96.5	99.7
			MIN =		37	97.9	0.81	96.5	99.7
			AVG =		37	97.9	0.81	96.5	99.7
			STD =		0	0.0	0.00	0.0	0.0

LAB DENSITY DATA (Gl/Gt)-DESIGN
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	LAMAR	SH 19	SURFACE	DS3	8	98.8	0.20	98.5	99.1
14	BASTROP	SH 21	SURFACE	1	6	99.3	0.43	98.9	100.0
14	BASTROP	SH 21	SURFACE	2	15	99.0	1.53	94.3	101.0
14	BLANCO	US 281	SURFACE	DS3	9	98.9	0.93	97.6	100.3
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	99.5	0.79	98.2	101.5
18	DALLAS	IH 635	LEVEL UP	2449-B	14	97.8	0.52	96.7	98.6
				COUNT =	6	6	6	6	6
				MAX =	15	99.5	1.53	98.9	101.5
				MIN =	6	97.8	0.20	94.3	98.6
				AVG =	11	98.9	0.73	97.4	100.1
				STD =	4	0.6	0.47	1.7	1.1

LAB DENSITY DATA (Gl/Gt)-DESIGN
TYPE D MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
1	FANNIN	US 82	LEVEL UP	DS3	21	98.8	0.55	97.7	100.1
1	HUNT	SH 50	SURFACE	DS3	15	98.7	1.31	95.6	100.0
1	LAMAR	US 82	SURFACE	1	5	98.7	0.42	98.2	99.3
3	WICHITA	US 82	SURFACE	4	8	98.2	0.53	97.6	99.4
5	GARZA	US 84	SURFACE	1	6	97.1	0.89	96.0	98.2
8	NOLAN	IH 20	LEVEL UP		8	102.3	3.38	100.3	110.6
10	ANDERSON	US 287	SURFACE	DS3	23	97.9	0.50	97.0	98.8
12	GALVESTON	FM 1764	LEVEL UP	D1	8	99.2	1.29	96.4	100.9
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	99.7	0.66	98.5	100.9
12	MONTGOMERY	IH 45	SURFACE	DS1	7	99.4	0.60	98.6	100.2
14	BASTROP	SH 71	SURFACE	2	18	98.4	0.69	96.9	99.2
19	CASS	SH 59	4 COURSES	1	44	98.2	0.69	97.1	99.4
23	LAMPASAS	US 190	SURFACE	1D	25	99.5	0.56	98.4	100.8
				COUNT =	13	13	13	13	13
				MAX =	44	102.3	3.38	100.3	110.6
				MIN =	5	97.1	0.42	95.6	98.2
				AVG =	15	98.9	0.93	97.6	100.6
				STD =	11	1.2	0.79	1.3	3.1

LAB DENSITY DATA (Gl/Gt)-DESIGN
TYPE G MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	AVG. %	STD. %	MIN. %	MAX. %
2	TARRANT	FM 1886	SURFACE	631	5	98.3	0.68	97.8	99.2
2	TARRANT	IH 20	SURFACE	662	5	98.8	0.43	98.1	99.1
18	NAVARRO	FM 1603	BASE/SURF	G3	13	95.6	0.59	95.0	97.3
20	TYLER	US 69	SURFACE	1	19	99.0	0.38	98.3	99.6
			COUNT =		4	4	4	4	4
			MAX =		19	99.0	0.68	98.3	99.6
			MIN =		5	95.6	0.38	95.0	97.3
			AVG =		11	97.9	0.52	97.3	98.8
			STD =		7	1.6	0.14	1.5	1.0

APPENDIX O

Lab VMA and PVF
Data by mixture type for each project.

LAB VMA & % VOIDS FILLED DATA
ALL MIXTURES

DIST	COUNTY	PROJECT	TYPE	DESIGN #	N	VMA DATA AVG.	STD.	MIN.	MAX.	% VOIDS FILLED AVG.	STD.	MIN.	MAX.
1	FANNIN	US 82	D LEVEL UP	DS3	21	14.3	0.58	13.5	15.4	85.9	3.63	80.0	86.3
1	HUNT	SH 50	D SURFACE	DS3	15	13.6	1.15	12.4	16.2	83.6	8.03	66.1	90.6
1	LAMAR	SH 19	C SURFACE	DS3	8	13.6	0.23	13.3	14.0	82.9	0.75	82.2	84.4
1	LAMAR	US 82	D SURFACE	1	5	14.5	0.42	14.1	15.0	80.8	2.45	77.2	83.6
2	TARRANT	FM 1886	G SURFACE	631	5	14.8	0.55	14.0	15.3	73.5	5.05	69.3	82.1
2	TARRANT	IH 20	G SURFACE	662	5	13.1	0.41	12.7	13.7	84.5	3.03	79.6	86.7
3	WICHITA	US 82	D SURFACE	4	8	13.9	0.53	12.6	14.3	74.6	3.55	70.0	81.0
5	GARZA	US 84	D SURFACE	1	6	15.0	0.21	14.7	15.3	77.4	5.48	72.2	86.9
8	NOLAN	IH 20	D LEVEL UP		7	11.3	0.36	10.9	11.8	71.4	4.34	64.3	76.7
10	ANDERSON	US 287	D SURFACE	DS3	23	14.7	0.51	13.6	15.5				
12	GALVESTON	FM 1764	D LEVEL UP	D1	8	12.5	1.30	10.5	15.1	79.3	6.53	64.8	86.2
12	MONTGOMERY	FM 1314	D SURFACE	DS1	13	12.2	0.53	11.5	13.1	74.5	5.88	65.6	88.7
12	MONTGOMERY	IH 45	D SURFACE	DS1	7	12.9	0.80	12.1	13.9	63.0	5.44	52.7	68.4
14	BASTROP	SH 21	C SURFACE	1	6	11.7	0.42	11.0	12.1	80.8	3.39	77.0	85.9
14	BASTROP	SH 21	C SURFACE	2	15	11.9	1.28	10.3	15.9	83.7	6.32	74.0	97.1
14	BASTROP	SH 71	D SURFACE	2	18	13.1	0.38	12.6	14.1	83.2	5.70	71.4	90.6
14	BLANCO	US 281	C SURFACE	DS3	9	12.0	0.79	10.5	13.1	79.8	6.54	67.6	89.6
14	TRAVIS	IH 35	A LEVEL UP	2	37	12.0	0.74	10.5	13.6	77.5	6.63	65.2	92.4
14	TRAVIS	IH35-FRONTAGE	C SURFACE	DS3	15	11.4	0.61	9.9	12.1	82.1	4.97	74.9	96.0
18	DALLAS	IH 635	C LEVEL UP	2449-B	14	12.6	0.53	11.7	13.7				
18	NAVARRO	FM 1603	G BASE/SURF	G3	13	15.0	0.52	13.6	15.7				
19	CASS	SH 59	D 4 COURSES	1	44	12.8	0.54	11.7	13.6	75.2	6.08	66.2	83.7
20	TYLER	US 69	G SURFACE	1	19	11.8	0.35	11.3	12.4	80.9	3.15	74.8	87.0
23	LAMPASAS	US 190	D SURFACE	1D	24	12.3	0.51	11.2	13.2	78.5	4.52	70.6	87.5
				COUNT =	24	24	24	24	24	21	21	21	21
				MAX =	44	15.0	1.30	14.7	16.2	85.9	8.03	82.2	97.1
				MIN =	5	11.3	0.21	9.9	11.8	63.0	0.75	52.7	68.4
				AVG =	14	13.0	0.59	12.1	14.1	78.7	4.83	70.7	86.7
				STD =	10	1.2	0.29	1.4	1.3	5.4	1.73	6.8	6.6

LAB VMA & % VOIDS FILLED DATA
TYPE A MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	VMA DATA AVG.	STD.	MIN.	MAX.	% VOIDS FILLED AVG.	STD.	MIN.	MAX.
14	TRAVIS	IH 35	A LEVEL UP	2	37	12.0	0.74	10.5	13.6	77.5	6.63	65.2	92.4
			COUNT =		1	1	1	1	1	1	1	1	1
			MAX =		37	12.0	0.74	10.5	13.6	77.5	6.63	65.2	92.4
			MIN =		37	12.0	0.74	10.5	13.6	77.5	6.63	65.2	92.4
			AVG =		37	12.0	0.74	10.5	13.6	77.5	6.63	65.2	92.4
			STD =		0	0.0	0.00	0.0	0.0	0.0	0.00	0.0	0.0

LAB VMA & % VOIDS FILLED DATA
TYPE C MIXTURES

DIST	COUNTY	PROJECT	LAYER	DESIGN #	N	VMA DATA AVG.	STD.	MIN.	MAX.	% VOIDS FILLED AVG.	STD.	MIN.	MAX.
1	LAMAR	SH 19	SURFACE	DS3	8	13.6	0.23	13.3	14.0	82.9	0.75	82.2	84.4
14	BASTROP	SH 21	SURFACE	1	6	11.7	0.42	11.0	12.1	80.8	3.39	77.0	85.9
14	BASTROP	SH 21	SURFACE	2	15	11.9	1.28	10.3	15.9	83.7	6.32	74.0	97.1
14	BLANCO	US 281	SURFACE	DS3	9	12.0	0.79	10.5	13.1	79.8	6.54	67.6	89.6
14	TRAVIS	IH35-FRONTAGE	SURFACE	DS3	15	11.4	0.61	9.9	12.1	82.1	4.97	74.9	96.0
18	DALLAS	IH 635	LEVEL UP	2449-B	14	12.6	0.53	11.7	13.7				
				COUNT =	6	6	6	6	6	5	5	5	5
				MAX =	15	13.6	1.28	13.3	15.9	83.7	6.54	82.2	97.1
				MIN =	6	11.4	0.23	9.9	12.1	79.8	0.75	67.6	84.4
				AVG =	11	12.2	0.64	11.1	13.5	81.9	4.39	75.1	90.6
				STD =	4	0.8	0.36	1.2	1.4	1.6	2.39	5.3	5.8

LAB VMA & % VOIDS FILLED DATA
TYPE D MIXTURES

				DESIGN		VMA DATA				% VOIDS FILLED			
DIST	COUNTY	PROJECT	LAYER	#	N	AVG.	STD.	MIN.	MAX.	AVG.	STD.	MIN.	MAX.
1	FANNIN	US 82	LEVEL UP	DS3	21	14.3	0.58	13.5	15.4	85.9	3.63	80.0	96.3
1	HUNT	SH 50	SURFACE	DS3	15	13.6	1.15	12.4	16.2	83.6	8.03	56.1	90.6
1	LAMAR	US 82	SURFACE	1	5	14.5	0.42	14.1	15.0	80.8	2.45	77.2	83.6
3	WICHITA	US 82	SURFACE	4	8	13.9	0.53	12.6	14.3	74.6	3.55	70.0	81.0
5	GARZA	US 84	SURFACE	1	6	15.0	0.21	14.7	15.3	77.4	5.48	72.2	86.9
8	NOLAN	IH 20	LEVEL UP		7	11.3	0.36	10.9	11.8	71.4	4.34	64.3	76.7
10	ANDERSON	US 287	SURFACE	DS3	23	14.7	0.51	13.6	15.5				
12	GALVESTON	FM 1764	LEVEL UP	D1	8	12.5	1.30	10.5	15.1	79.3	6.53	64.8	86.2
12	MONTGOMERY	FM 1314	SURFACE	DS1	13	12.2	0.53	11.5	13.1	74.5	5.88	65.6	88.7
12	MONTGOMERY	IH 45	SURFACE	DS1	7	12.9	0.80	12.1	13.9	63.0	5.44	52.7	68.4
14	BASTROP	SH 71	SURFACE	2	18	13.1	0.38	12.6	14.1	83.2	5.70	71.4	90.6
19	CASS	SH 59	4 COURSES	1	44	12.8	0.54	11.7	13.6	75.2	6.08	66.2	83.7
23	LAMPASAS	US 190	SURFACE	1D	24	12.3	0.51	11.2	13.2	78.5	4.52	70.6	87.5
			COUNT =		13	13	13	13	13	12	12	12	12
			MAX =		44	15.0	1.30	14.7	16.2	85.9	8.03	80.0	96.3
			MIN =		5	11.3	0.21	10.5	11.8	63.0	2.45	52.7	68.4
			AVG =		15	13.3	0.60	12.4	14.3	77.3	5.14	68.4	85.0
			STD =		11	1.1	0.31	1.3	1.2	6.2	1.52	7.0	7.3

LAB VMA & % VOIDS FILLED DATA
TYPE G MIXTURES

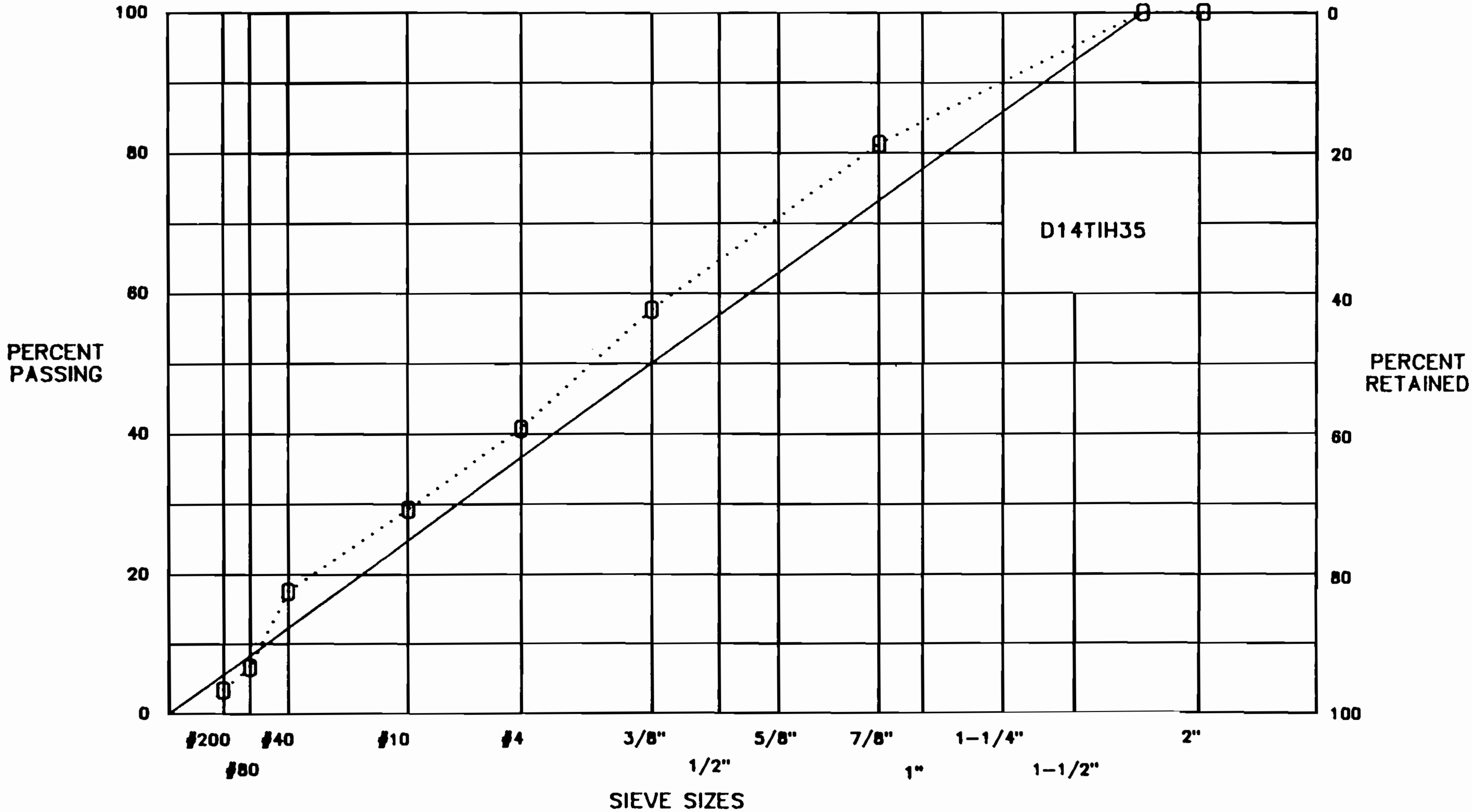
				DESIGN		VMA DATA				% VOIDS FILLED			
DIST	COUNTY	PROJECT	LAYER	#	N	AVG.	STD.	MIN.	MAX.	AVG.	STD.	MIN.	MAX.
2	TARRANT	FM 1886	SURFACE	631	5	14.8	0.55	14.0	15.3	73.5	5.05	69.3	82.1
2	TARRANT	IH 20	SURFACE	662	5	13.1	0.41	12.7	13.7	84.5	3.03	79.6	86.7
18	NAVARRO	FM 1603	BASE/SURF	G3	13	15.0	0.52	13.6	15.7				
20	TYLER	US 69	SURFACE	1	19	11.8	0.35	11.3	12.4	80.9	3.15	74.8	87.0
			COUNT =		4	4	4	4	4	3	3	3	3
			MAX =		19	15.0	0.55	14.0	15.7	84.5	5.05	79.6	87.0
			MIN =		5	11.8	0.35	11.3	12.4	73.5	3.03	69.3	82.1
			AVG =		11	13.7	0.46	12.9	14.3	79.6	3.74	74.6	85.3
			STD =		7	1.5	0.09	1.2	1.5	5.6	1.13	5.2	2.7

APPENDIX P

0.45 Power gradation charts

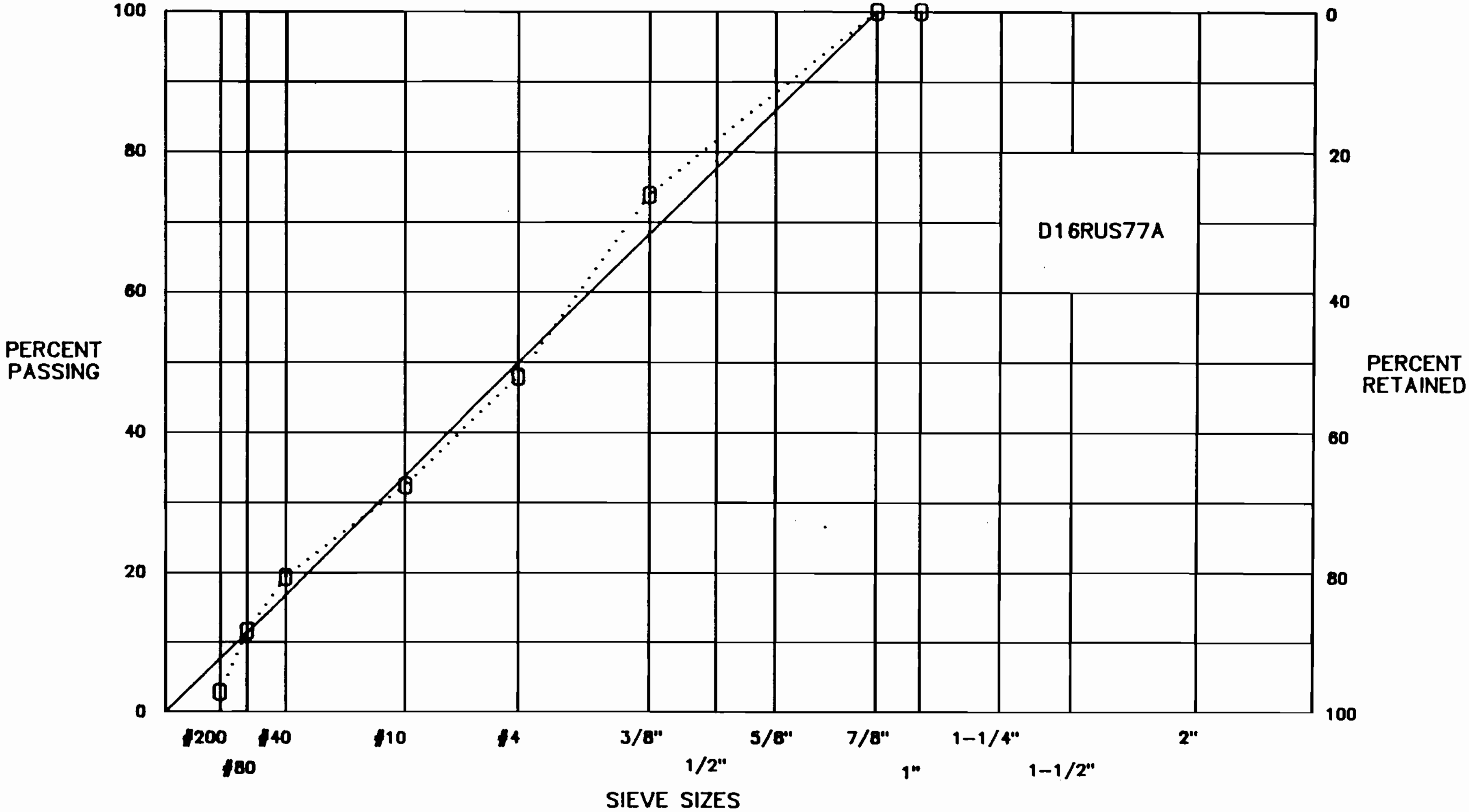
0.45 Power gradation charts
For Type A mixtures

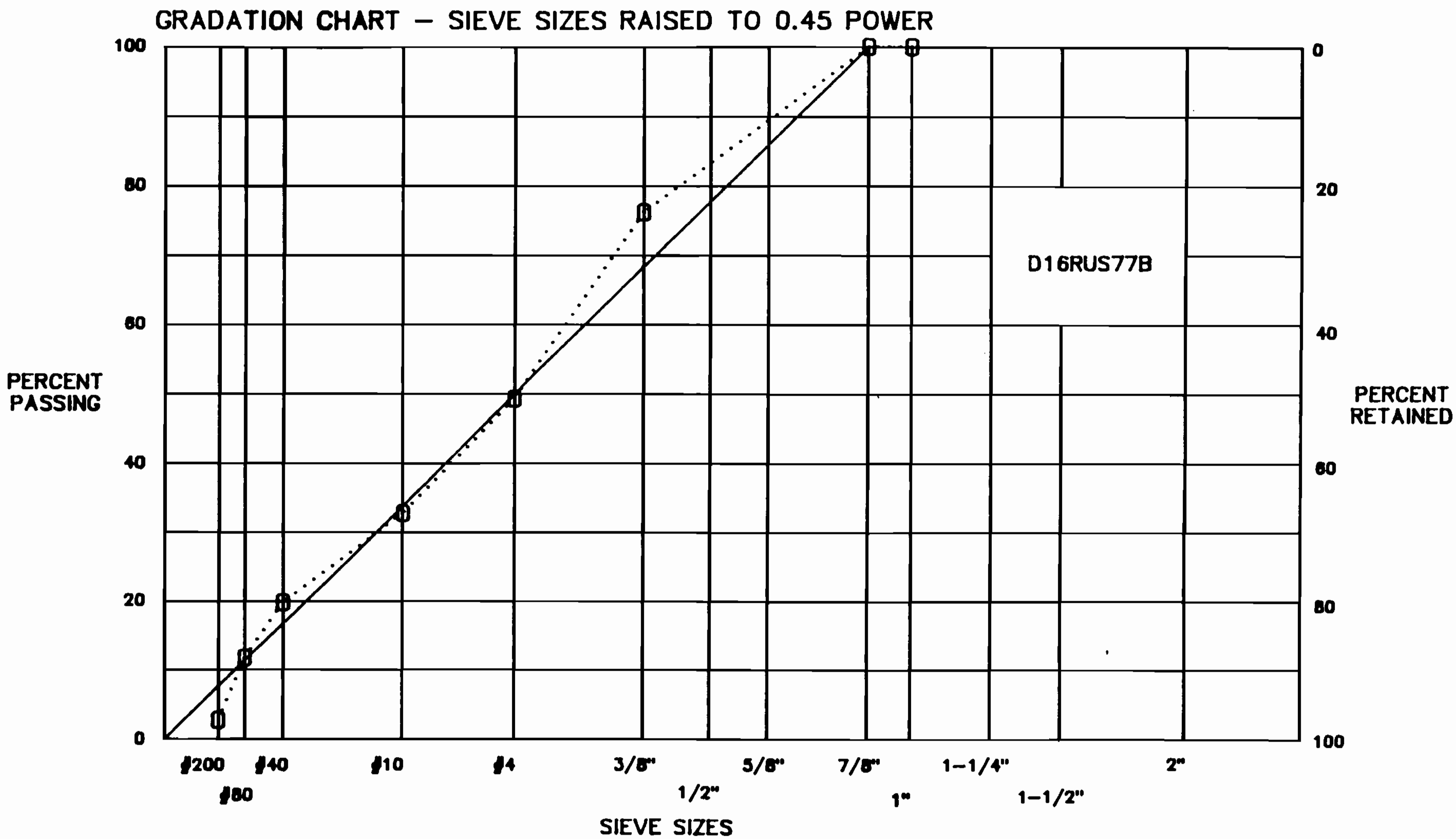
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



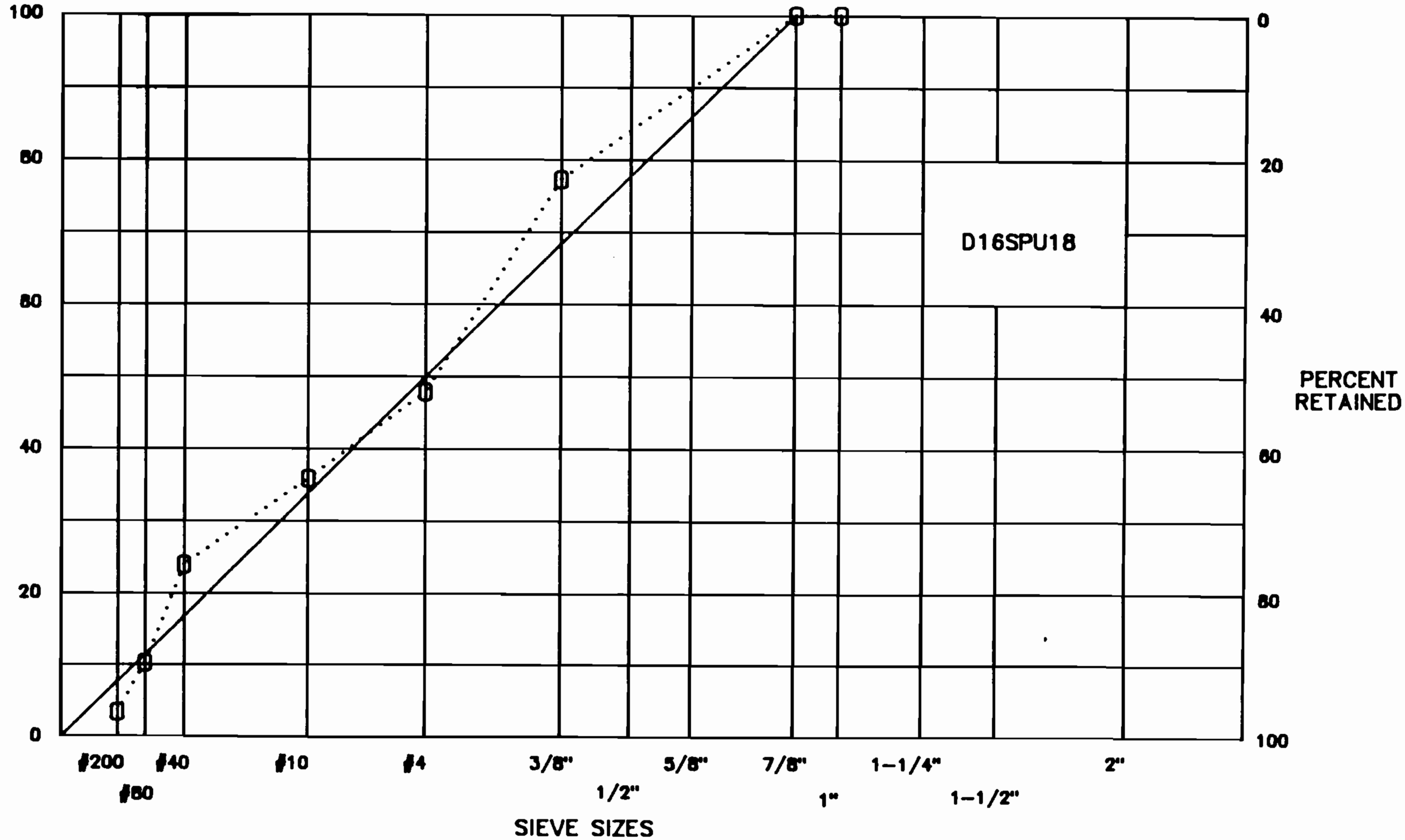
0.45 Power gradation charts
For Type B mixtures

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

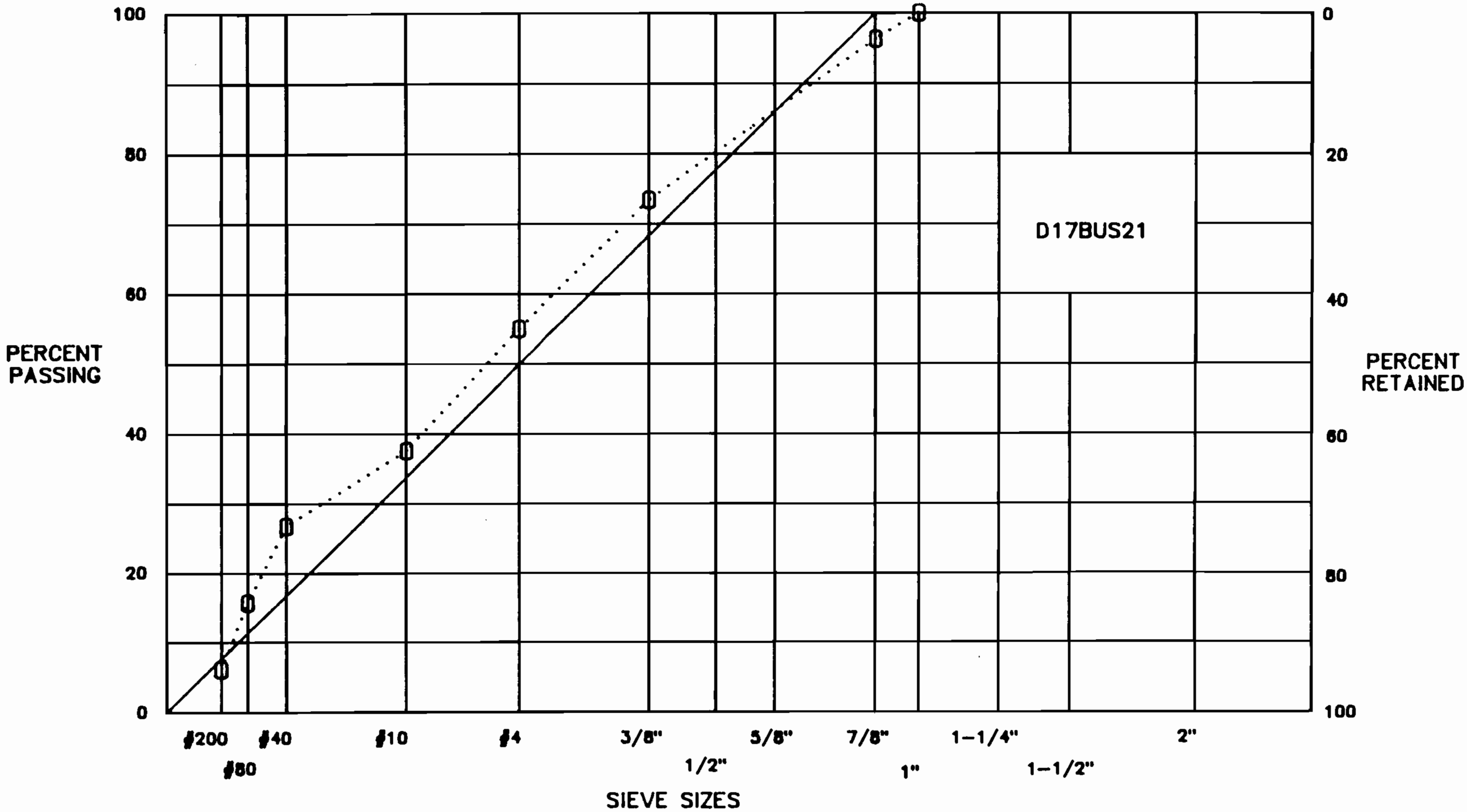



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
20
40
60
80
100
D16RUS77B
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

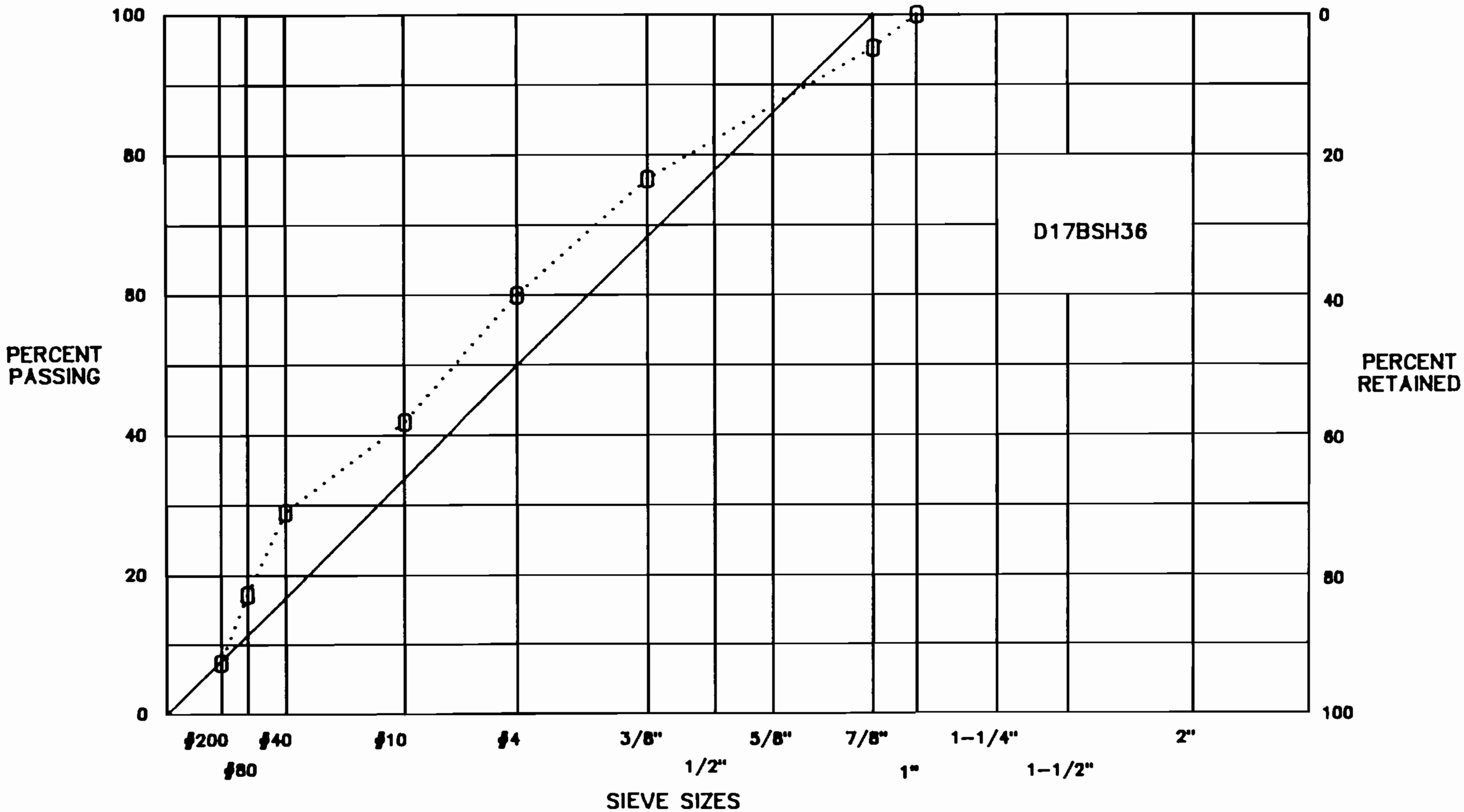
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



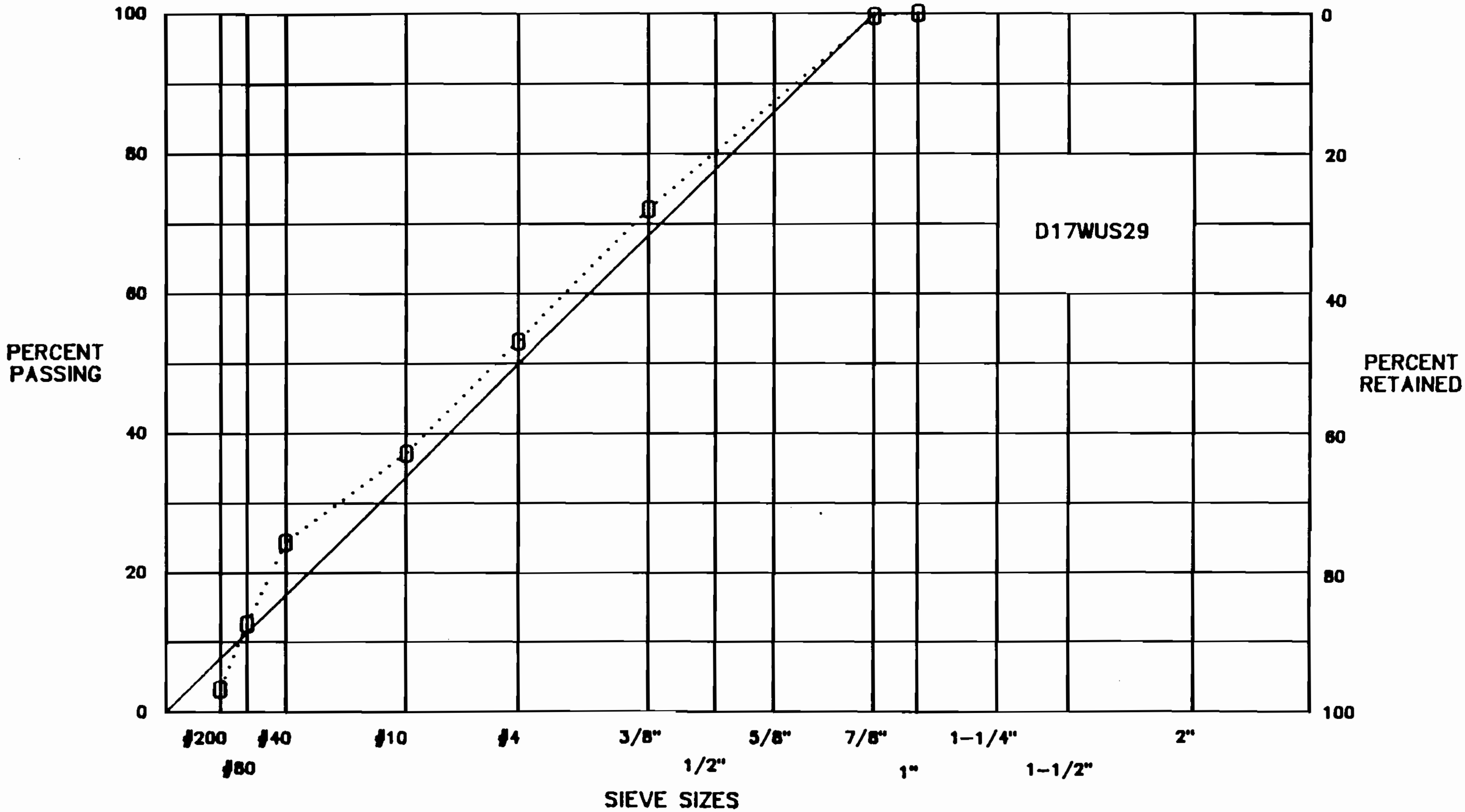
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



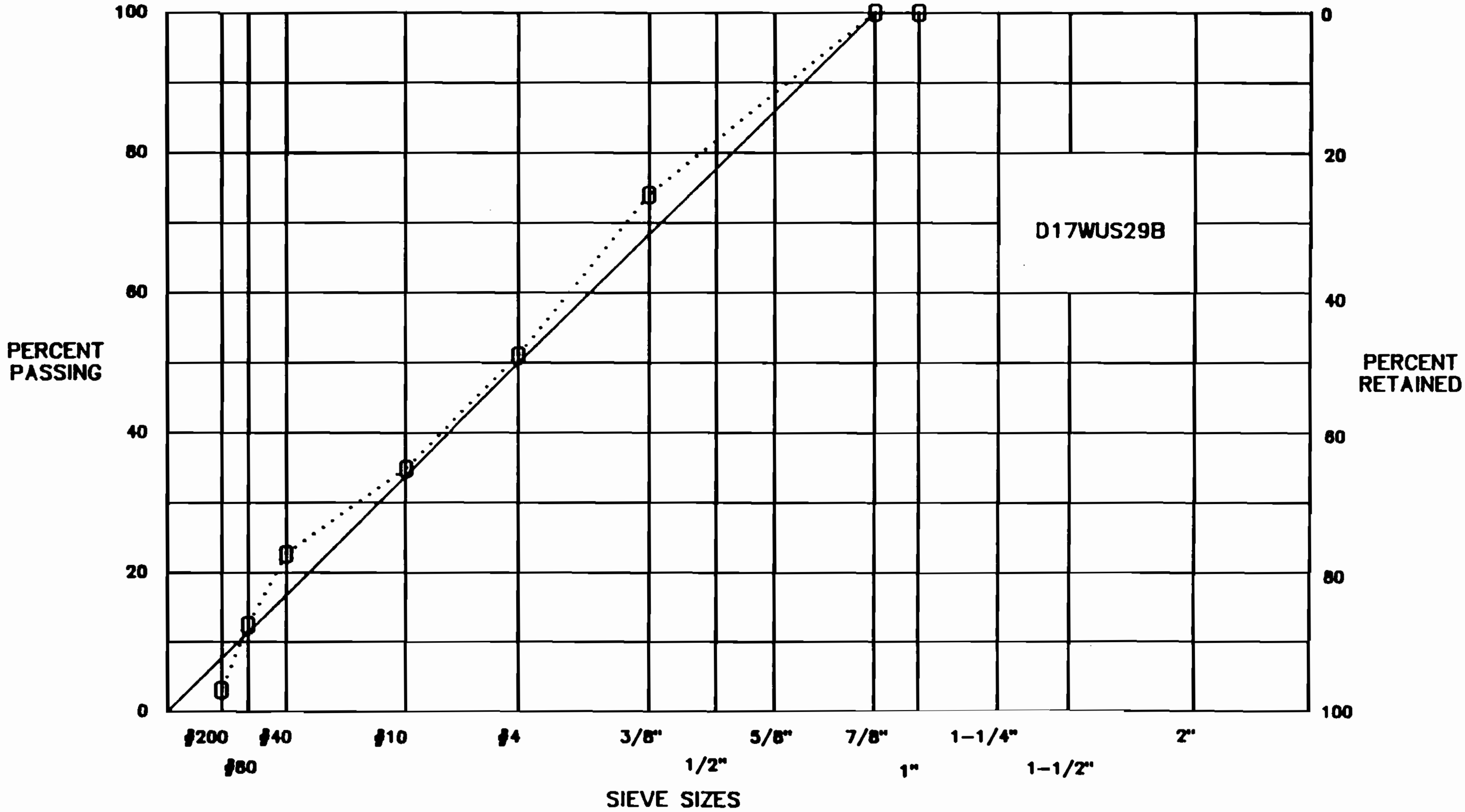
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



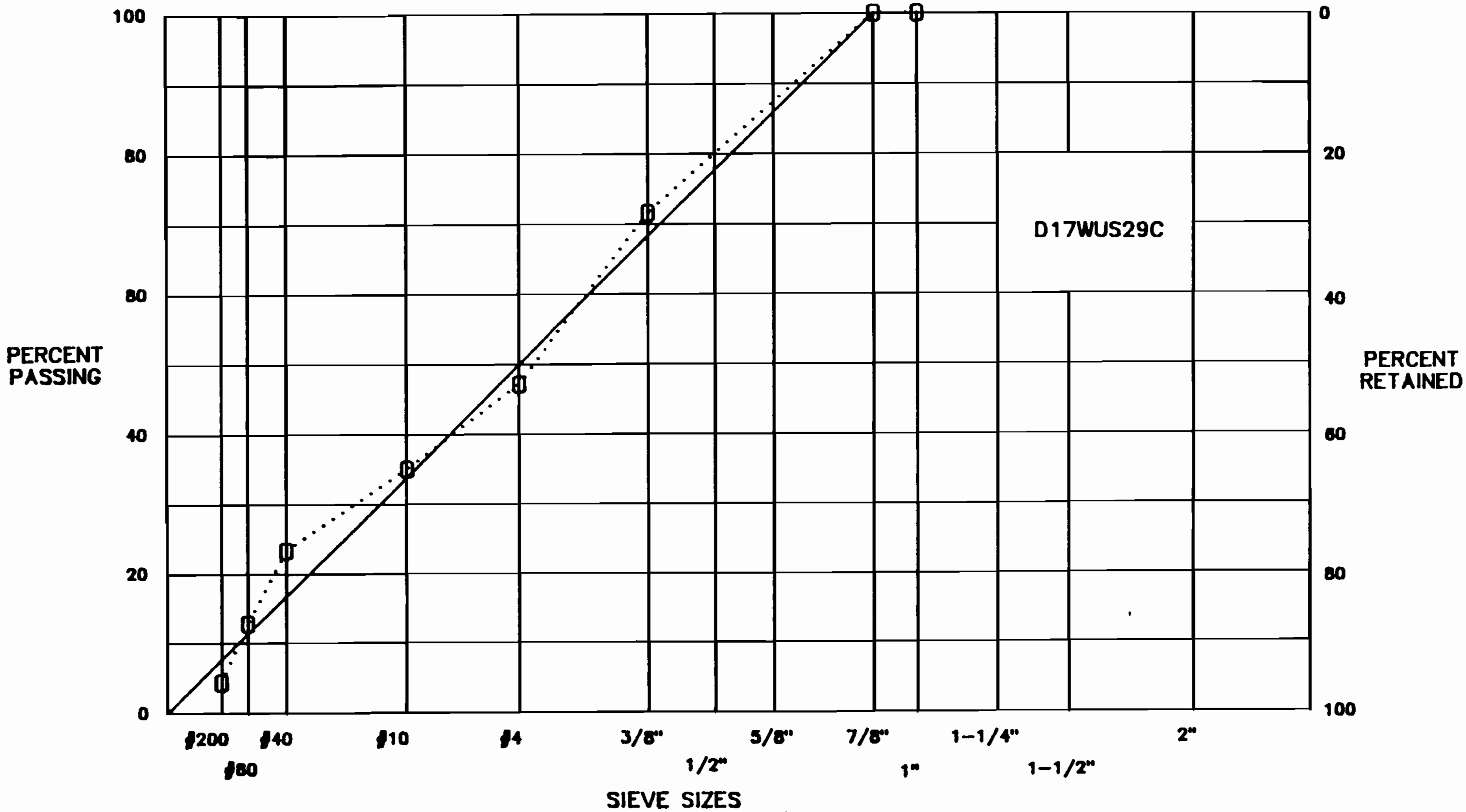
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

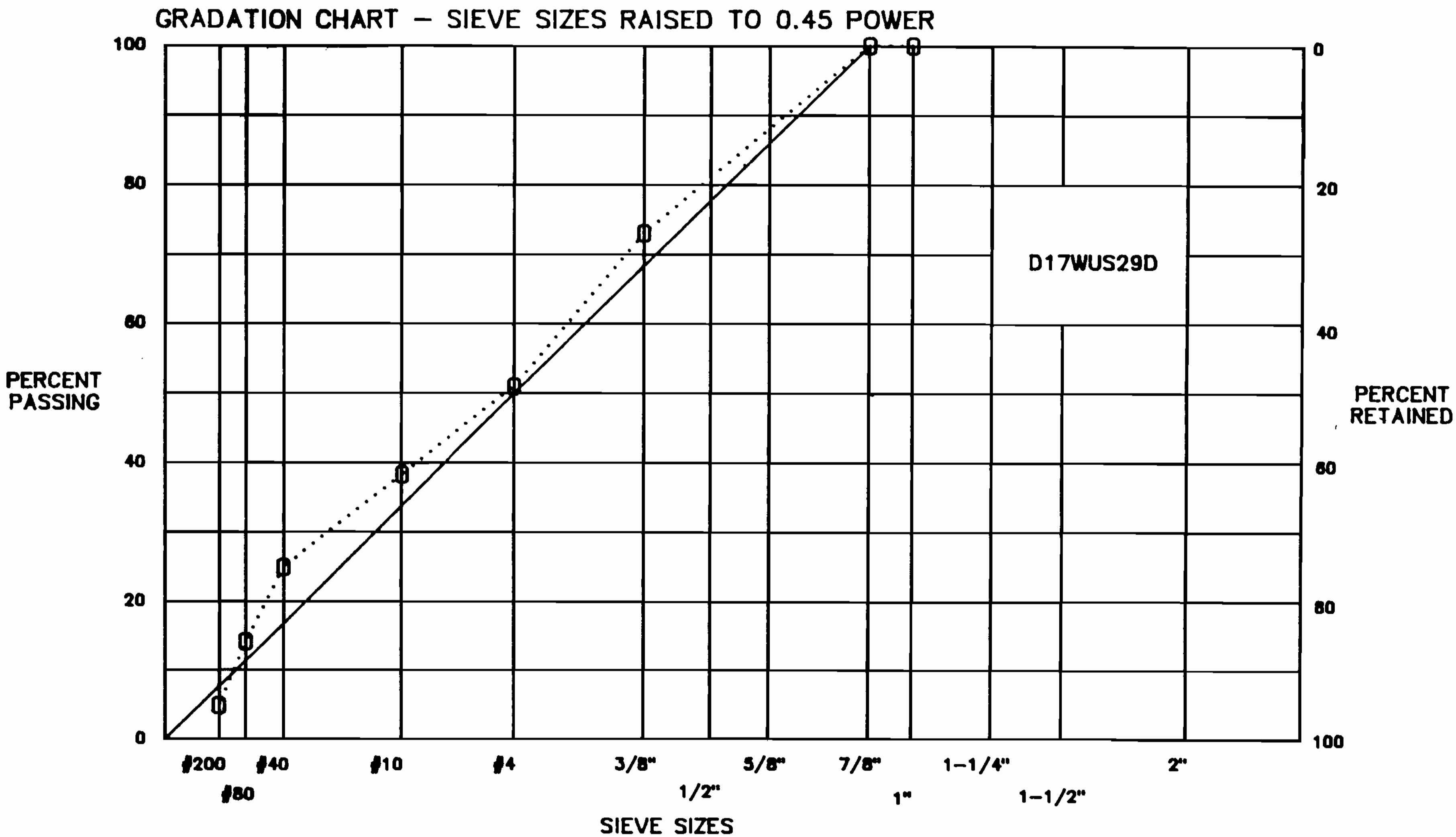


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

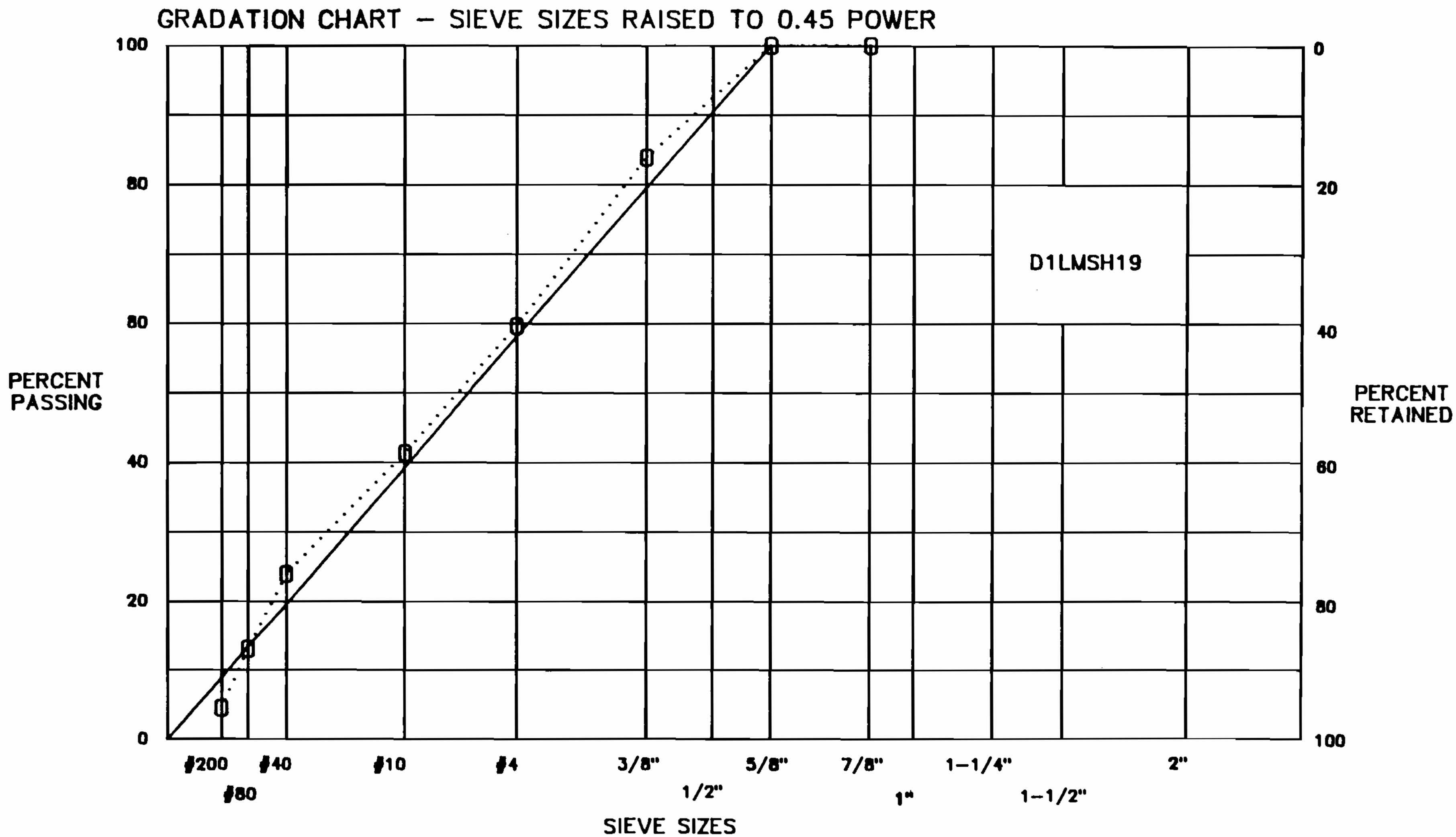


GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER



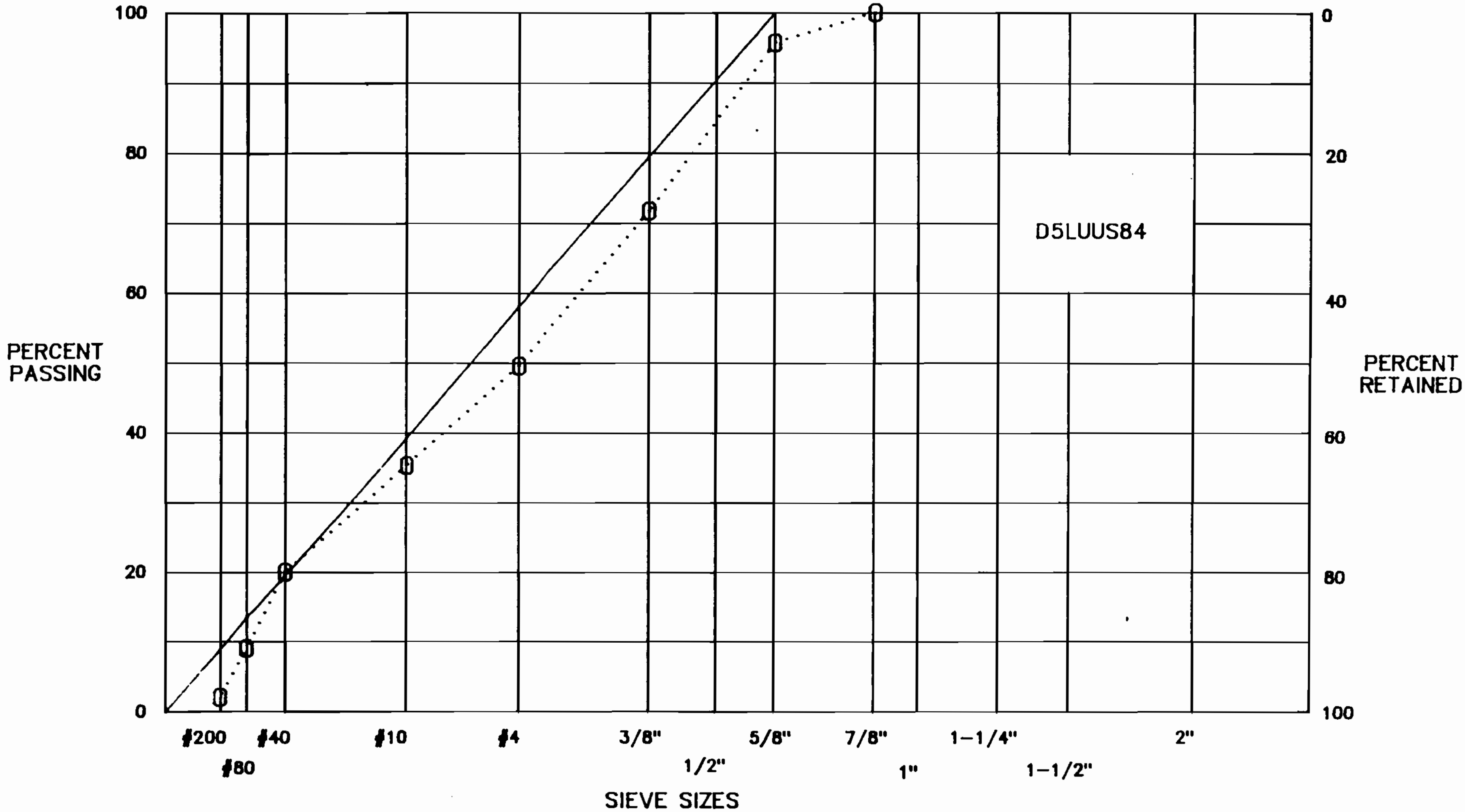

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
100
80
60
40
20
0
PERCENT RETAINED
0
20
40
60
80
100
D17WUS29D
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

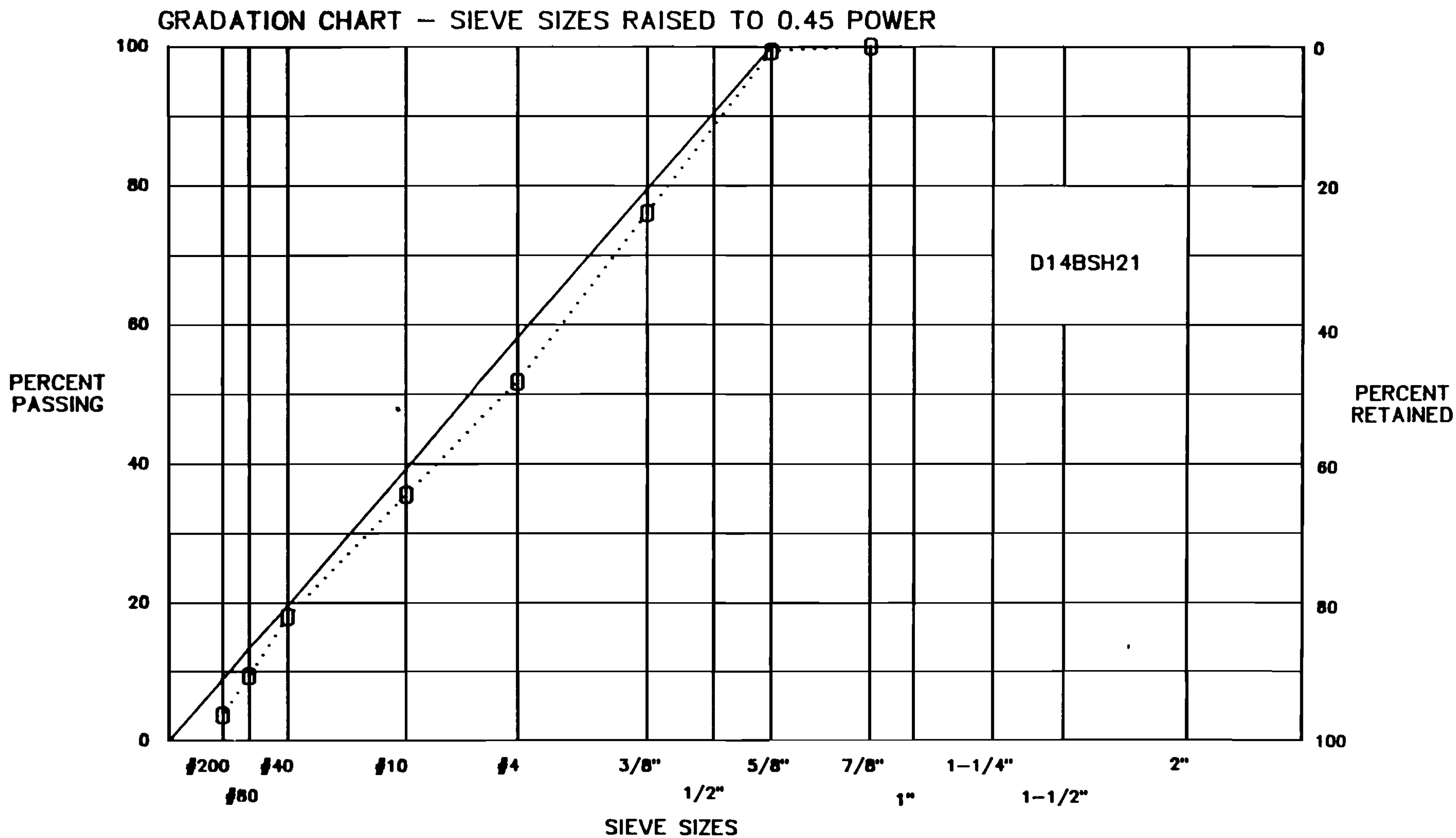
0.45 Power gradation charts
For Type C mixtures

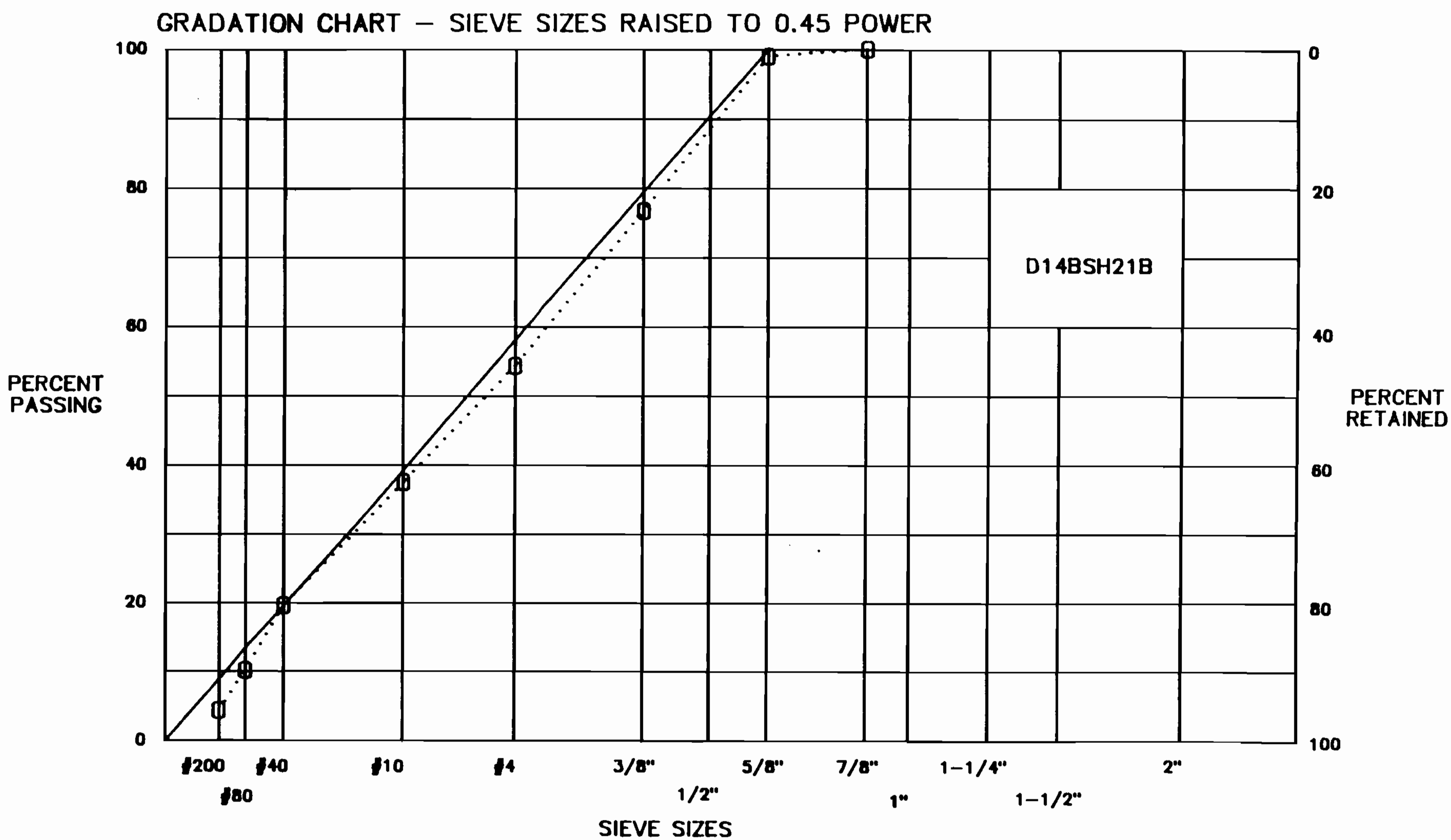


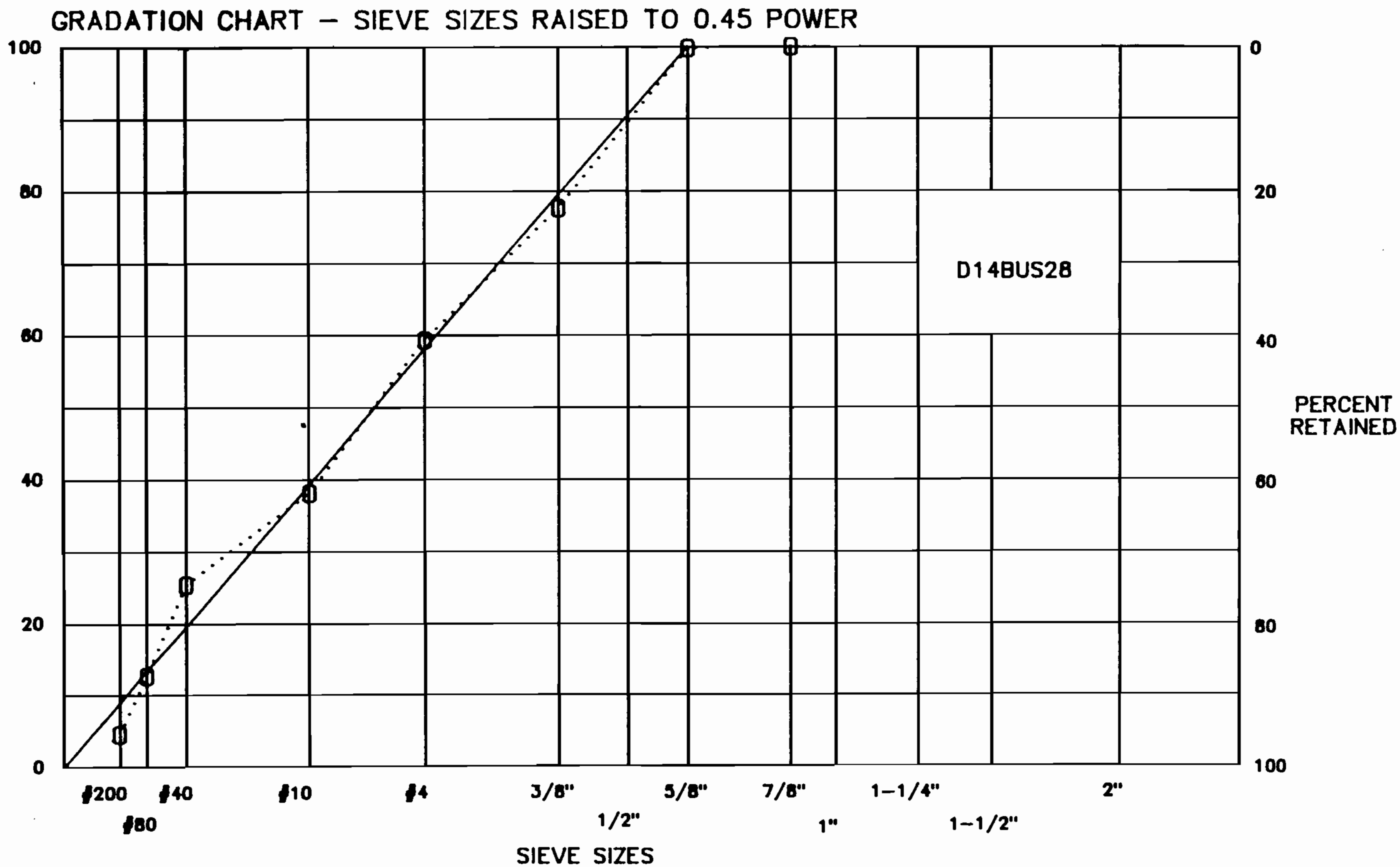
GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
D1LMSH19
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

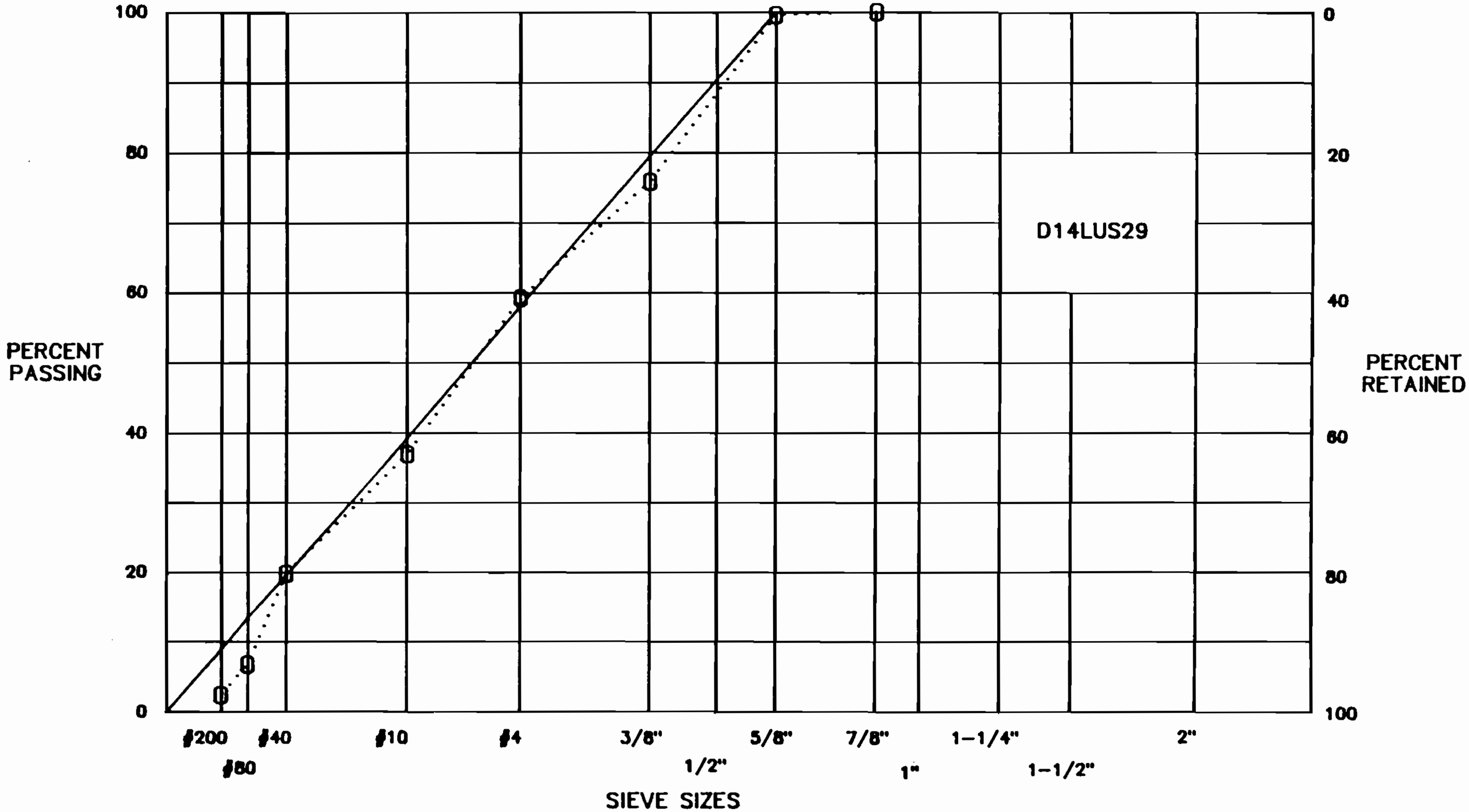



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
100
80
60
40
20
0
PERCENT PASSING
0
20
40
60
80
100
PERCENT RETAINED
D14BSH21
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

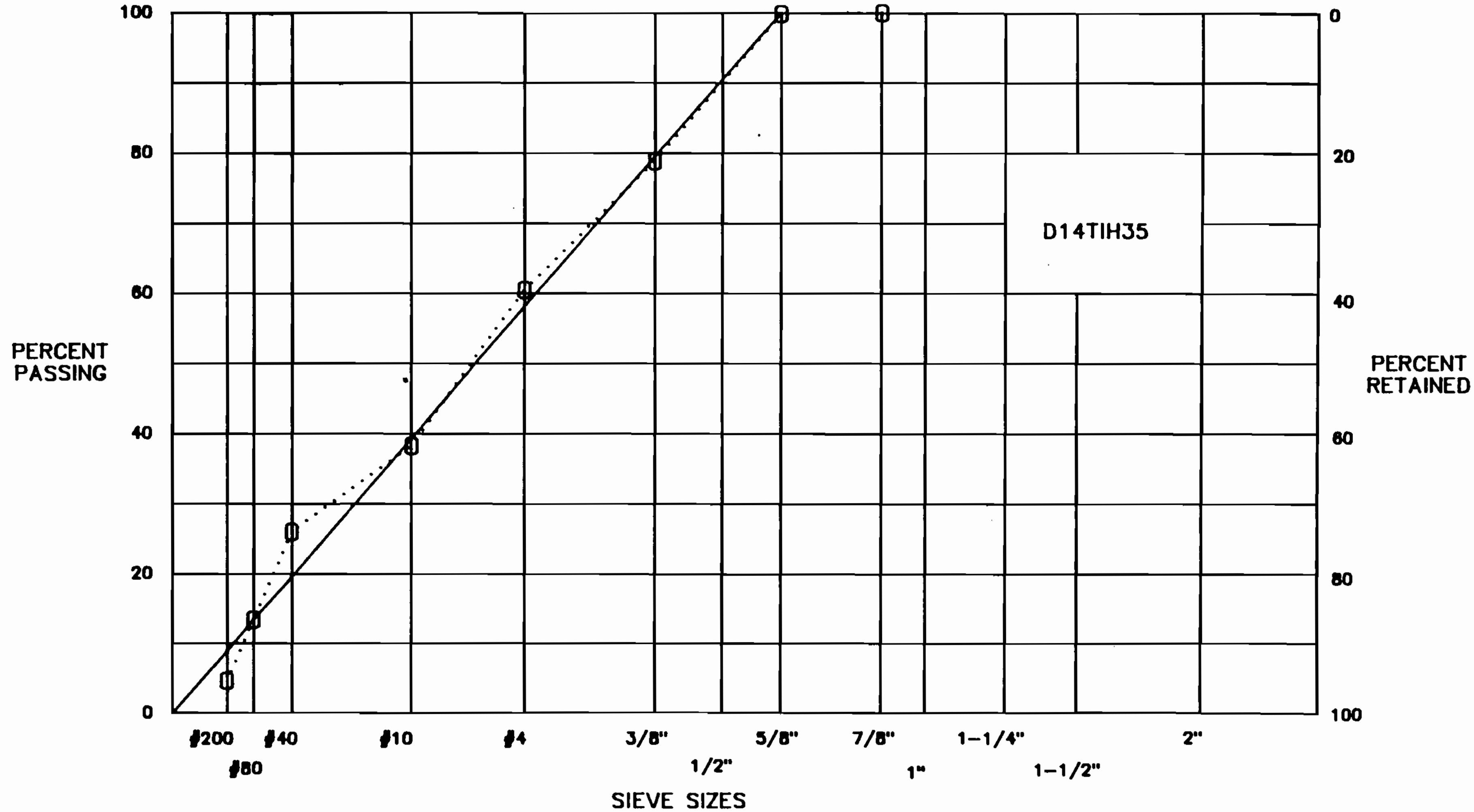

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
100
80
60
40
20
0
PERCENT RETAINED
0
20
40
60
80
100
D14BSH21B
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES


GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
D14BUS28
100
80
60
40
20
0
0
20
40
60
80
100
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

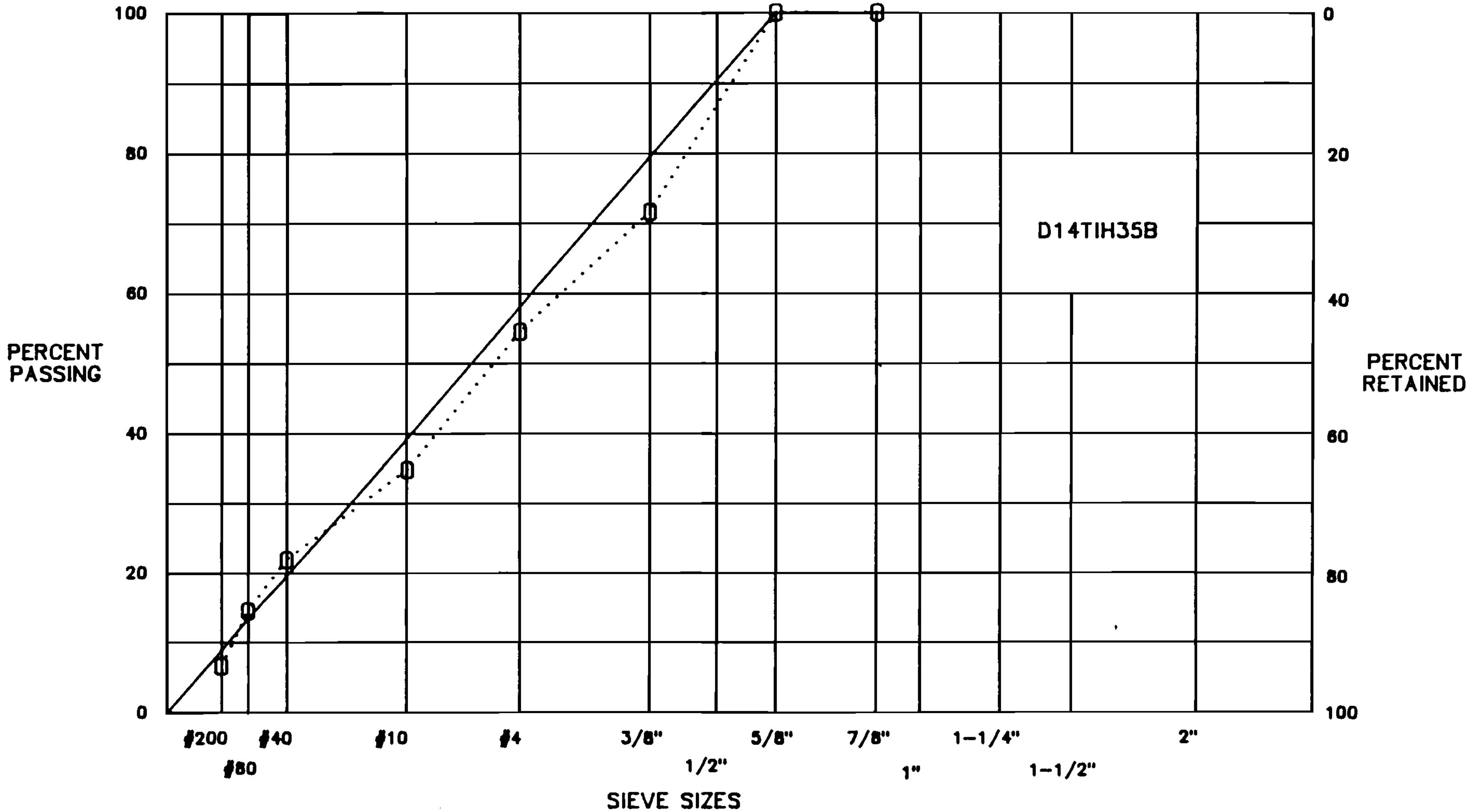
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



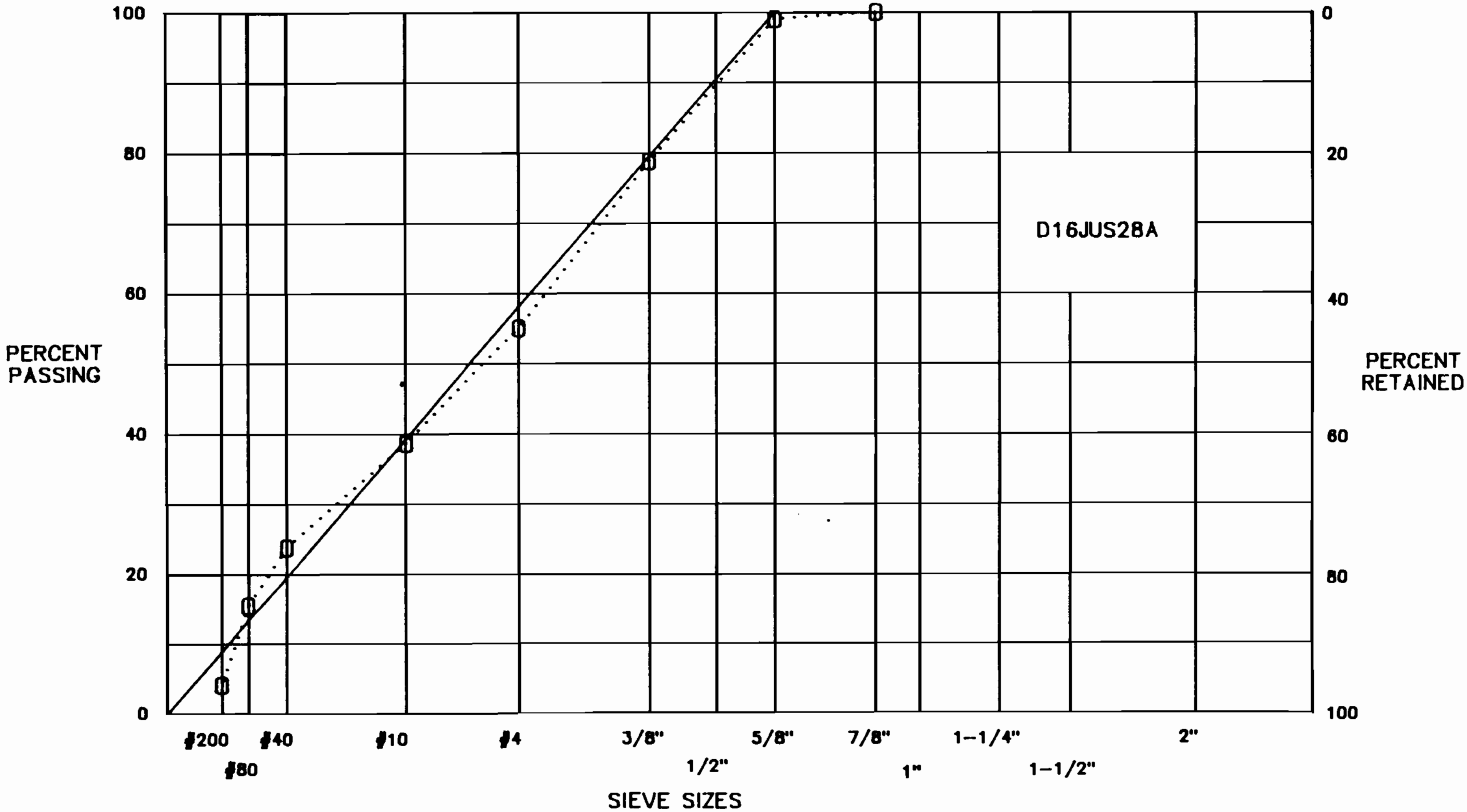
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



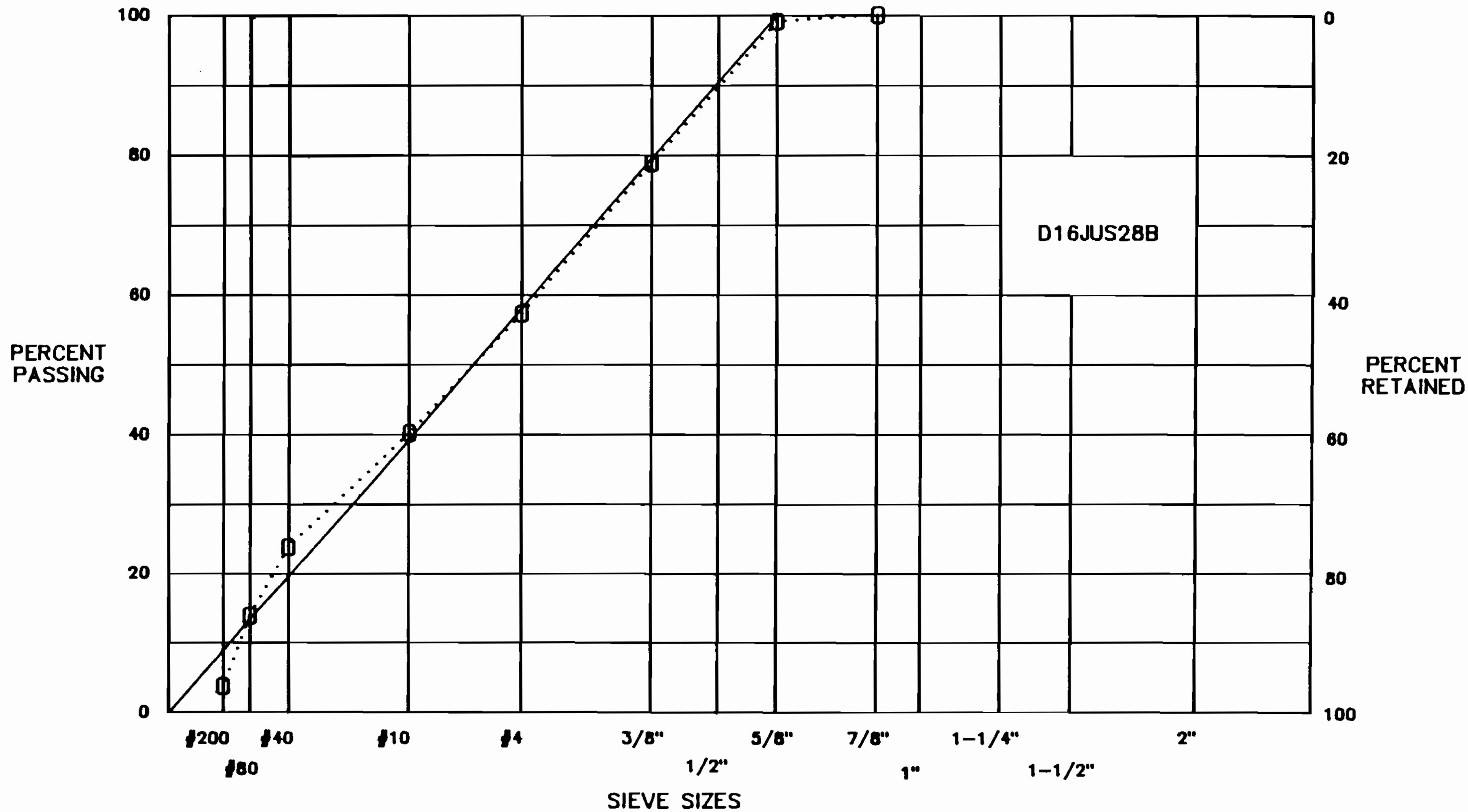
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



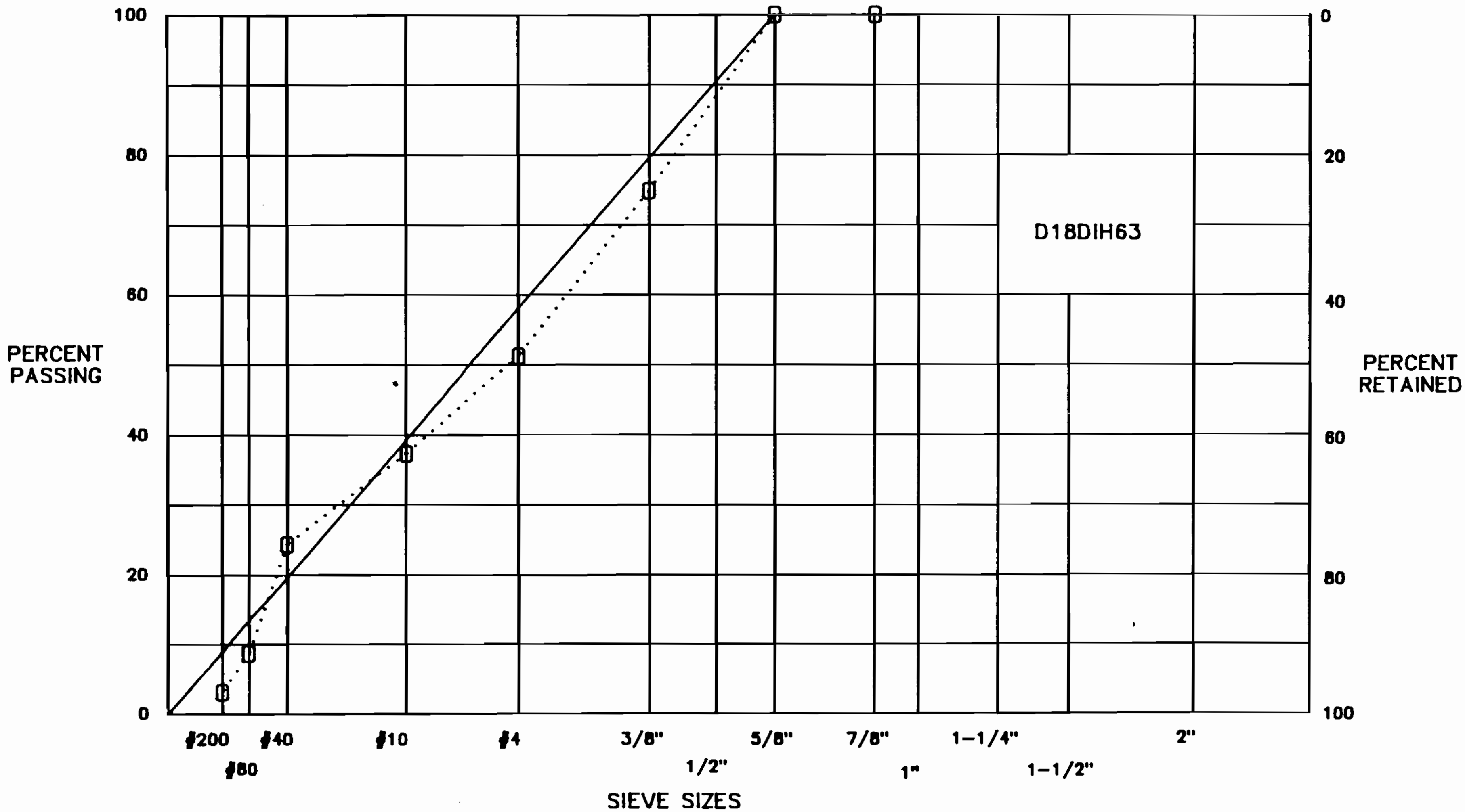
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



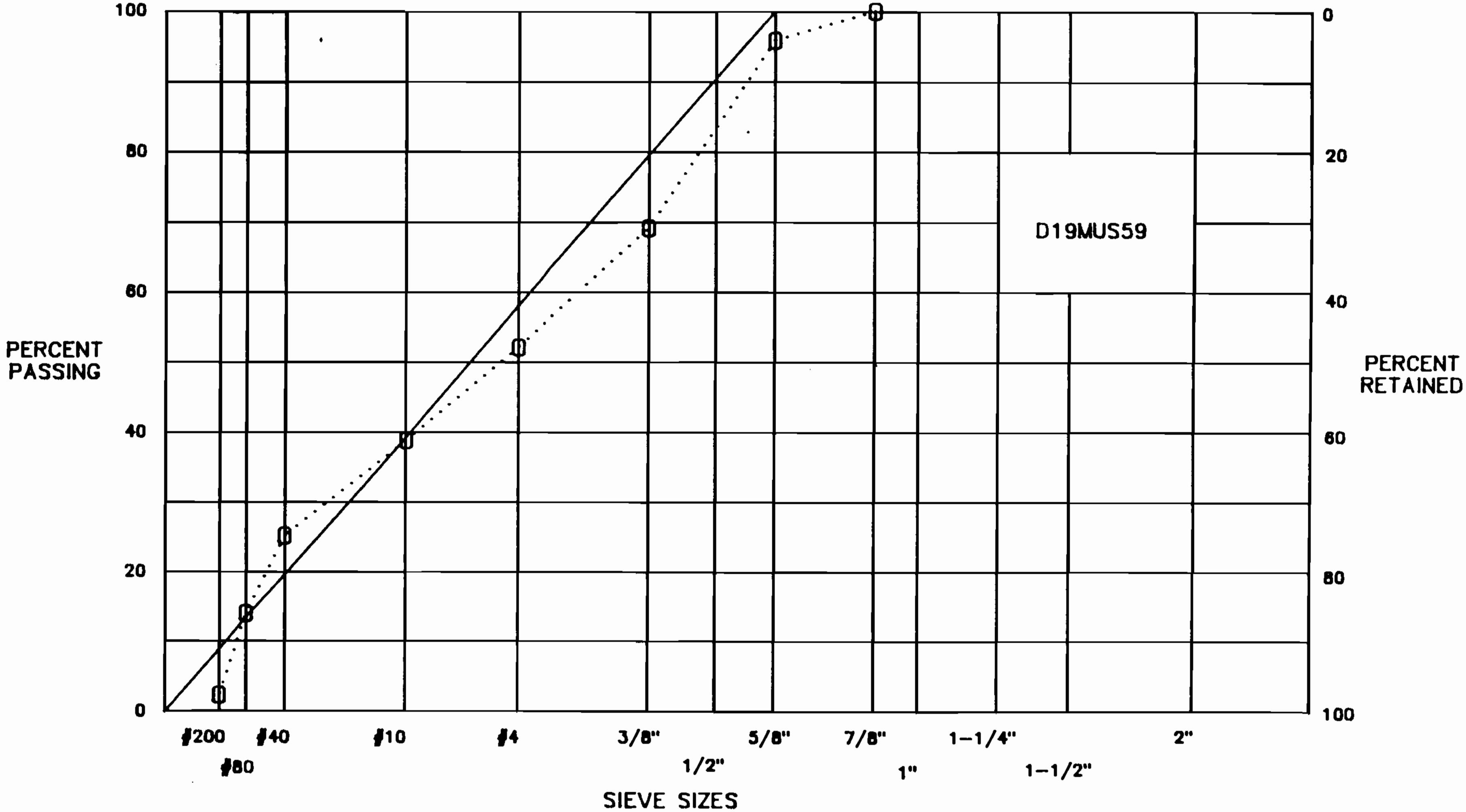
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



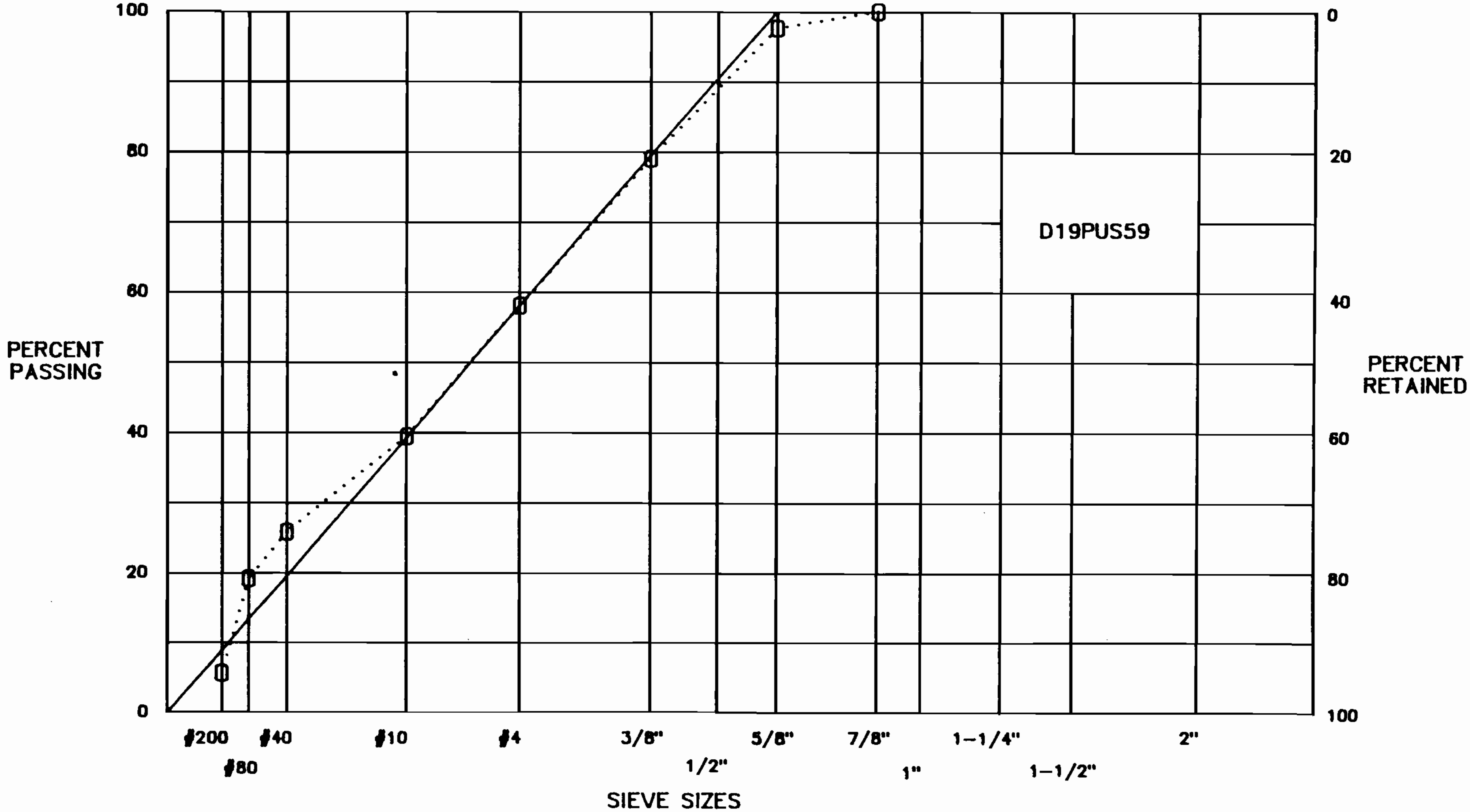
GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

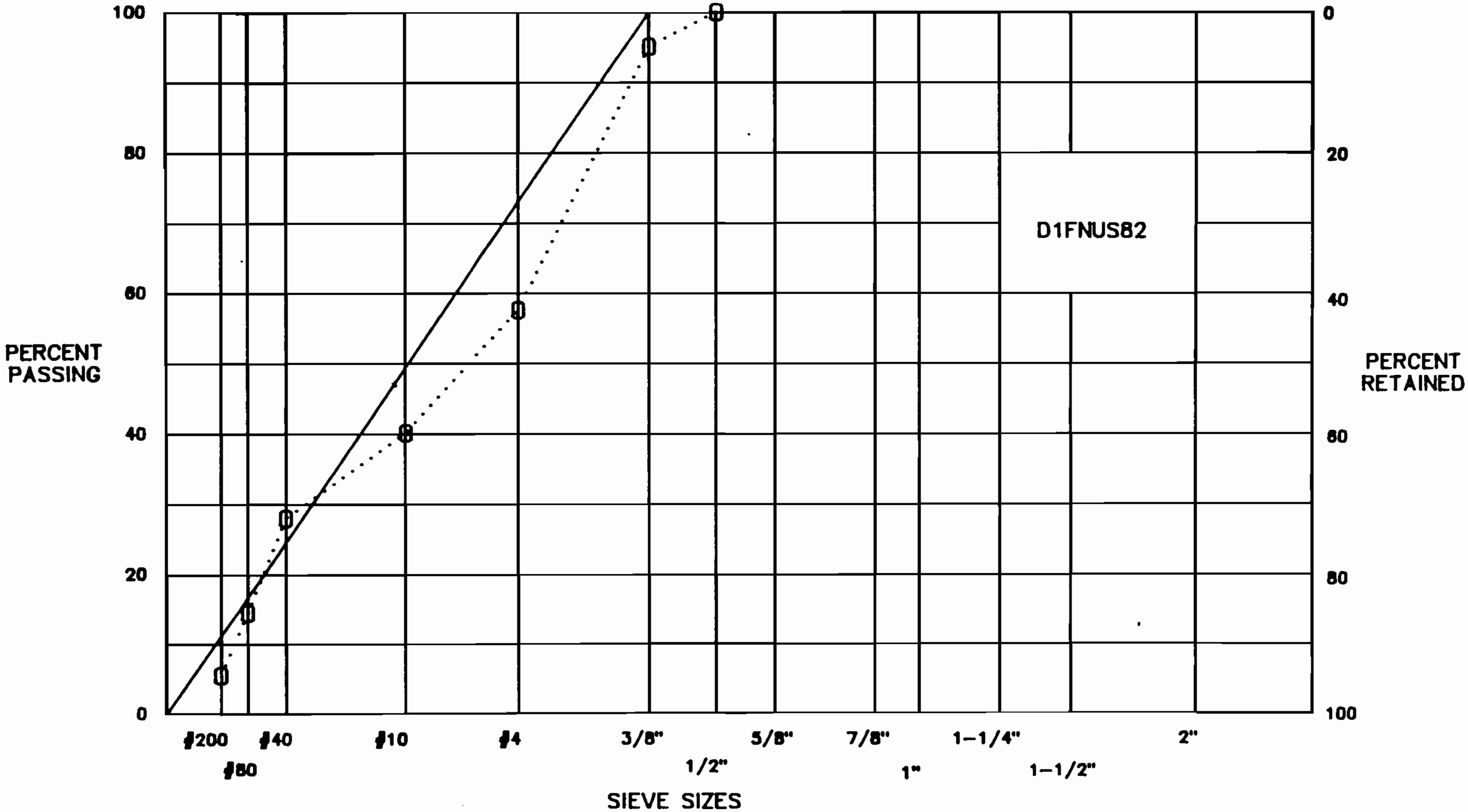


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

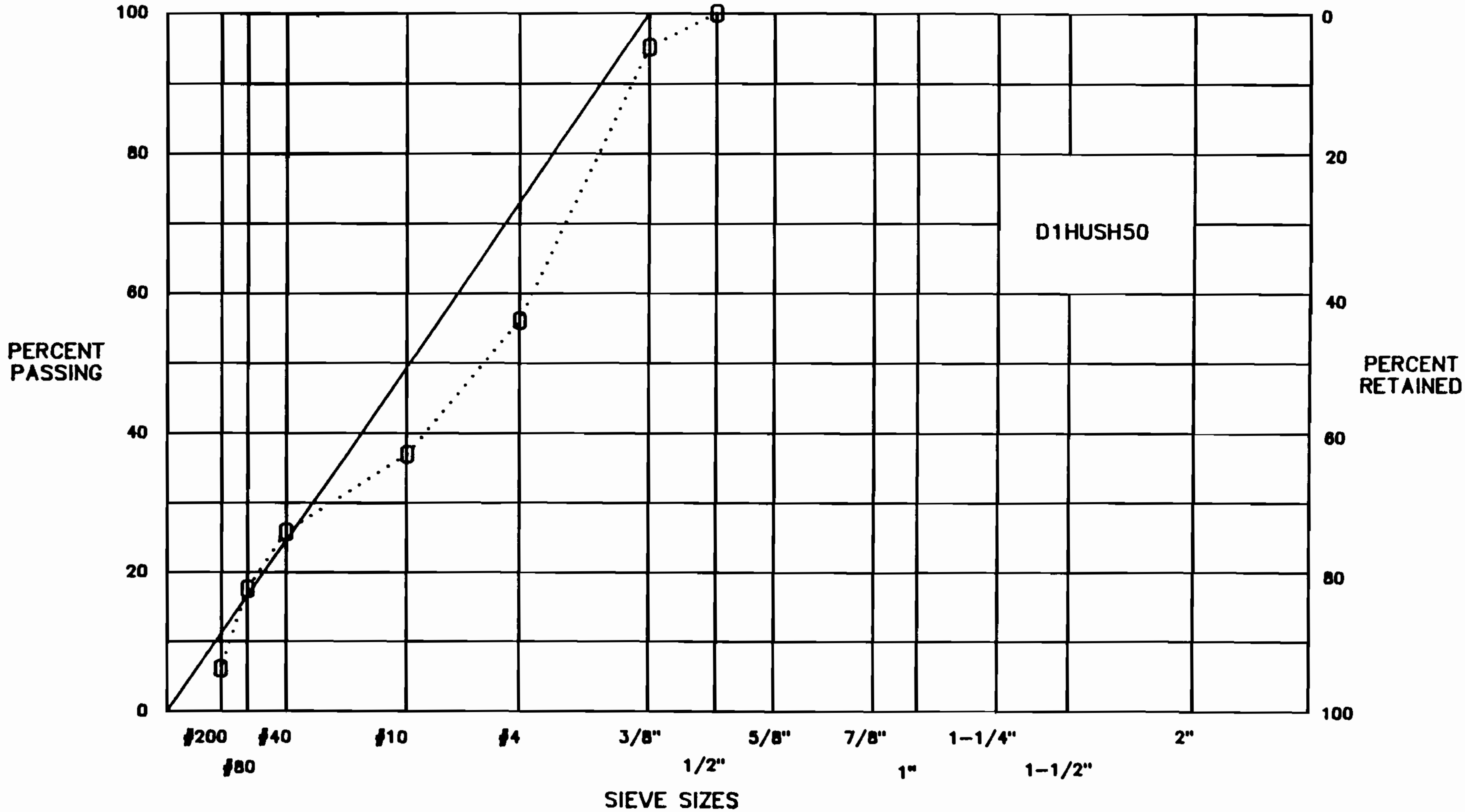


0.45 Power gradation charts
For Type D mixtures

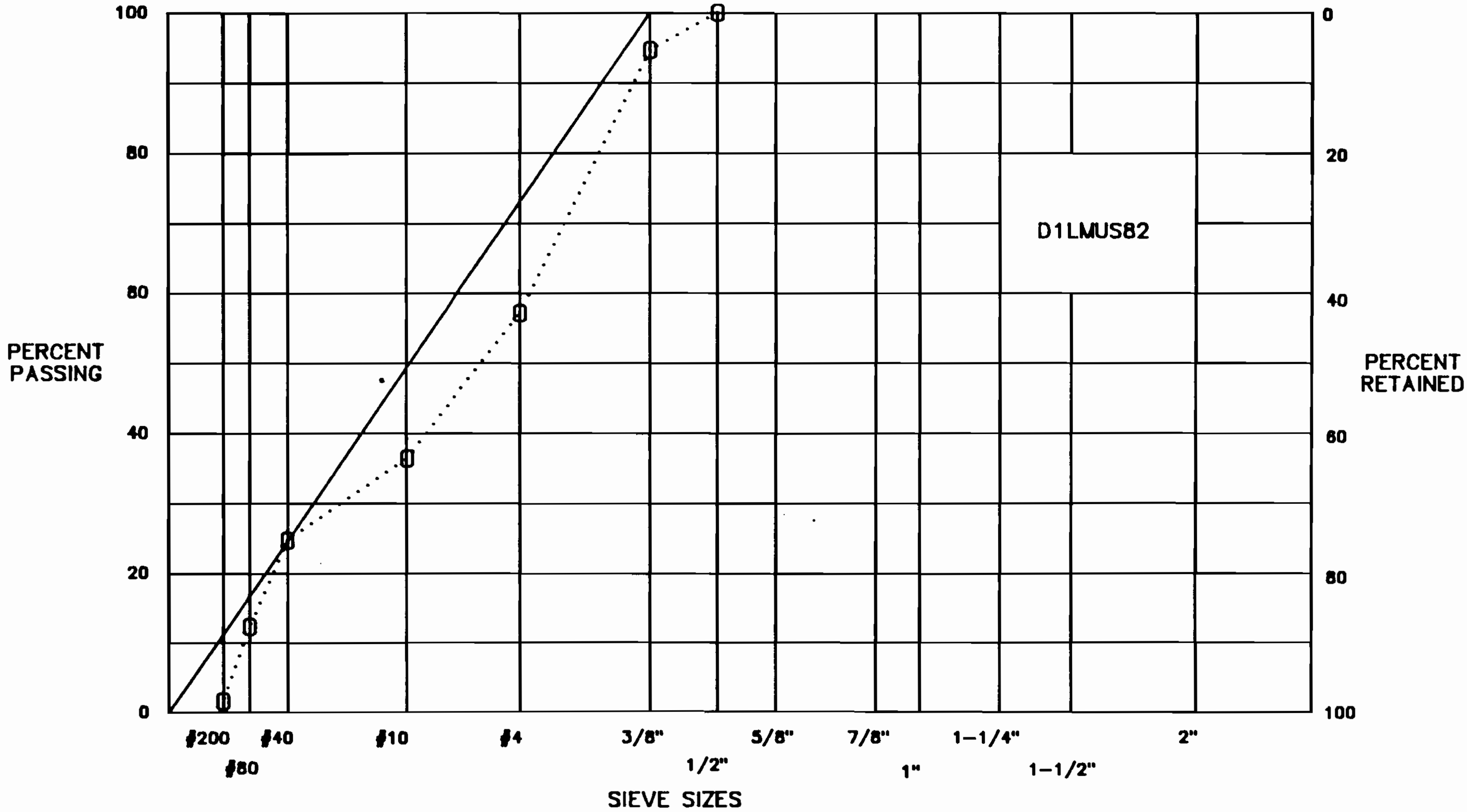
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

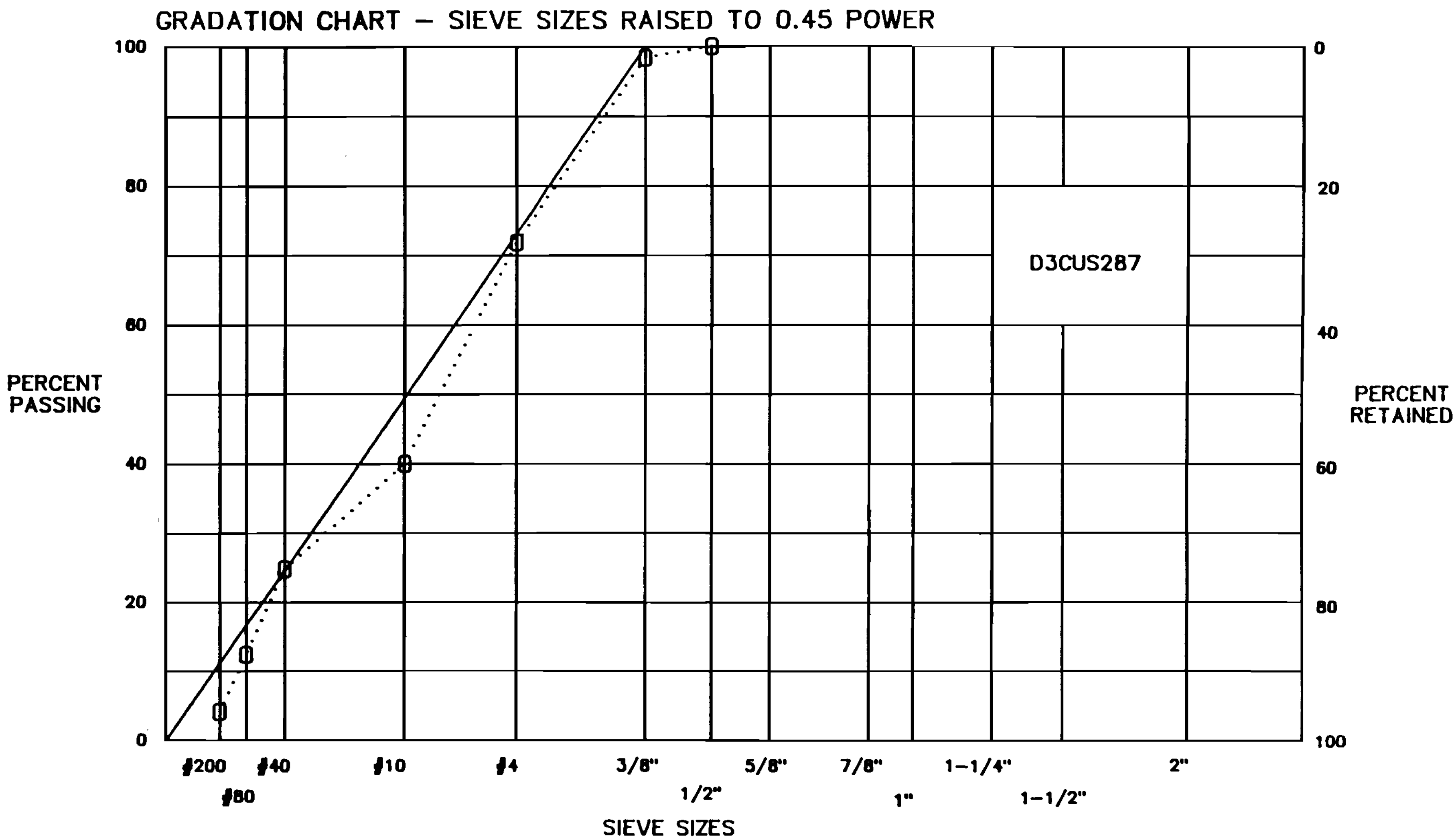


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

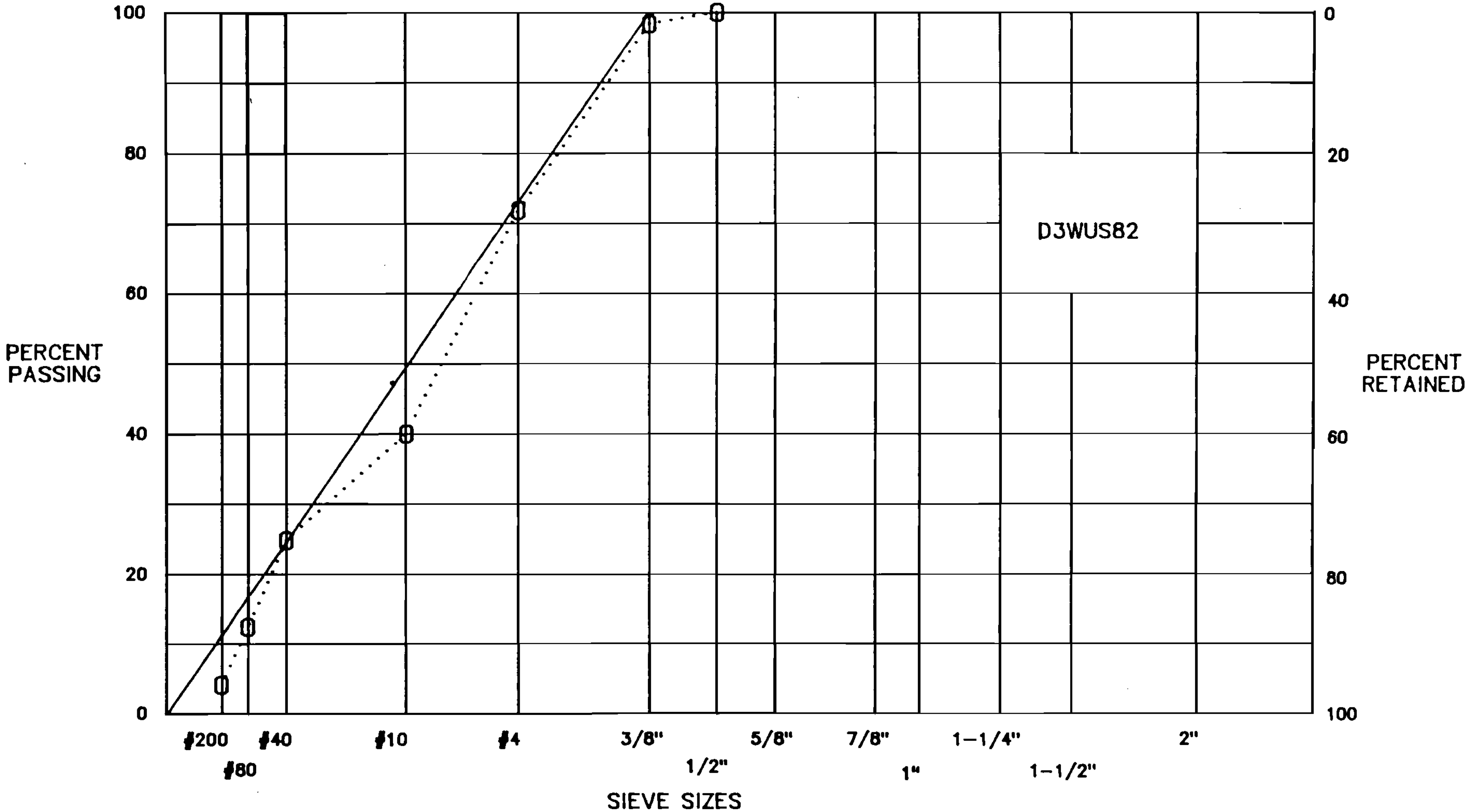


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

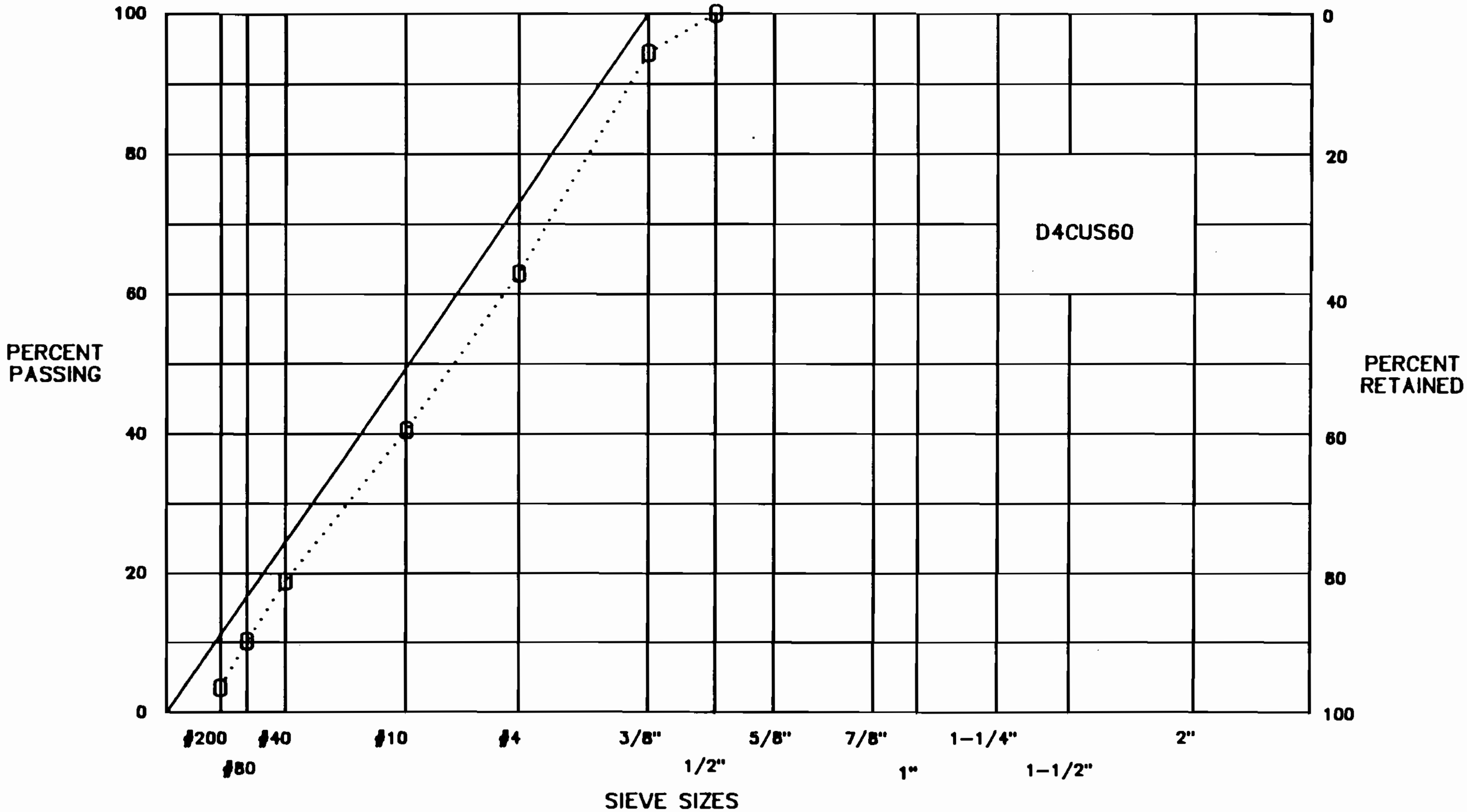



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
0
20
40
60
80
100
D3CUS287
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

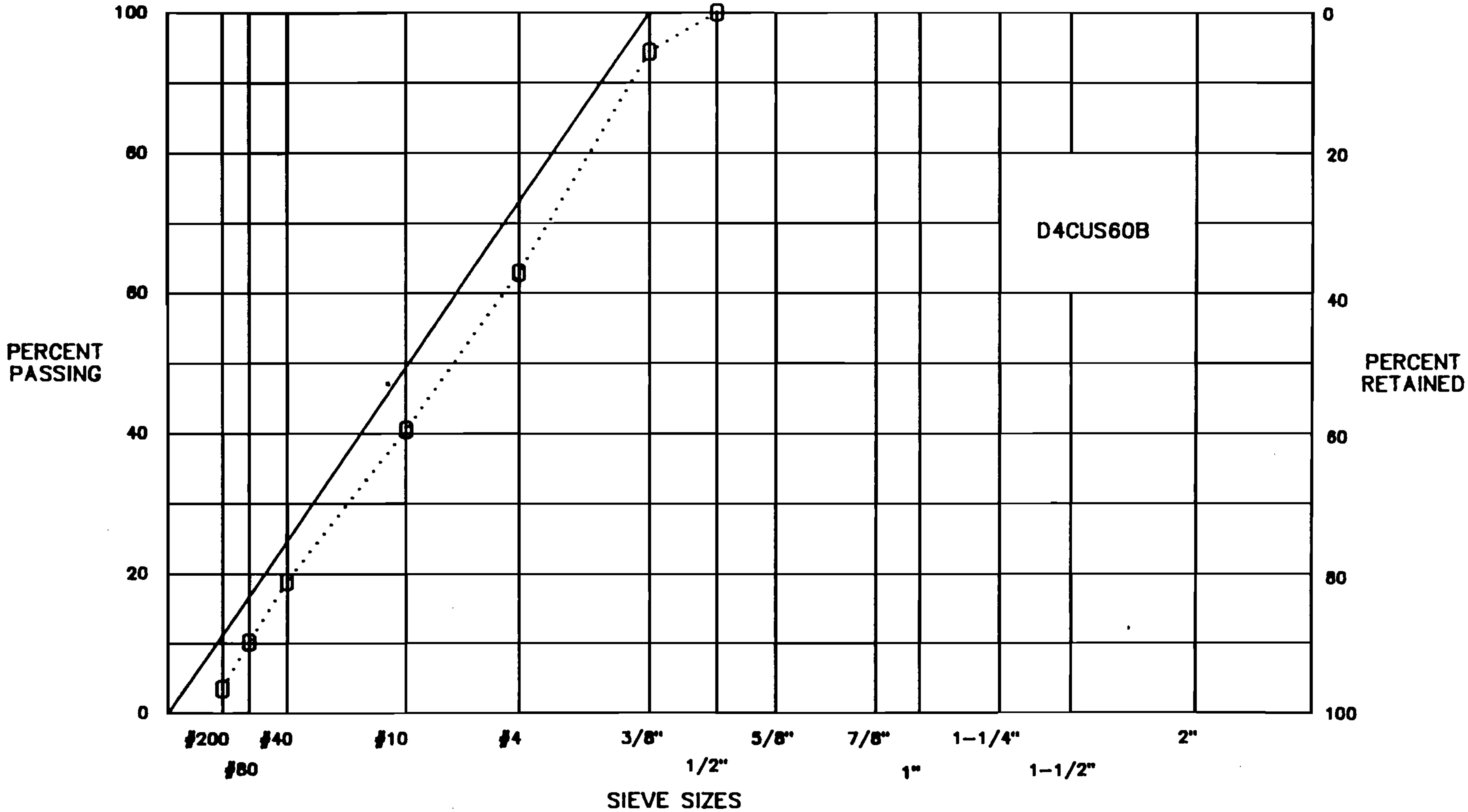
GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER



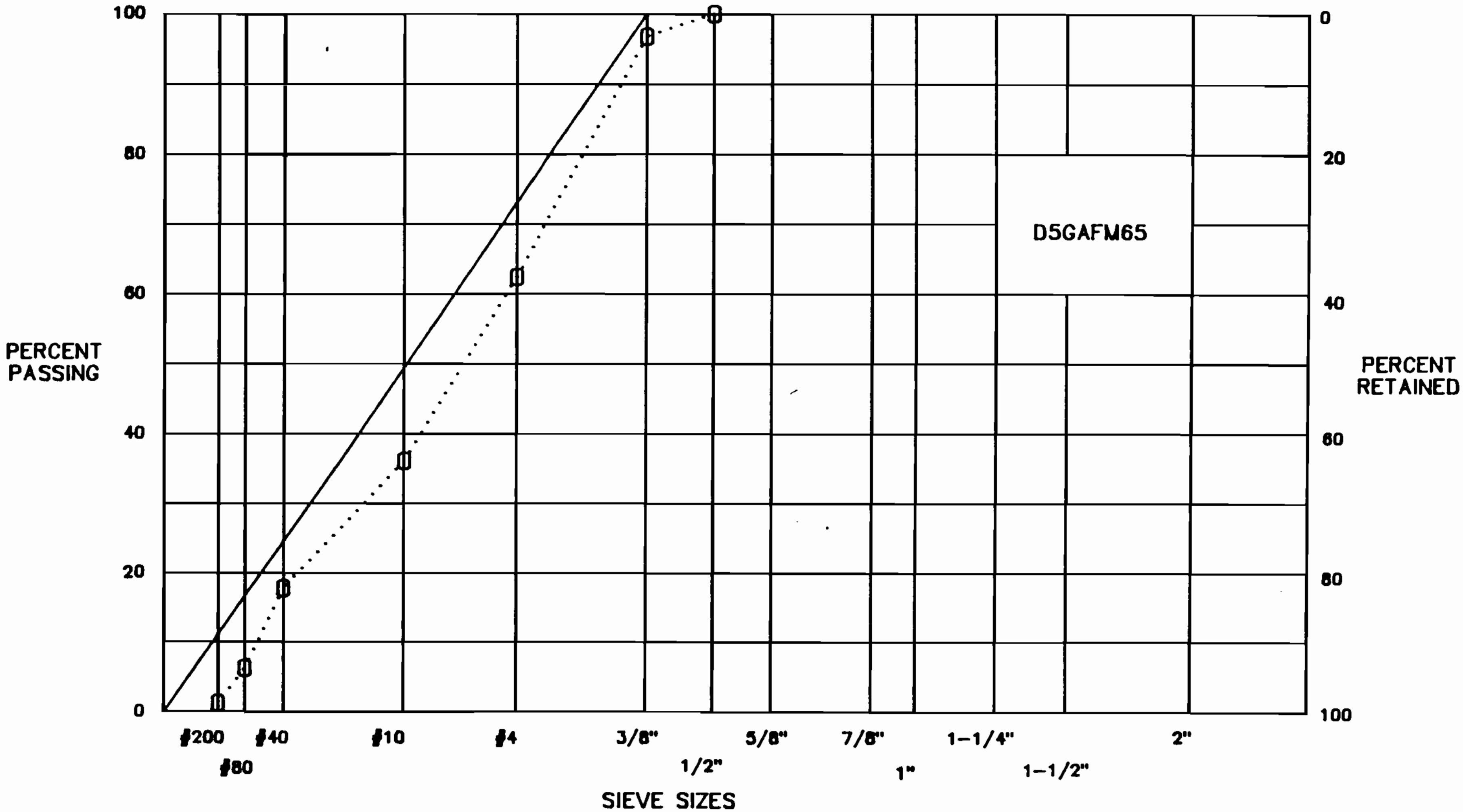
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

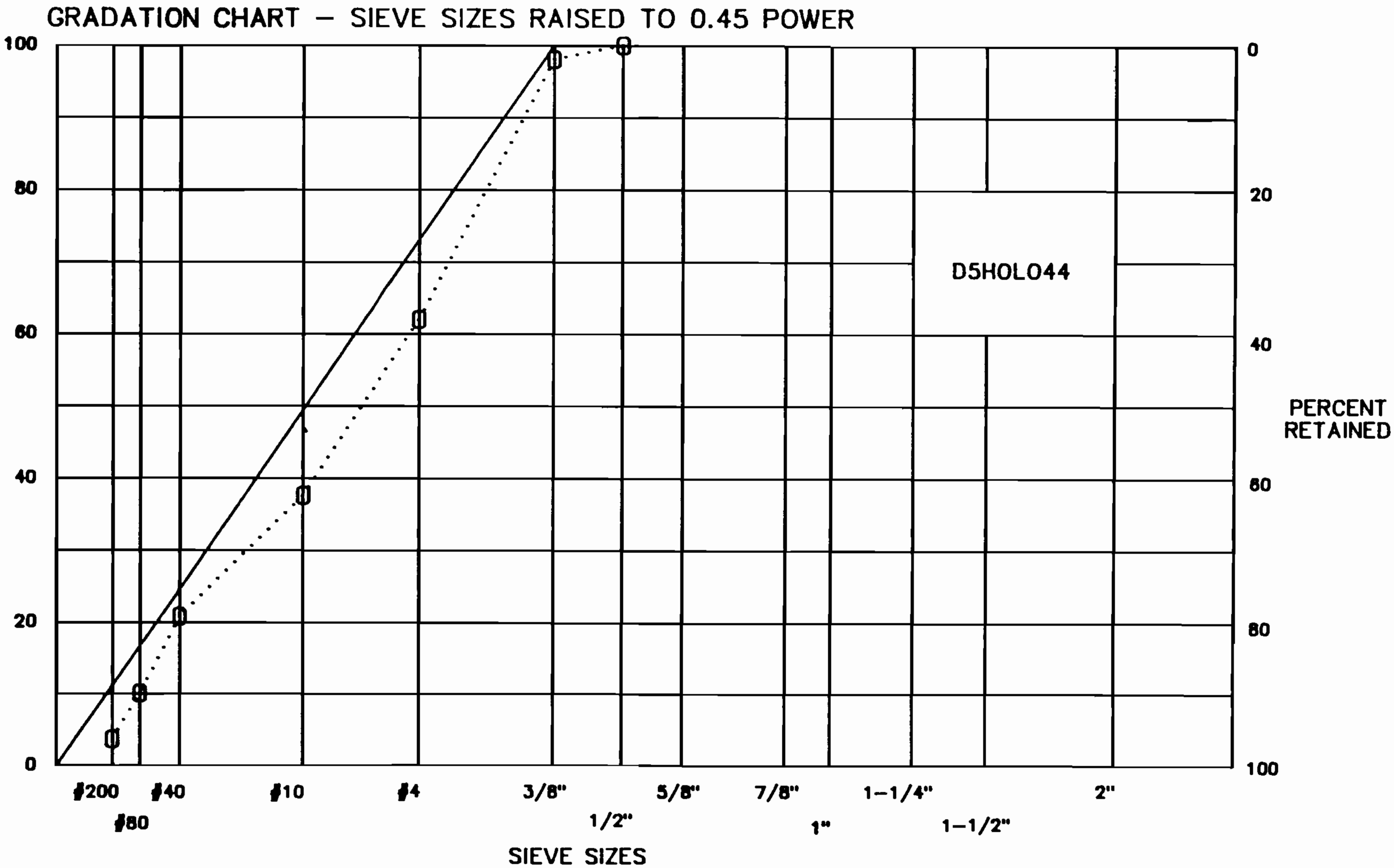


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

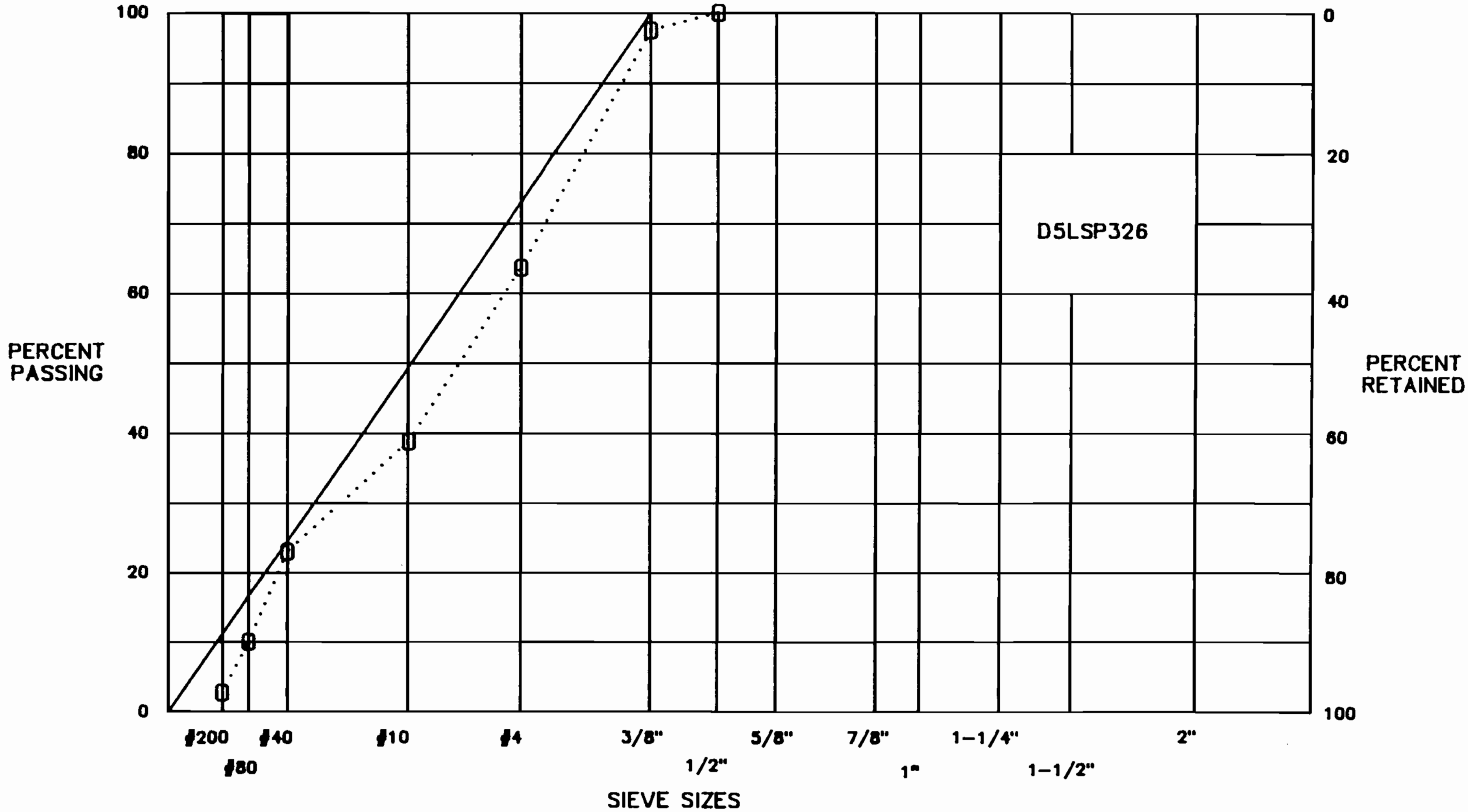


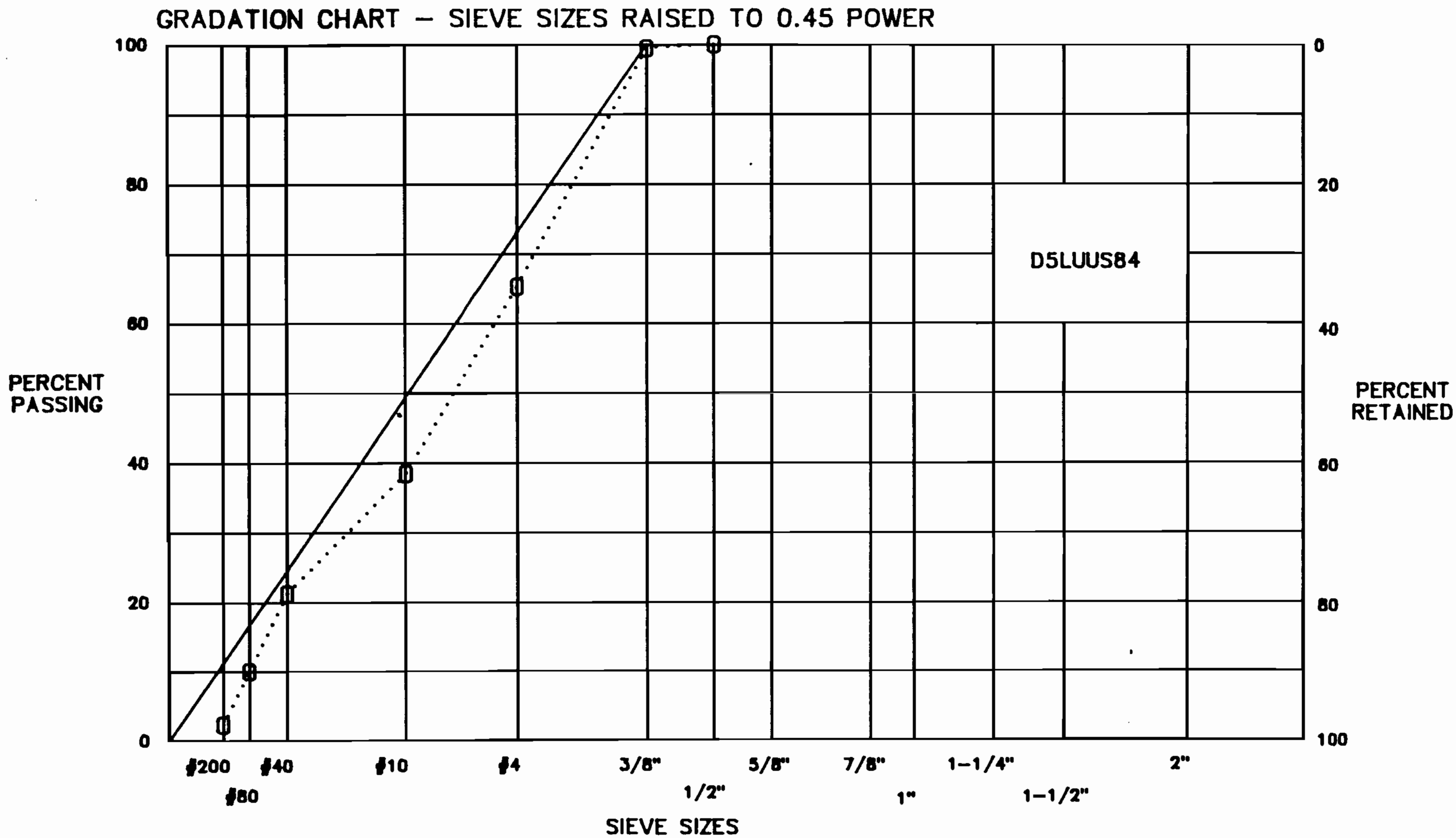
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



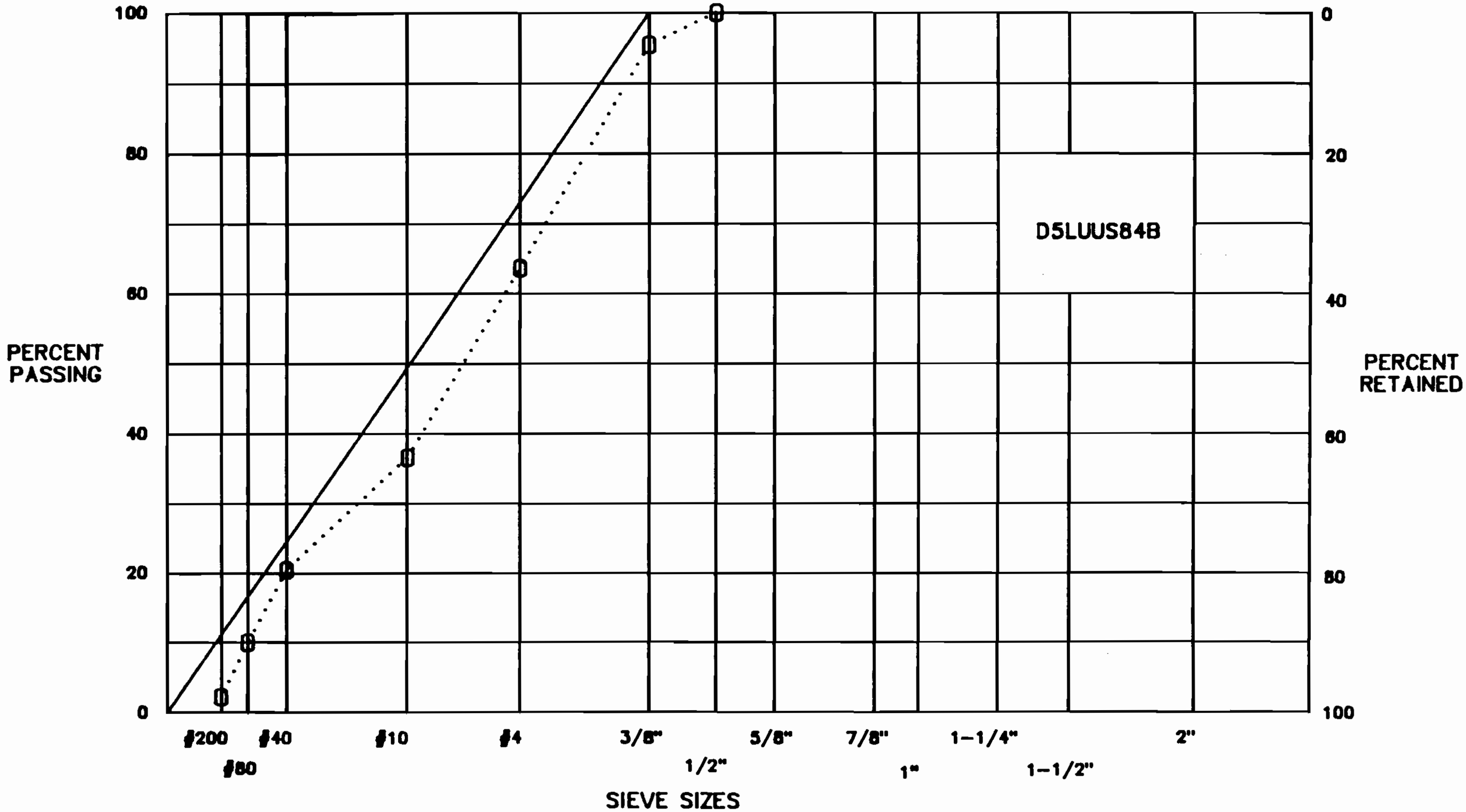

GRADATION CHART - SIEVE SIZES RAISED TO 0.45 POWER
100
80
60
40
20
0
PERCENT PASSING
0
20
40
60
80
100
PERCENT RETAINED
D5HOLO44
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER

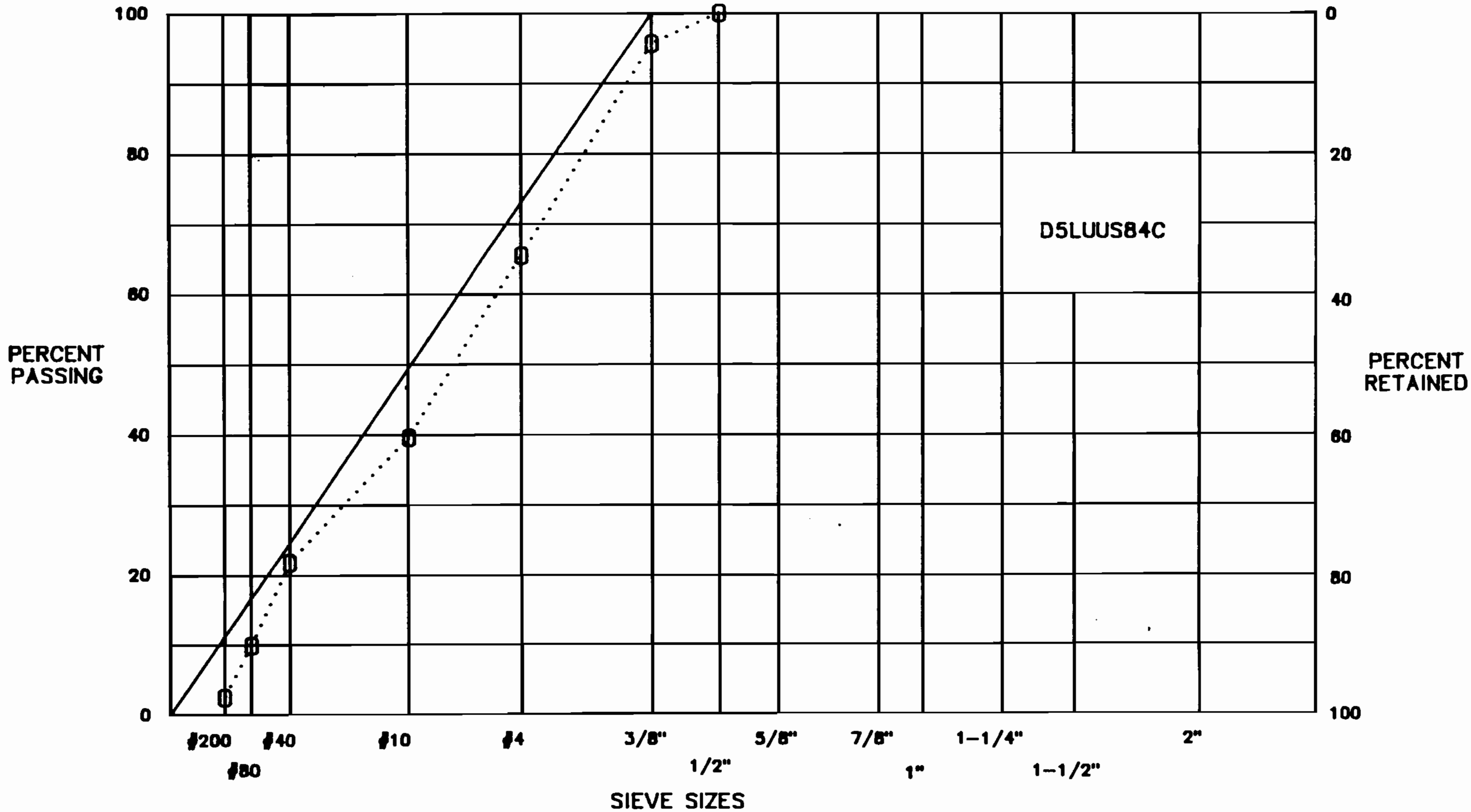



GRADATION CHART - SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
0
20
40
60
80
100
D5LUUS84
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

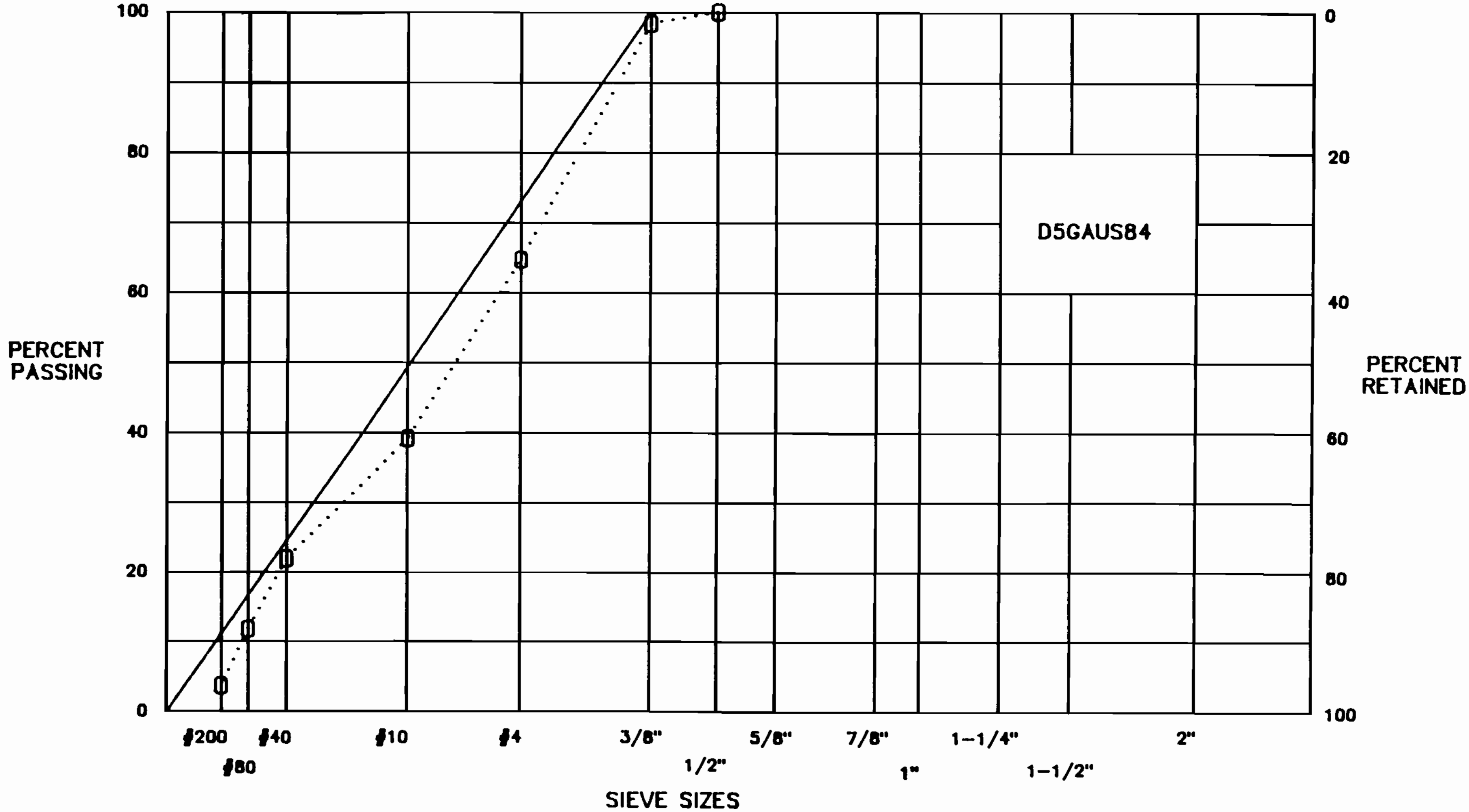
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



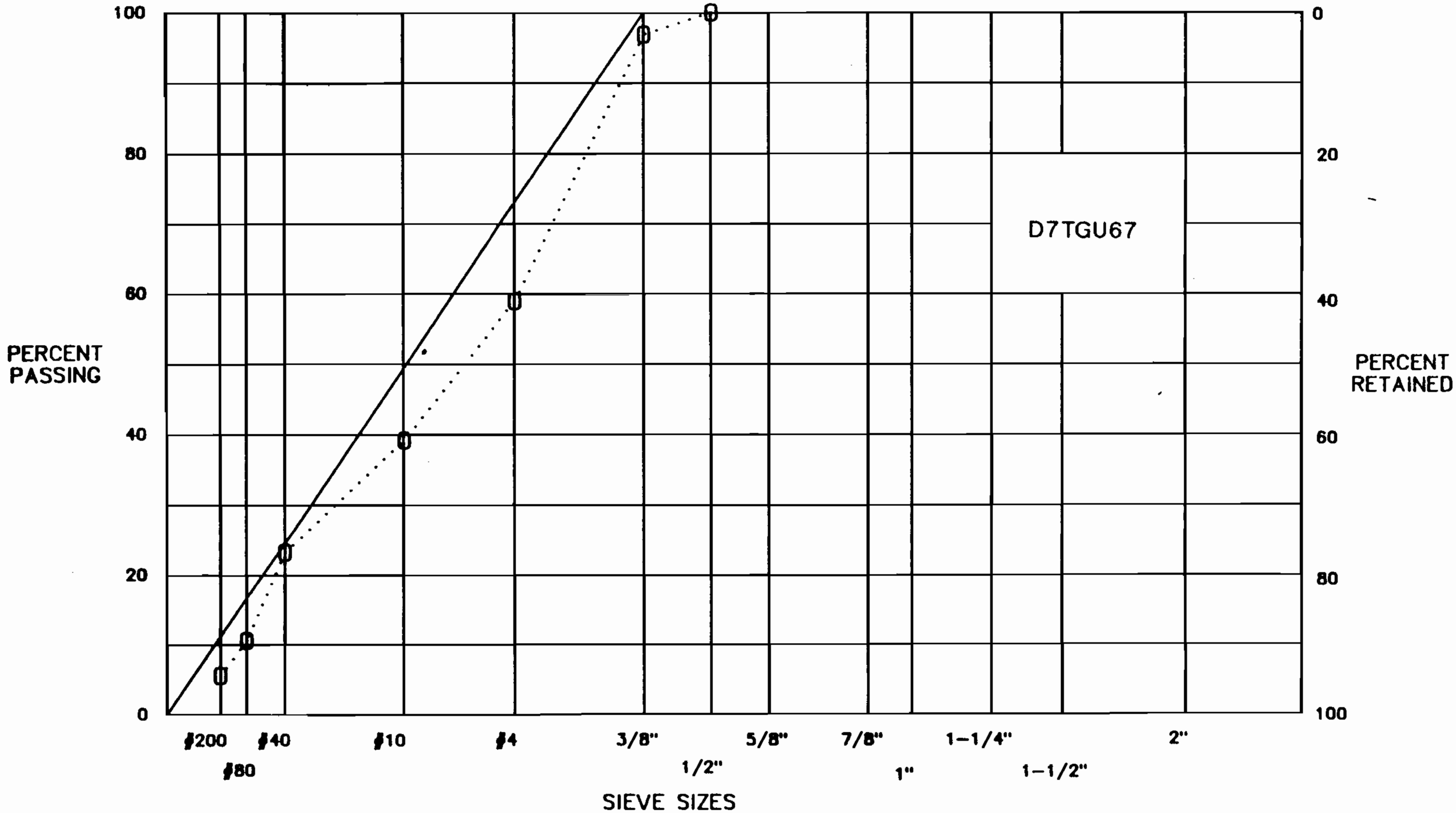
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

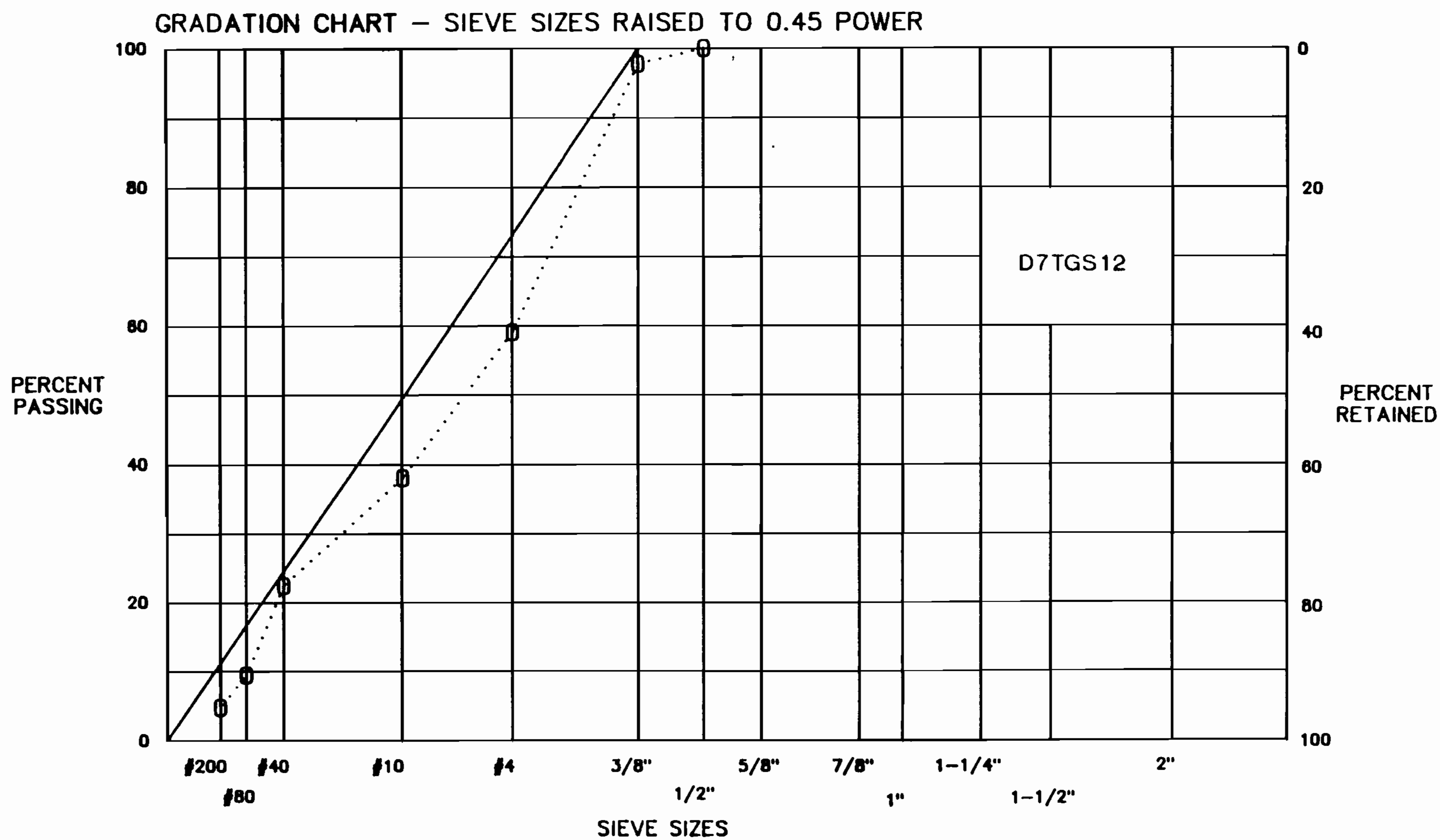


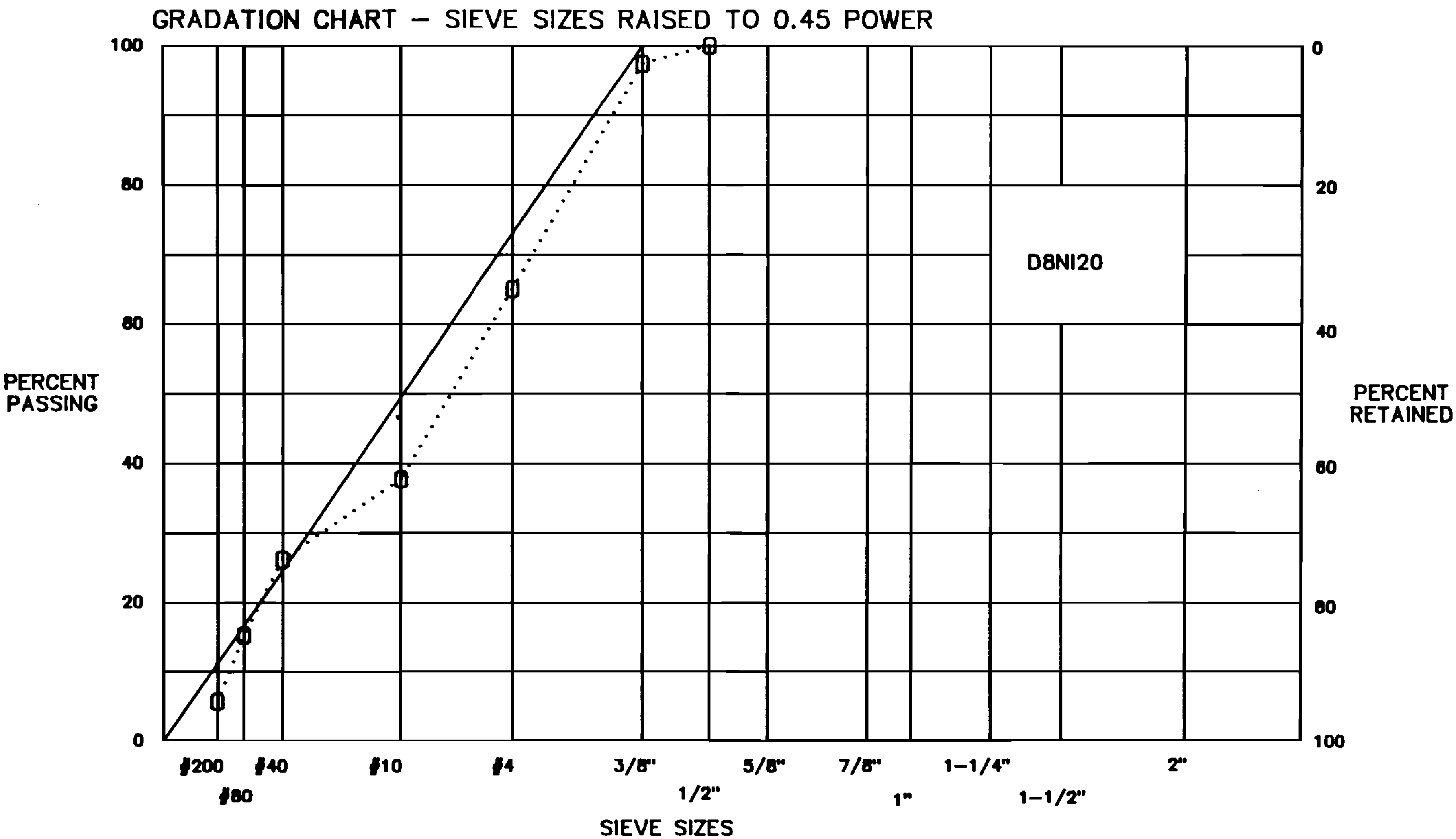
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



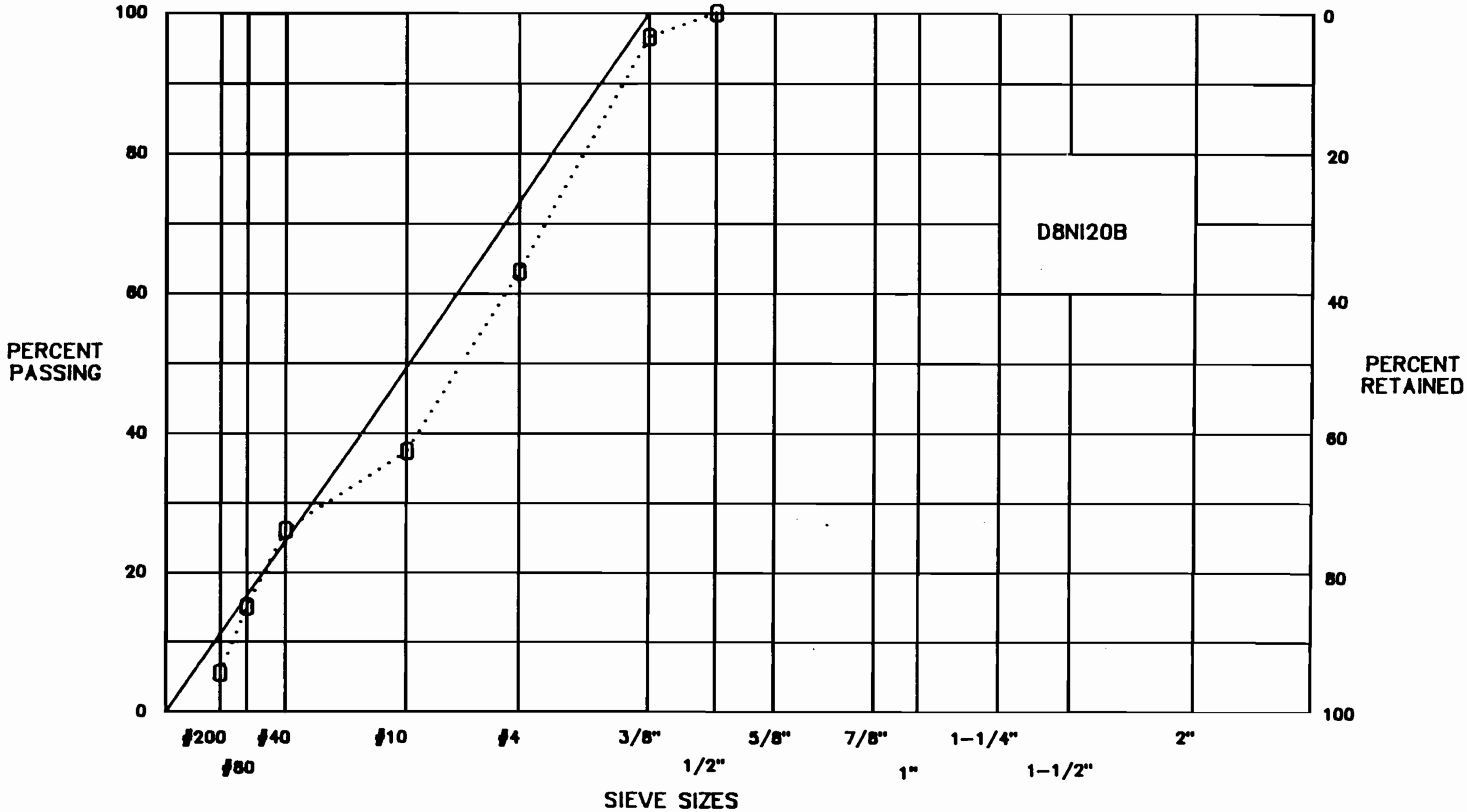
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



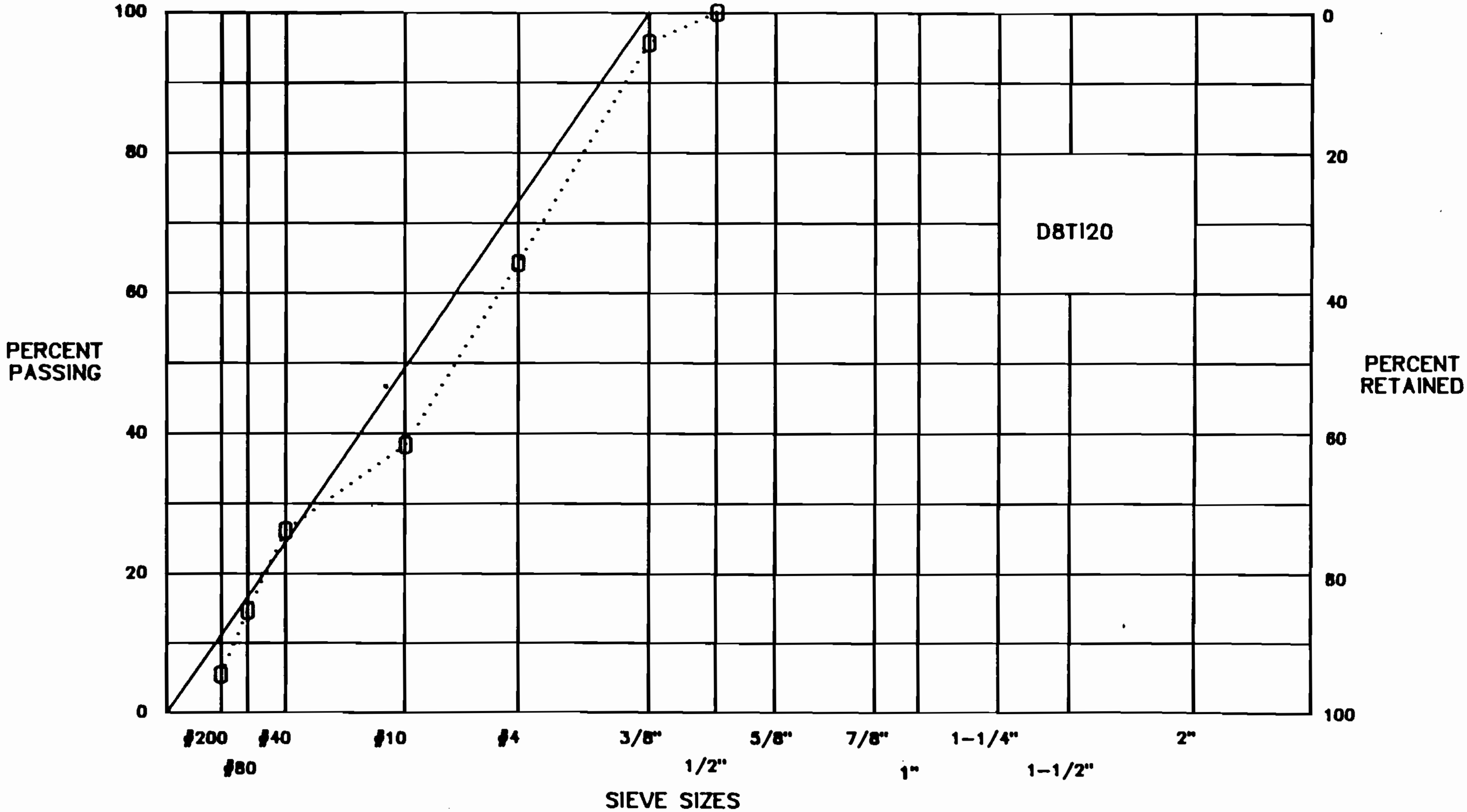

GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
0
20
40
60
80
100
D7TGS12
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES


GRADATION CHART - SIEVE SIZES RAISED TO 0.45 POWER
100
80
60
40
20
0
PERCENT PASSING
0
20
40
60
80
100
PERCENT RETAINED
D8NI20
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

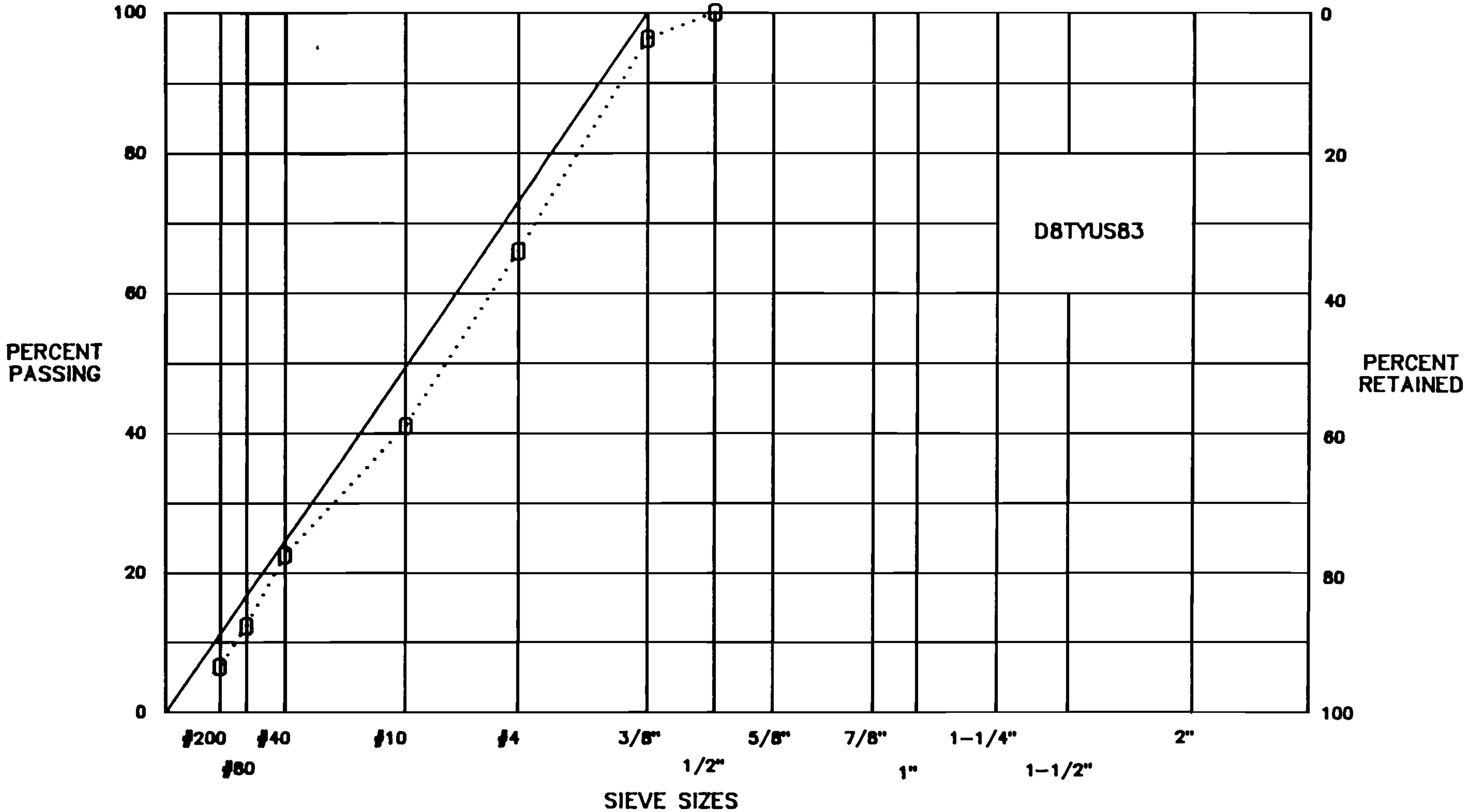
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



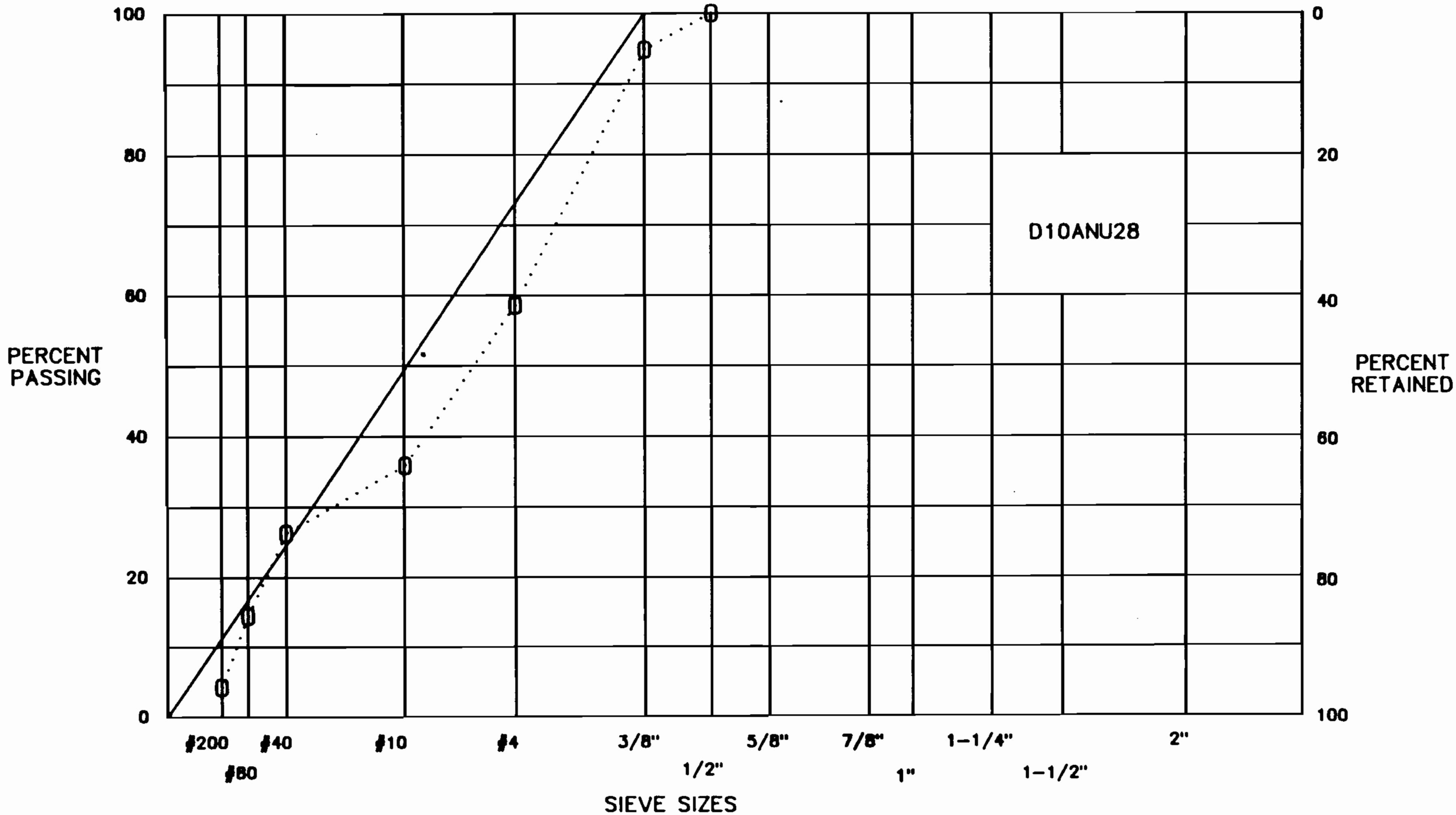
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



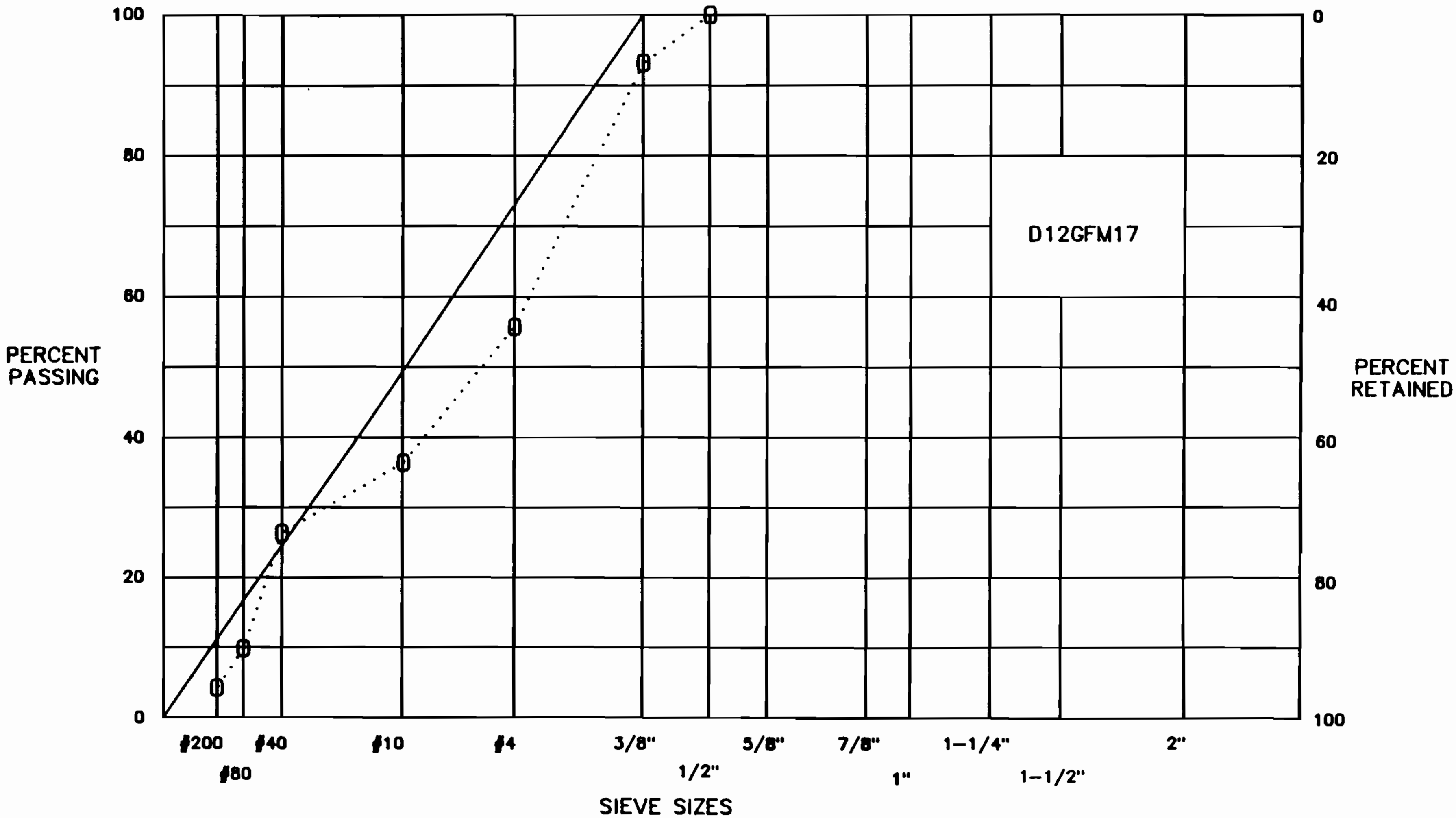
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



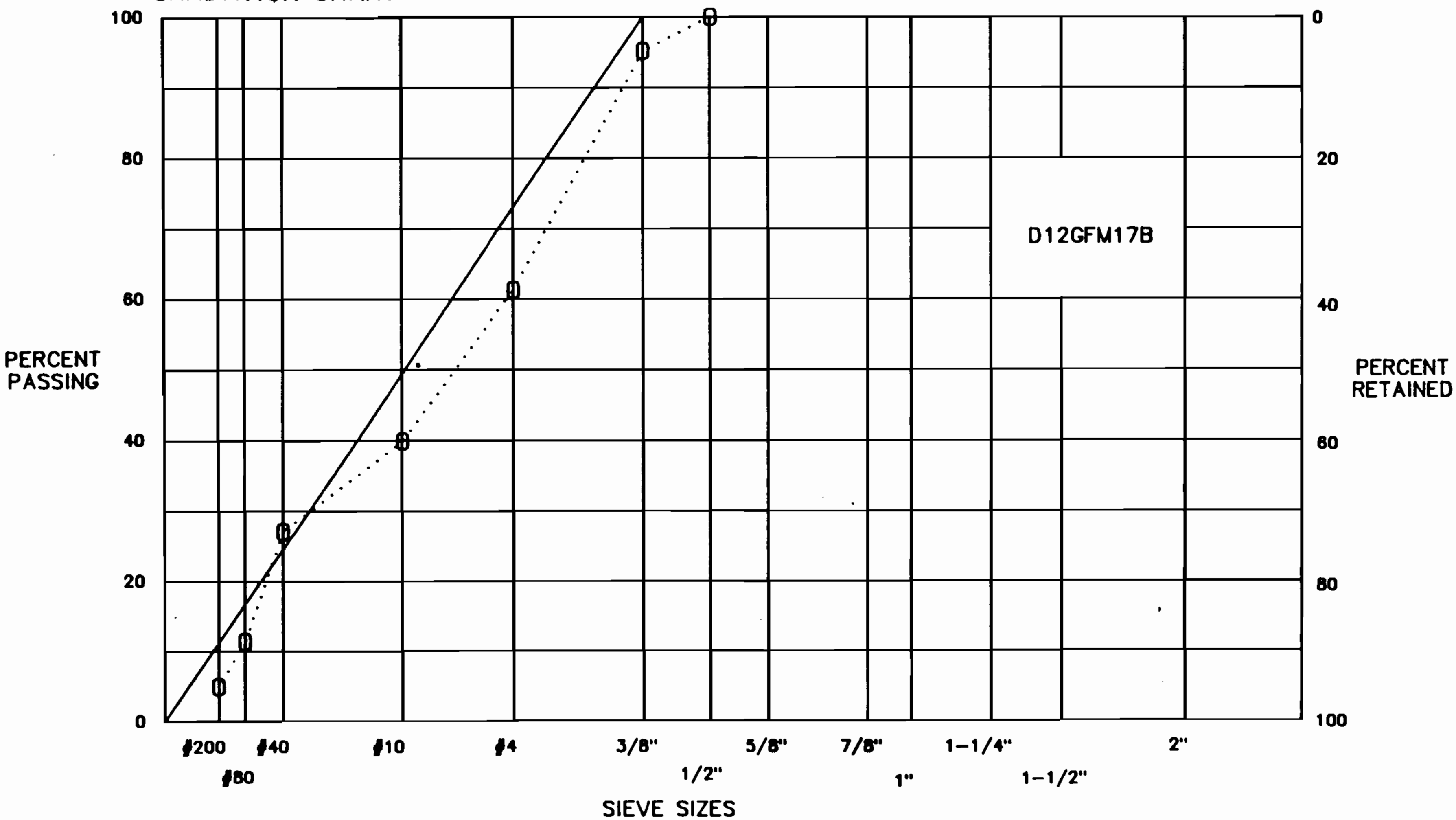
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



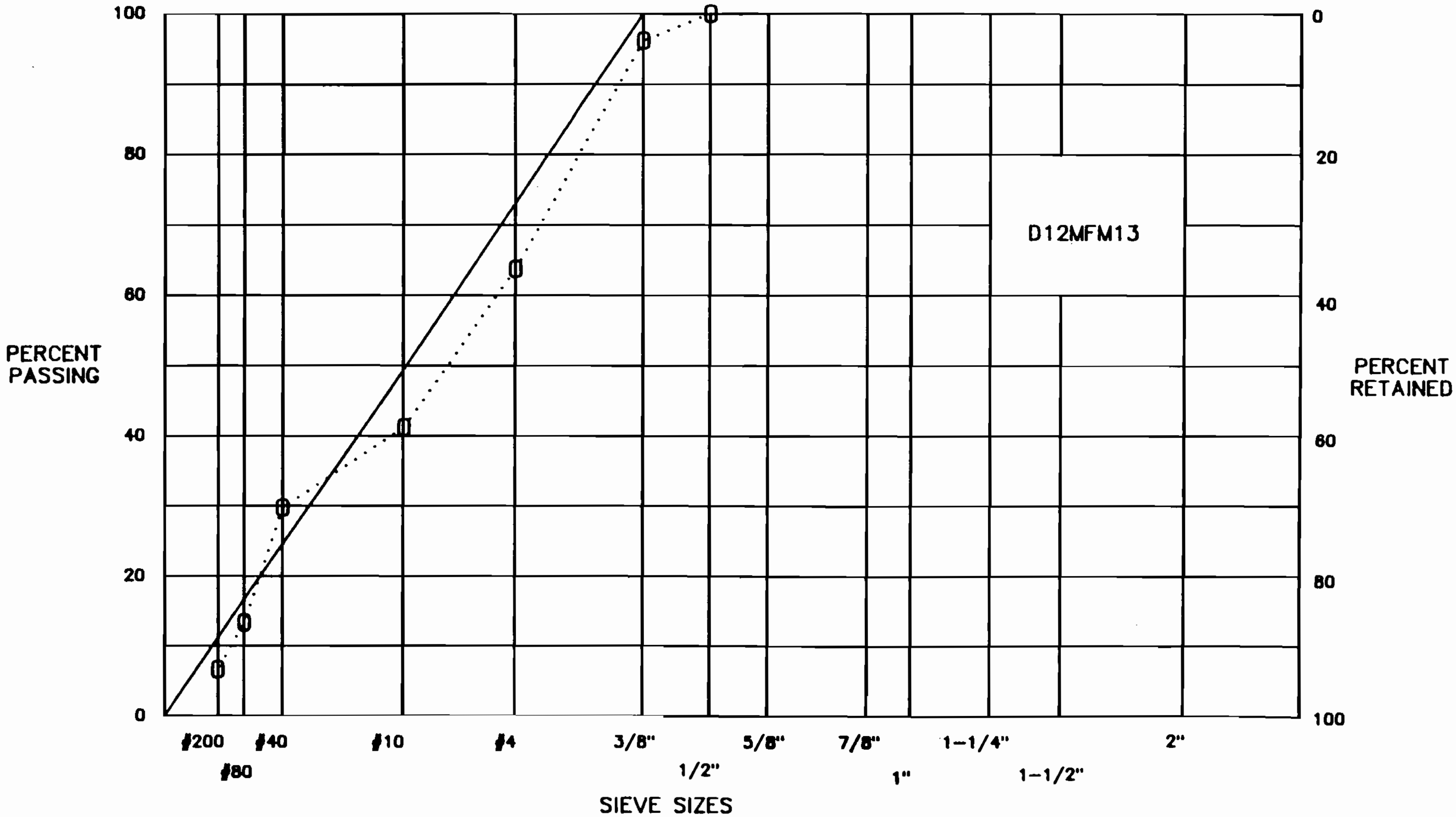
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



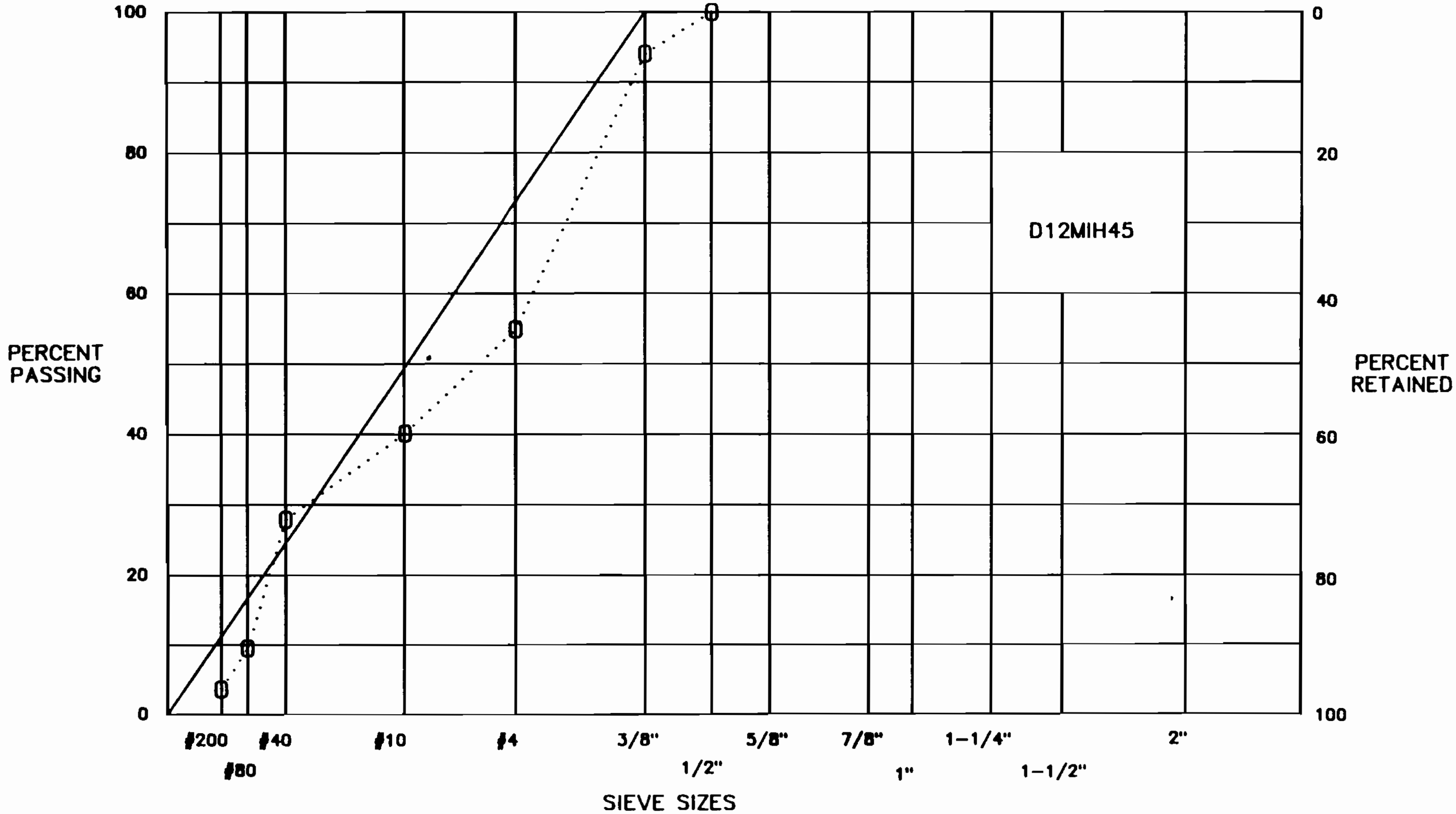
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

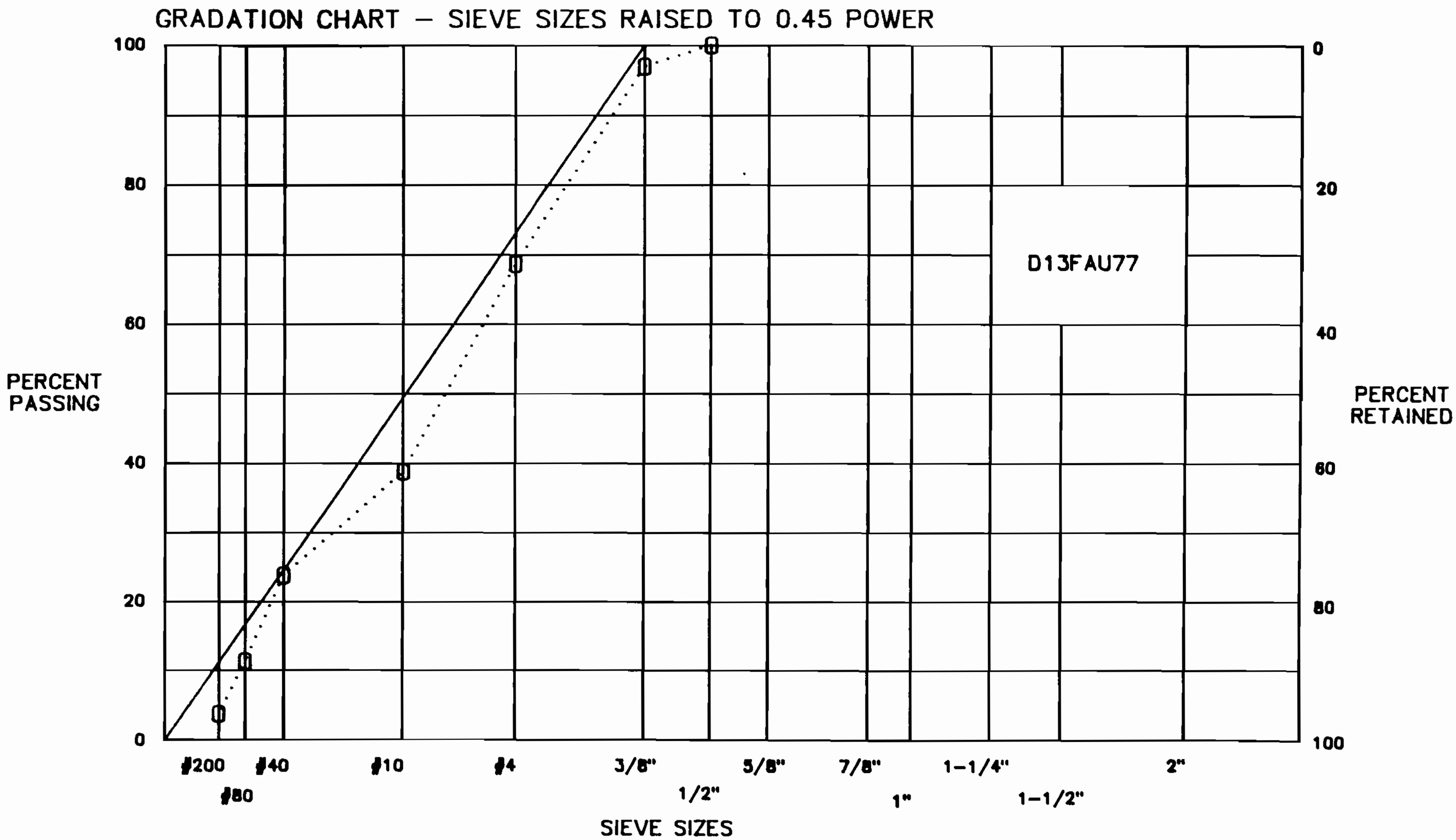


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

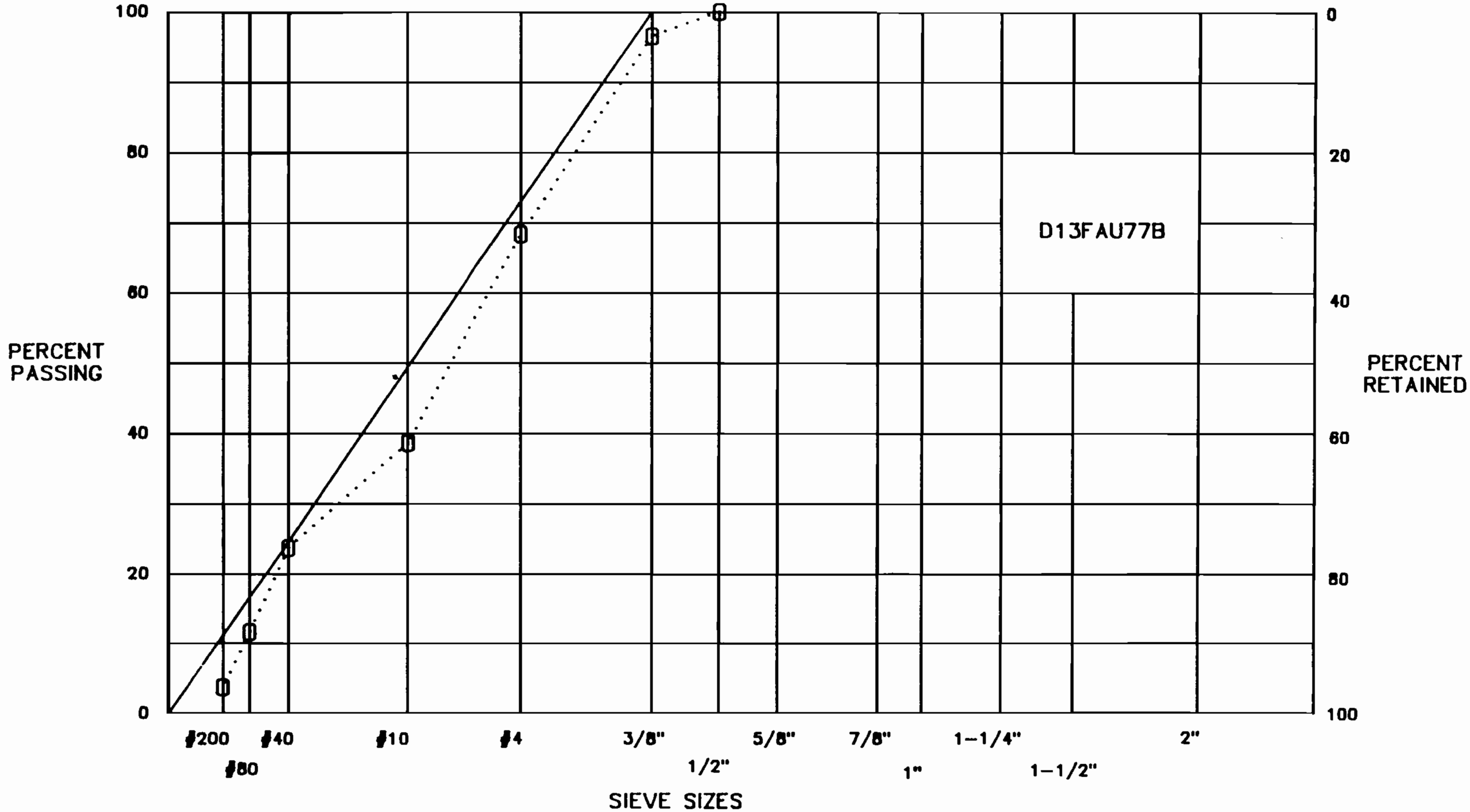


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

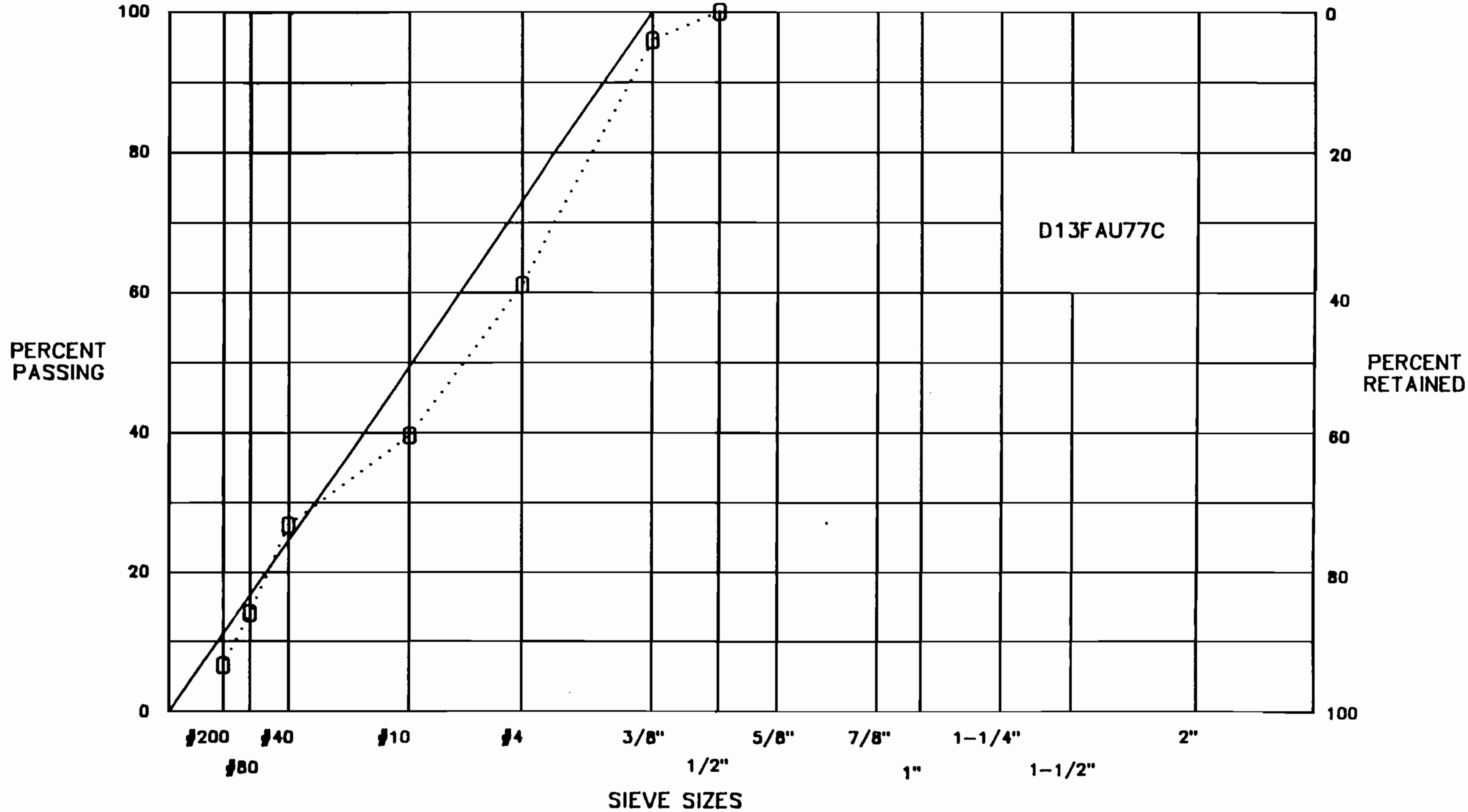



GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
100
80
60
40
20
0
PERCENT RETAINED
0
20
40
60
80
100
D13FAU77
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

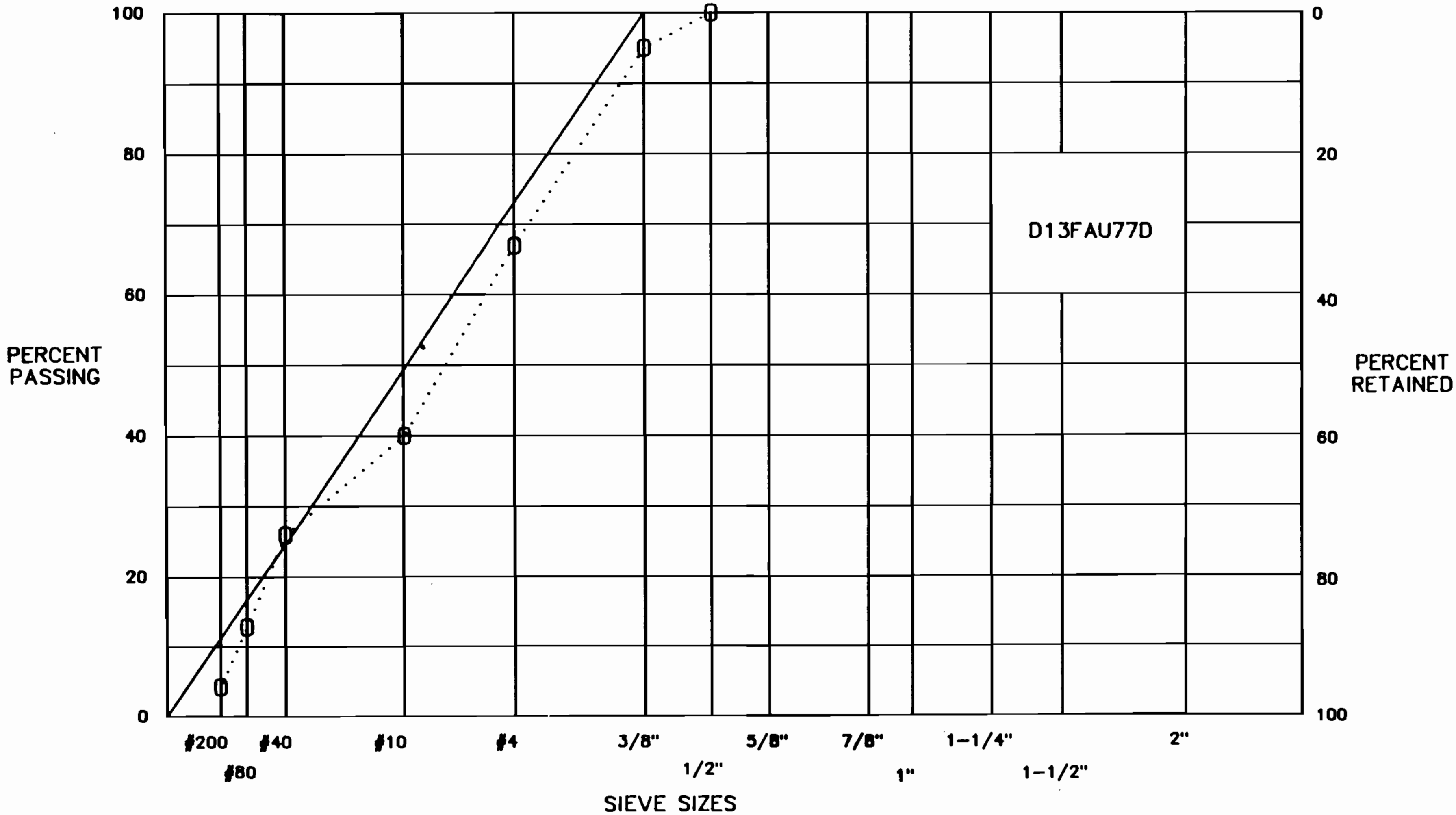
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

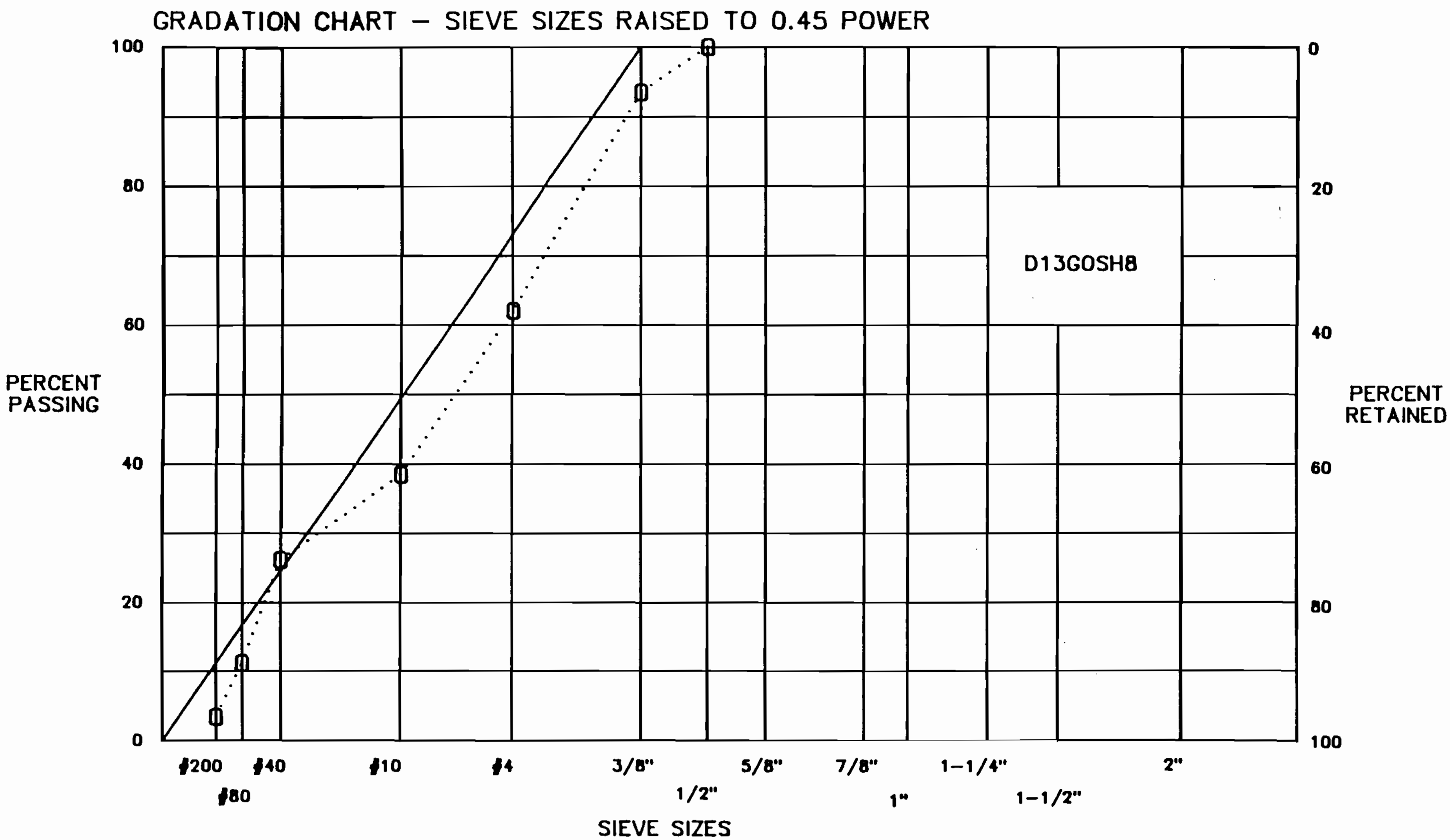


GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER



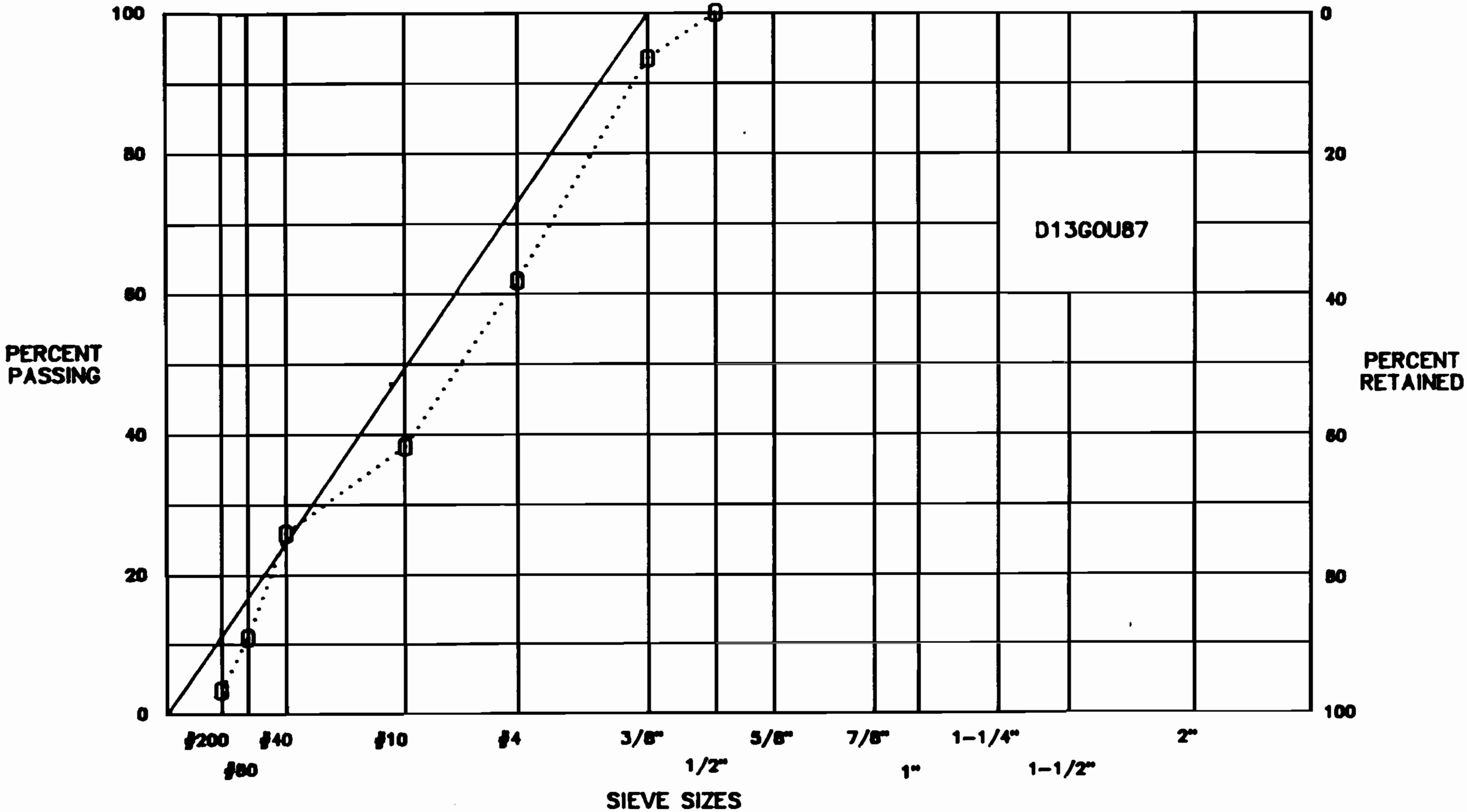
GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER

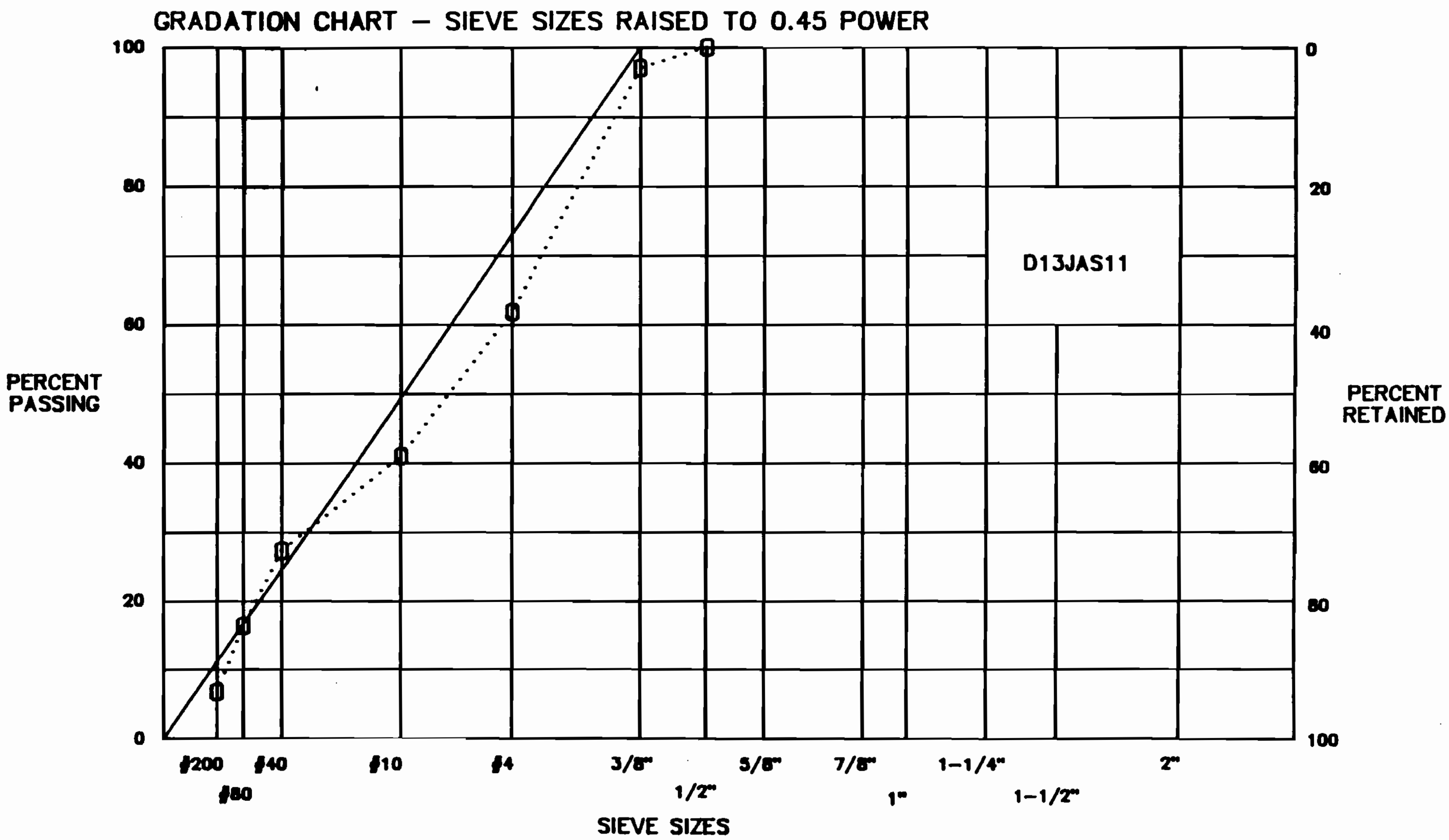




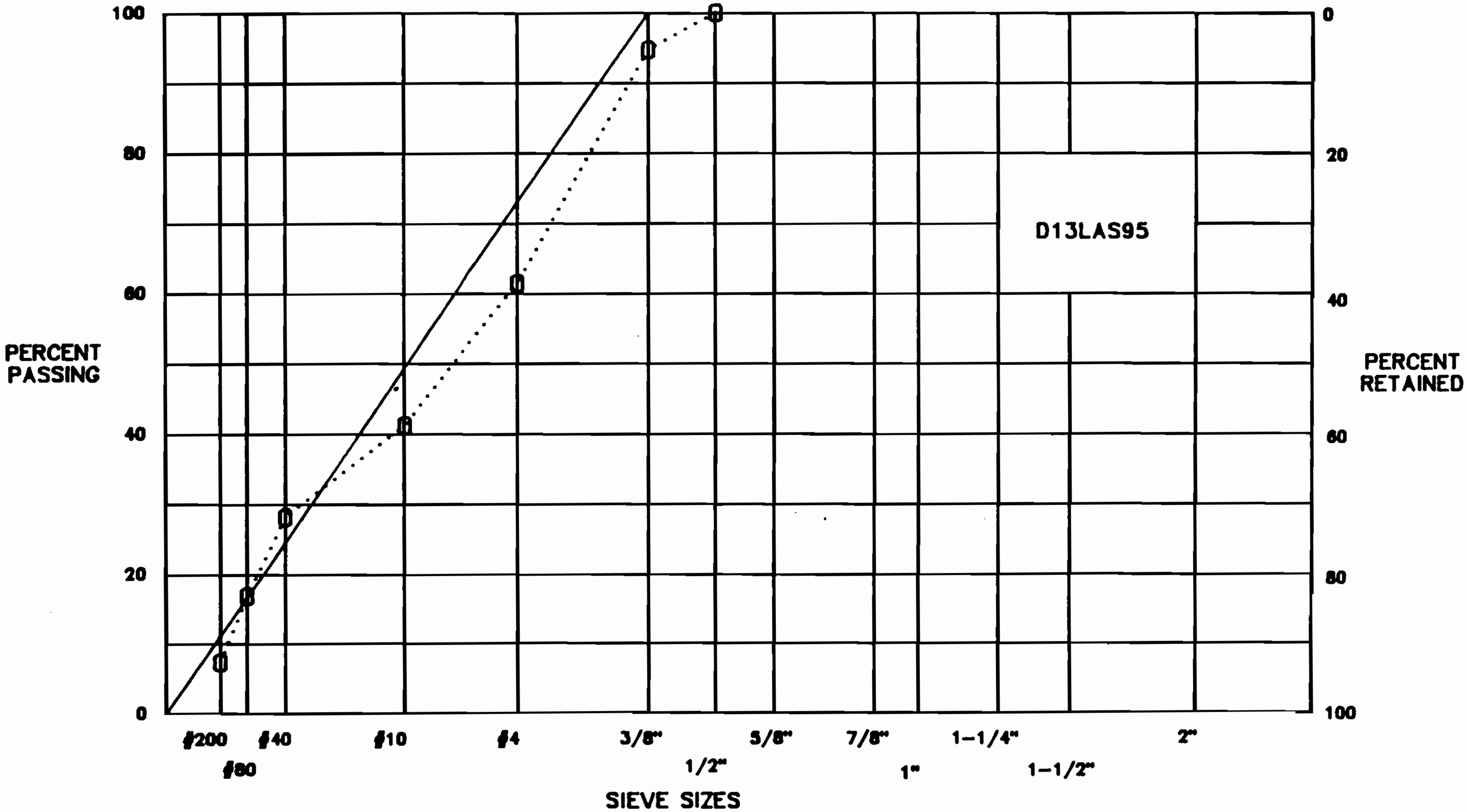
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
100
80
60
40
20
0
PERCENT PASSING
0
20
40
60
80
100
PERCENT RETAINED
D13GOSH8
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

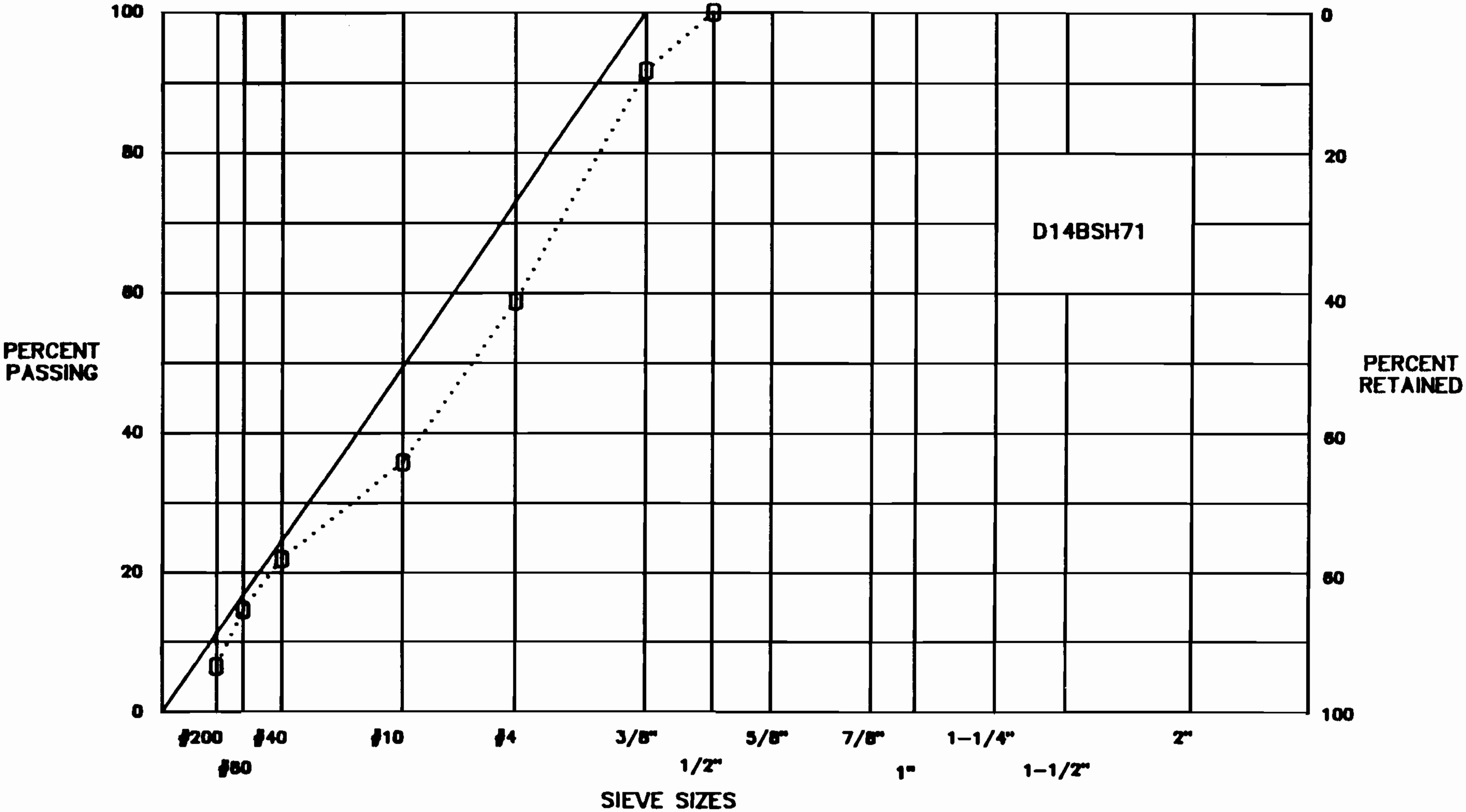



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
100
80
60
40
20
0
PERCENT RETAINED
0
20
40
60
80
100
D13JAS11
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

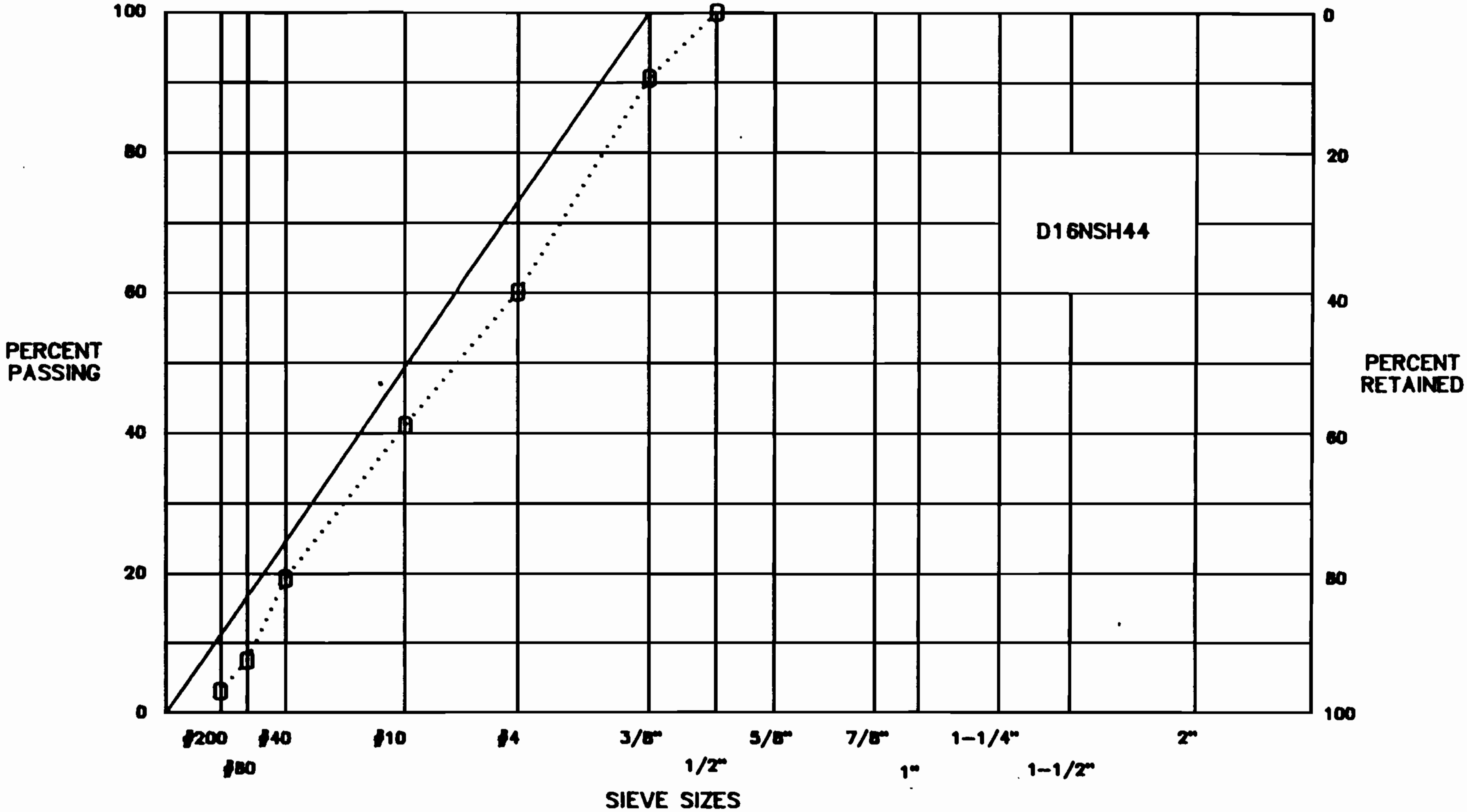
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



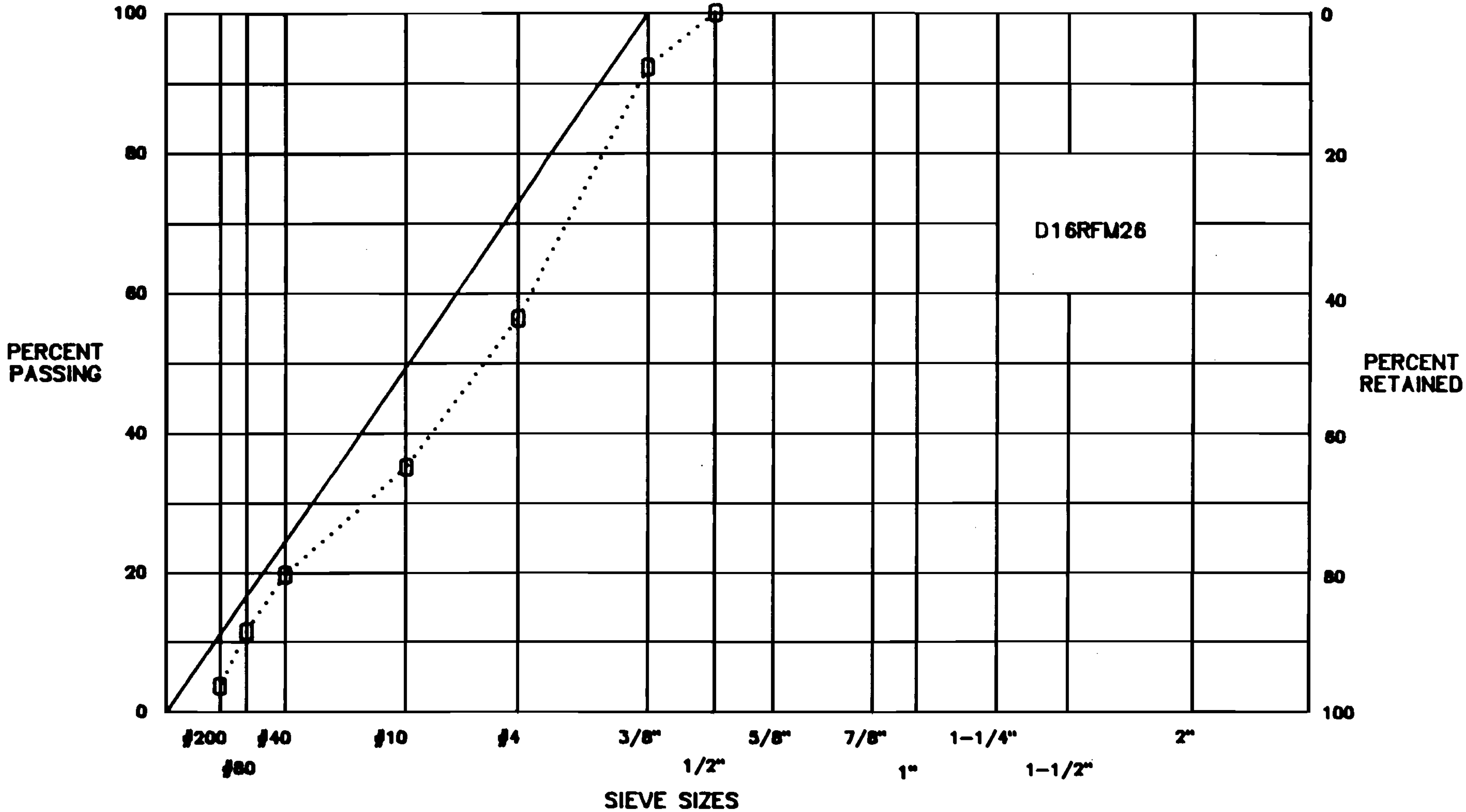
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

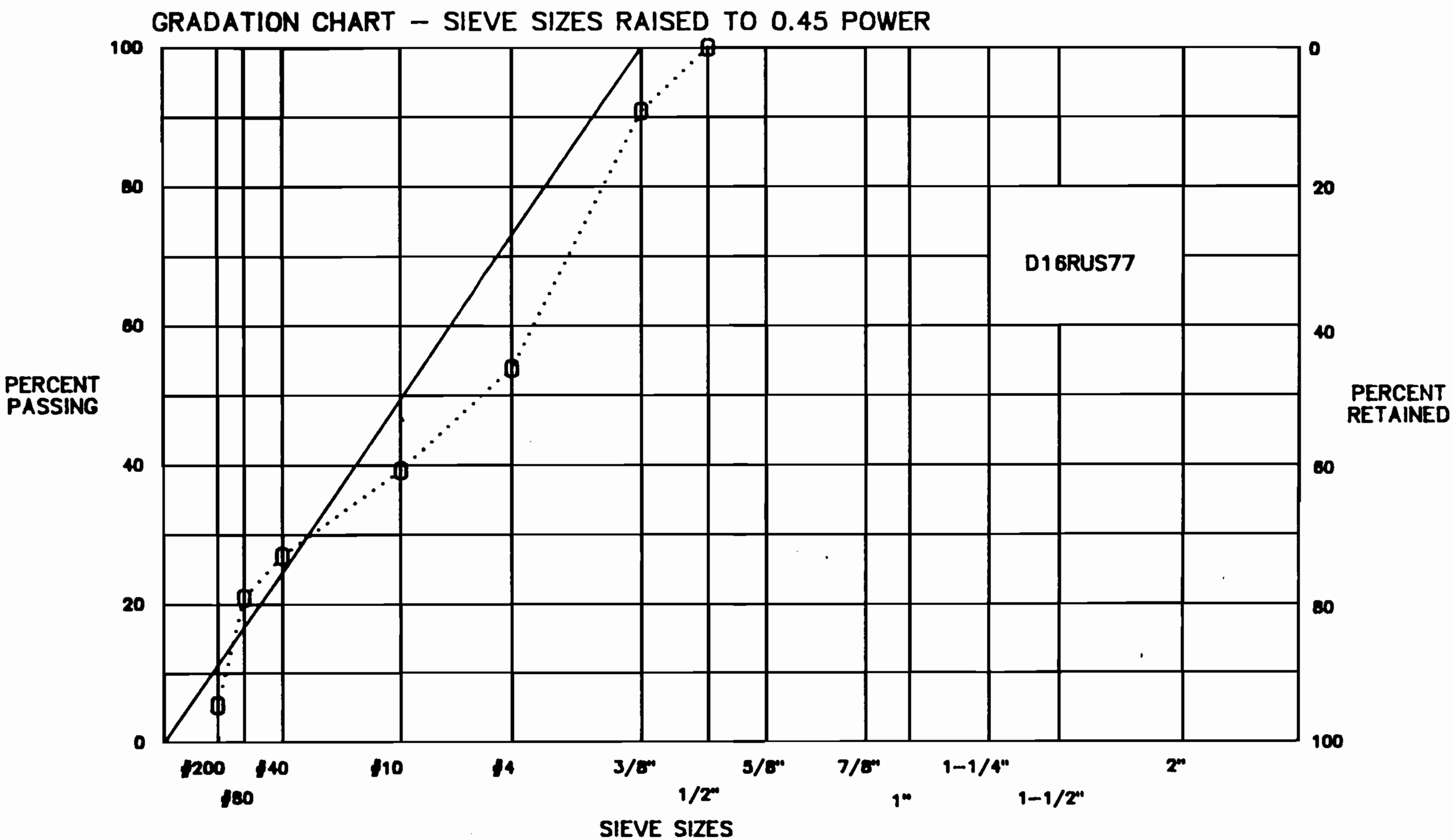


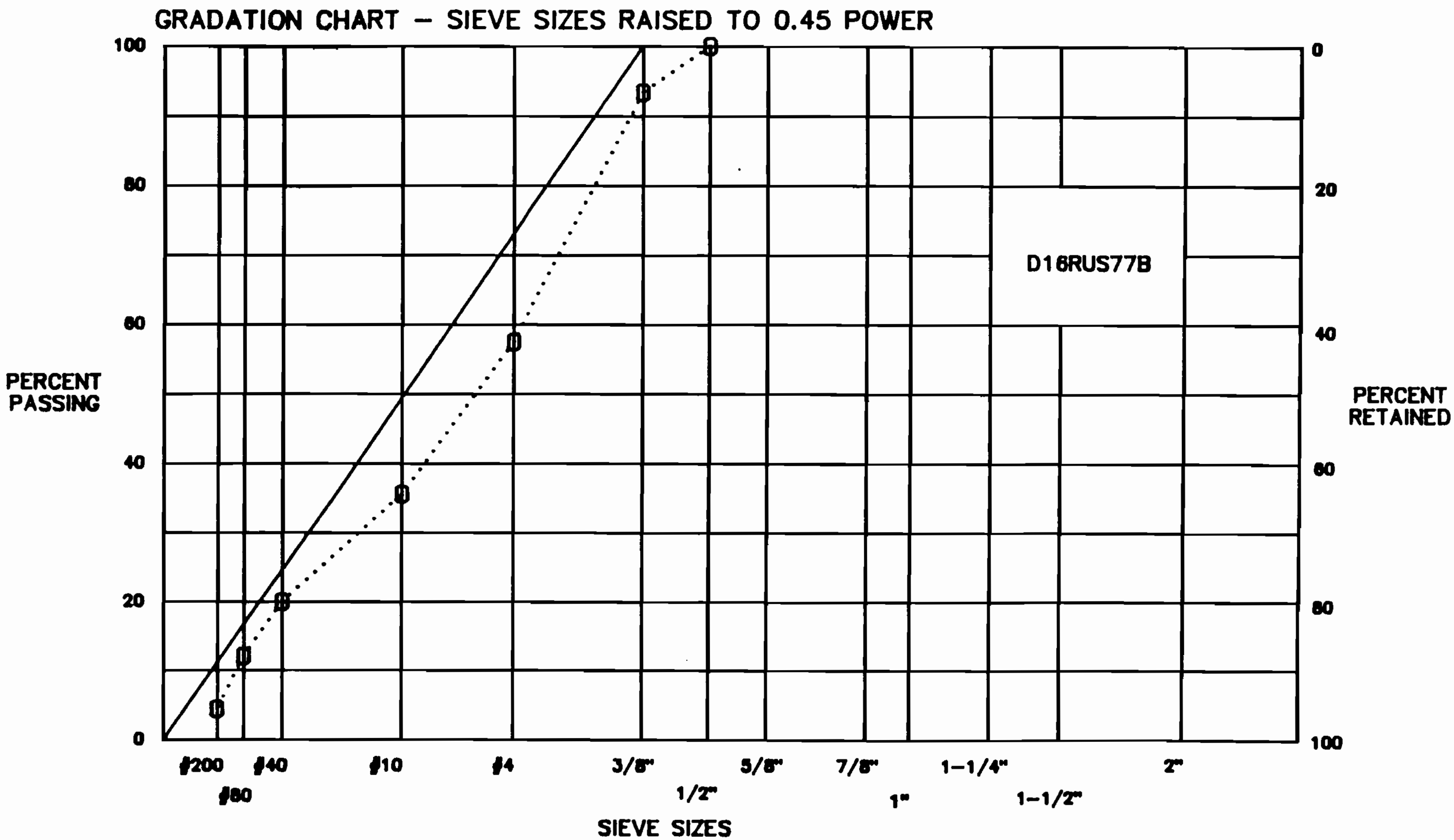
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



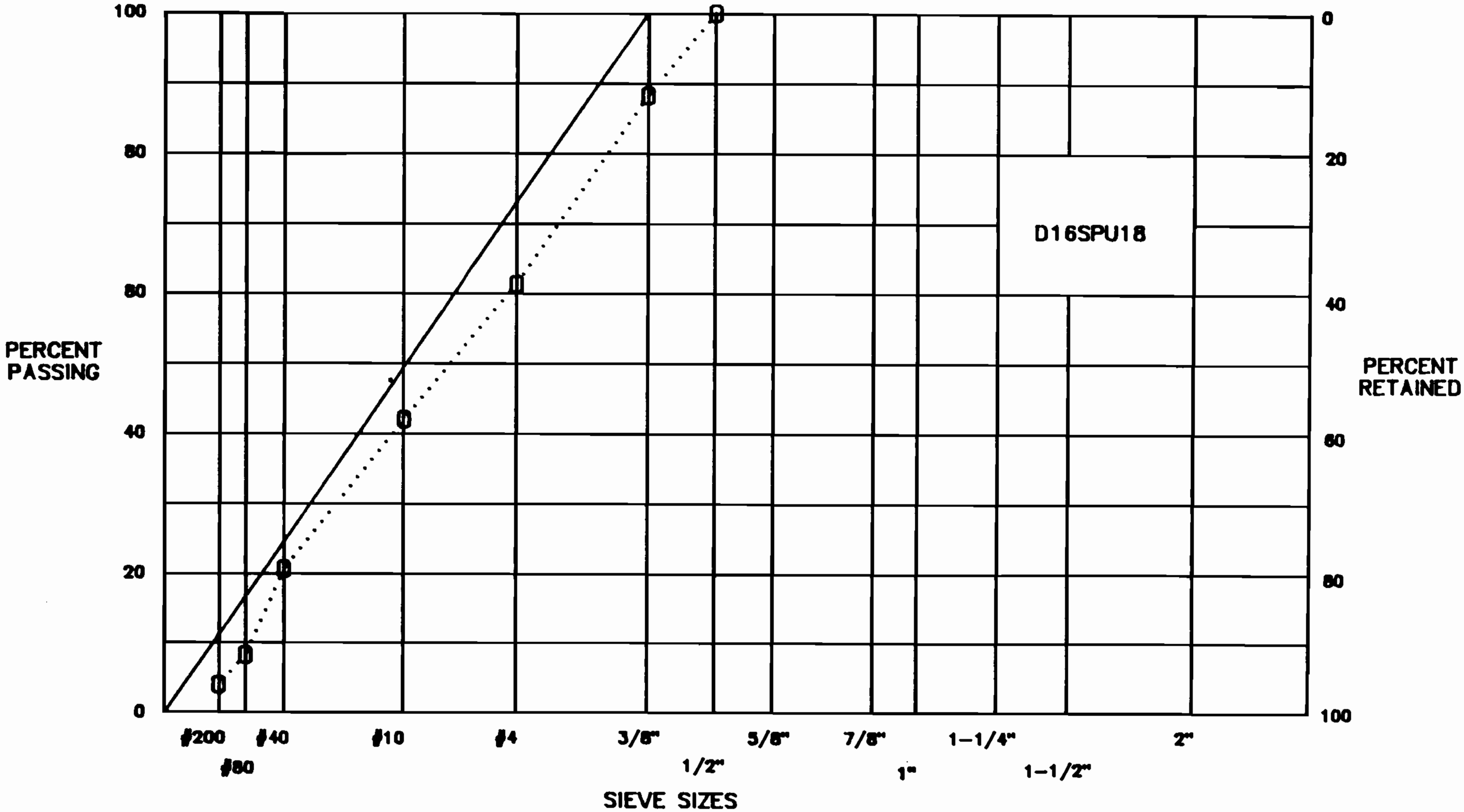
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



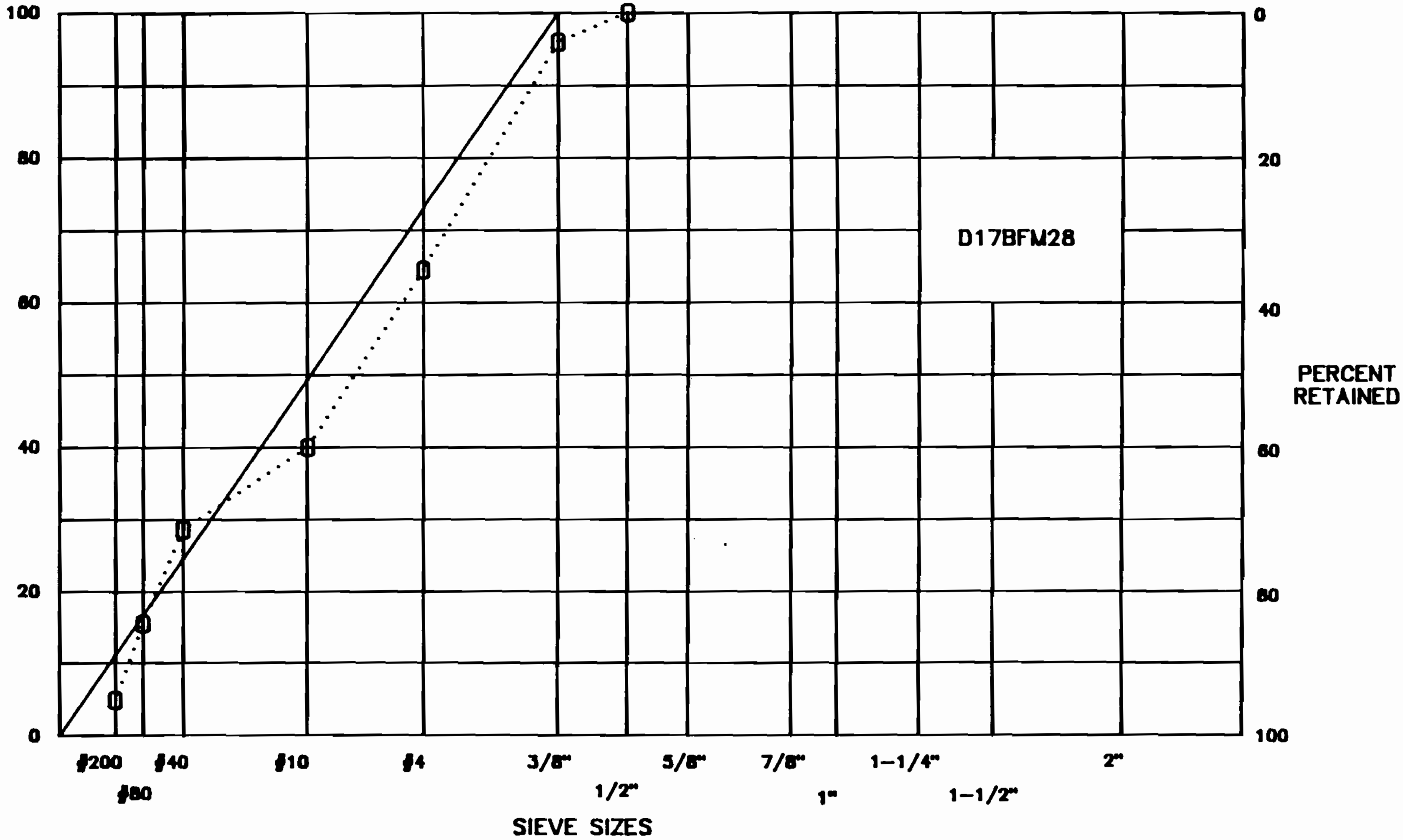

GRADATION CHART - SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
100
80
60
40
20
0
PERCENT RETAINED
0
20
40
60
80
100
D16RUS77
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES


GRADATION CHART - SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
D16RUS77B
100
80
60
40
20
0
20
40
60
80
100
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

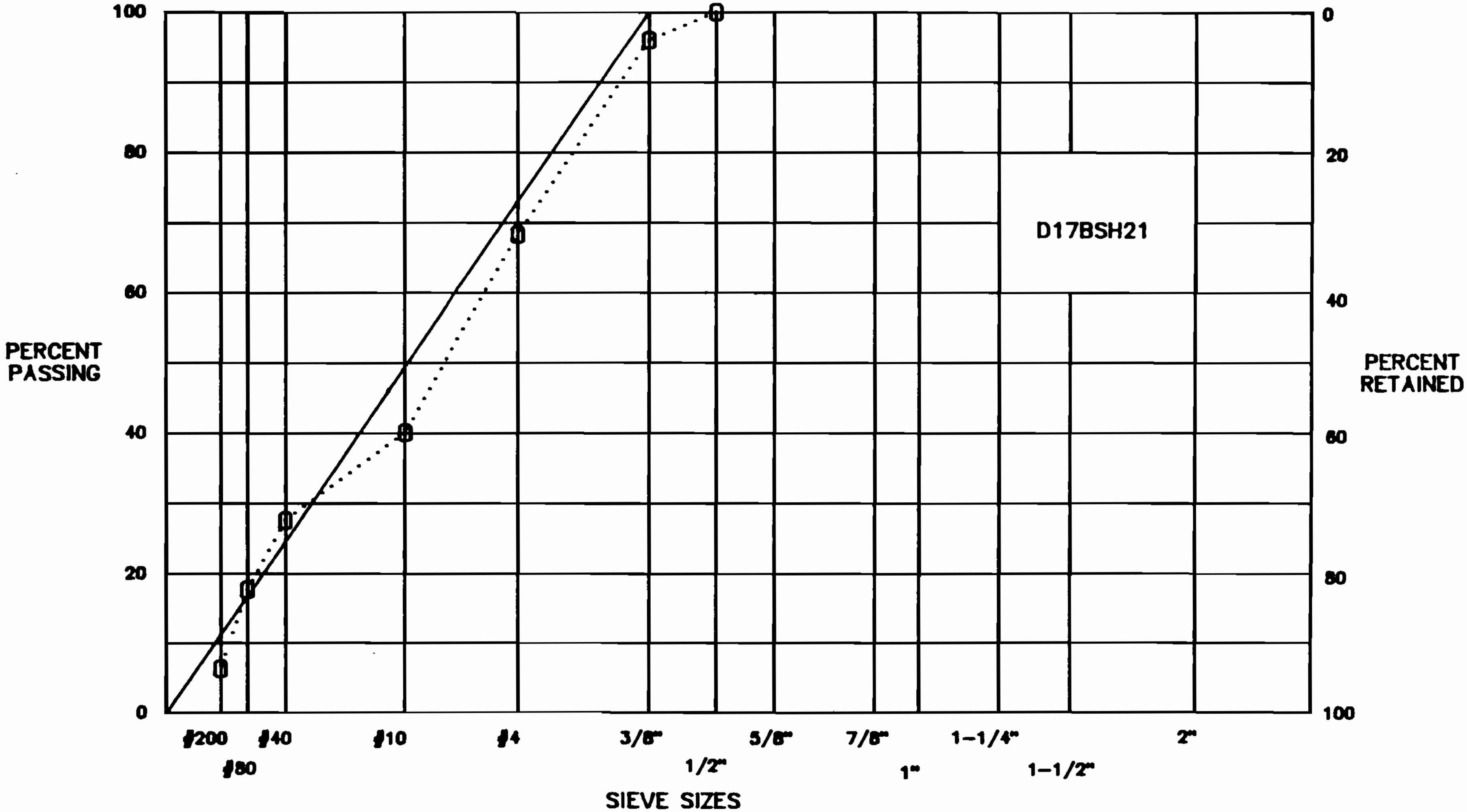
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



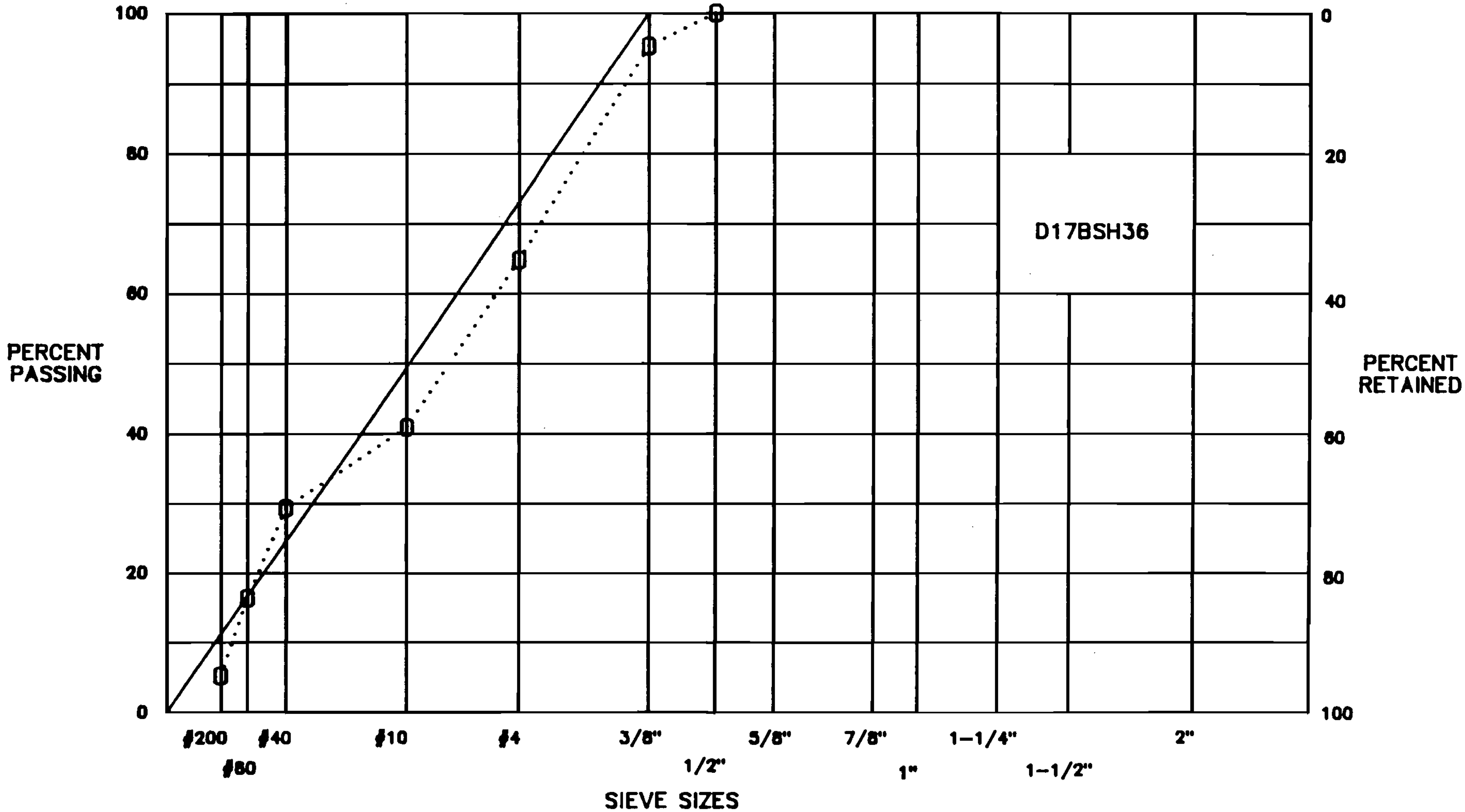
GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER

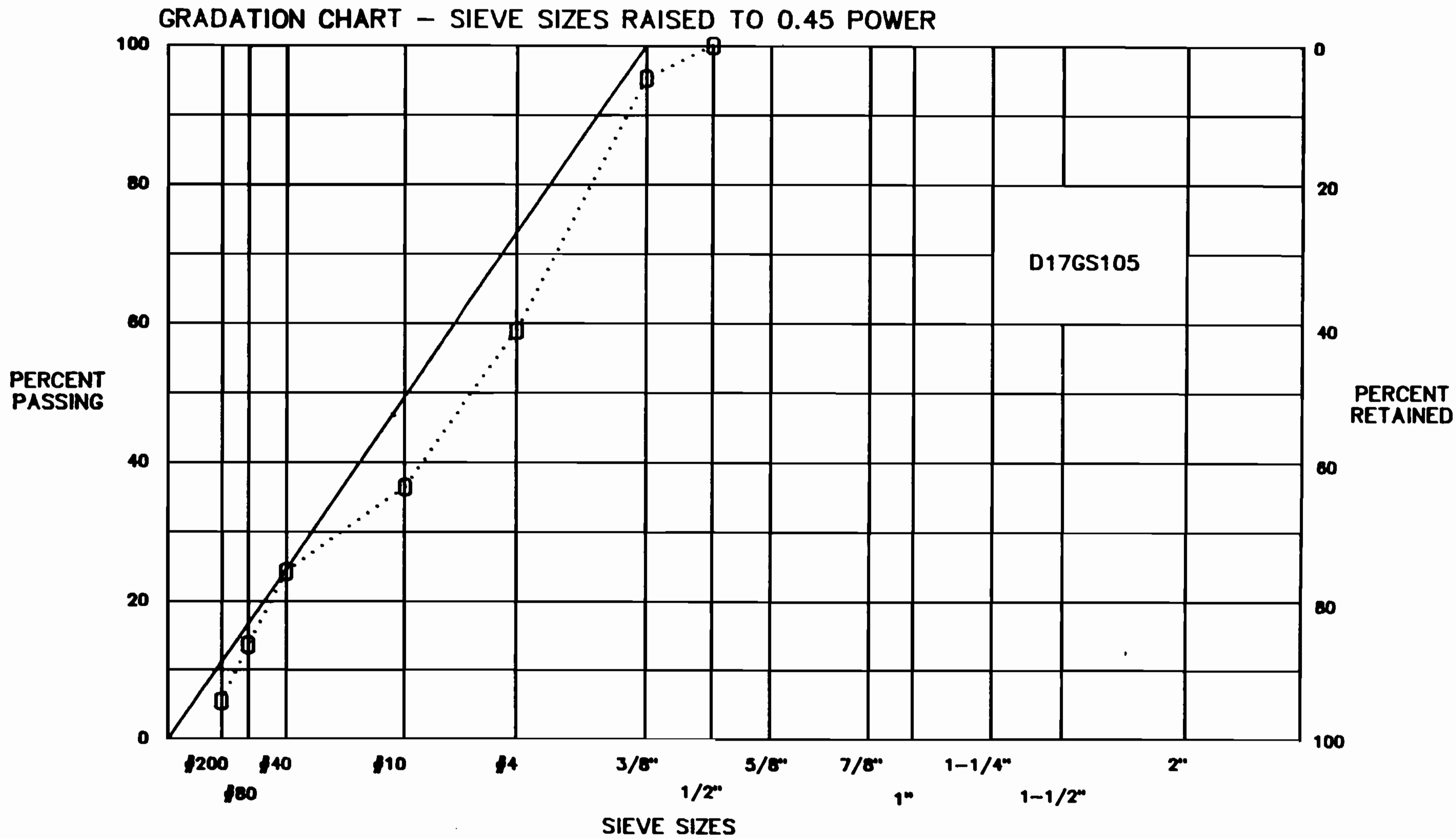


GRADATION CHART - SIEVE SIZES RAISED TO 0.45 POWER

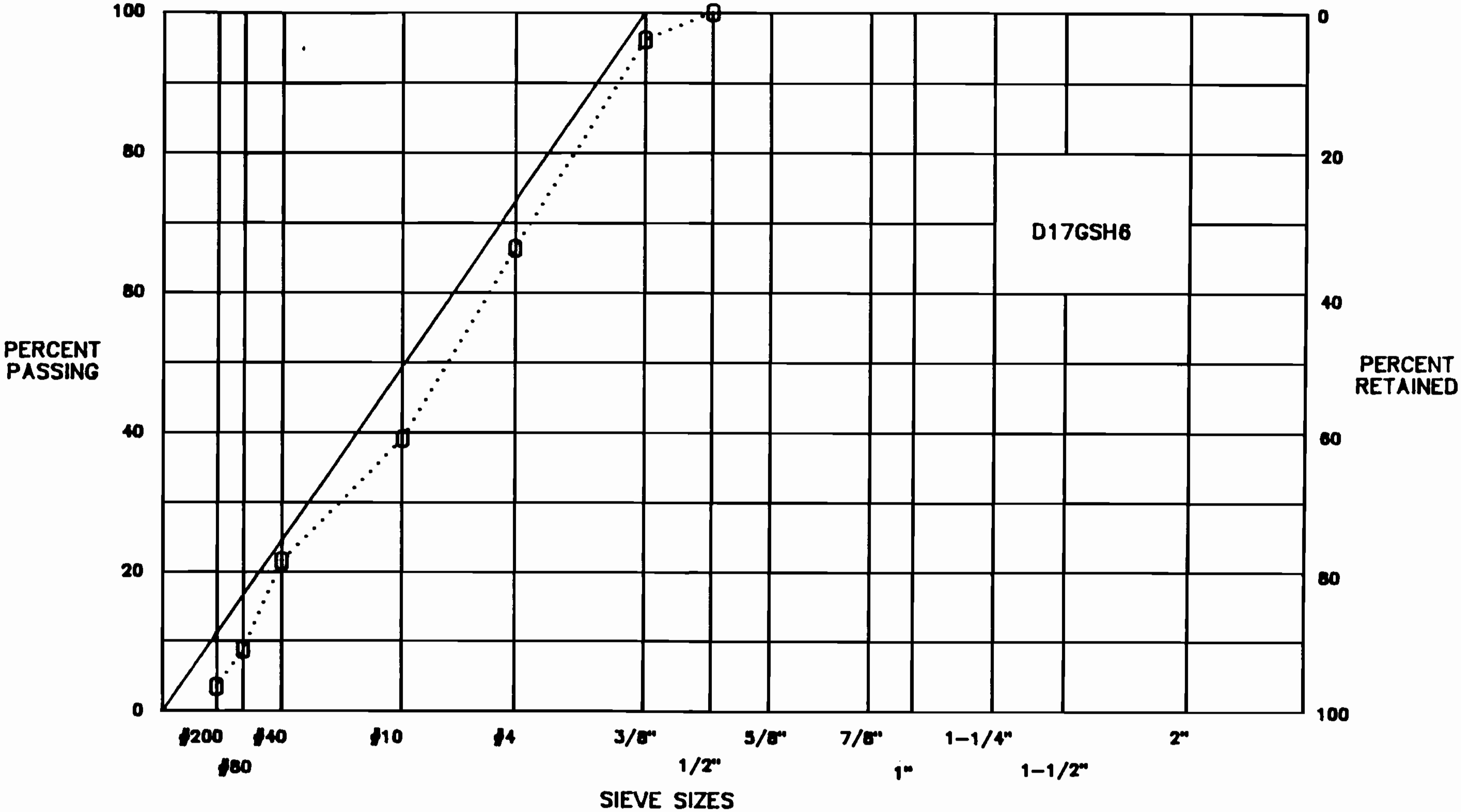


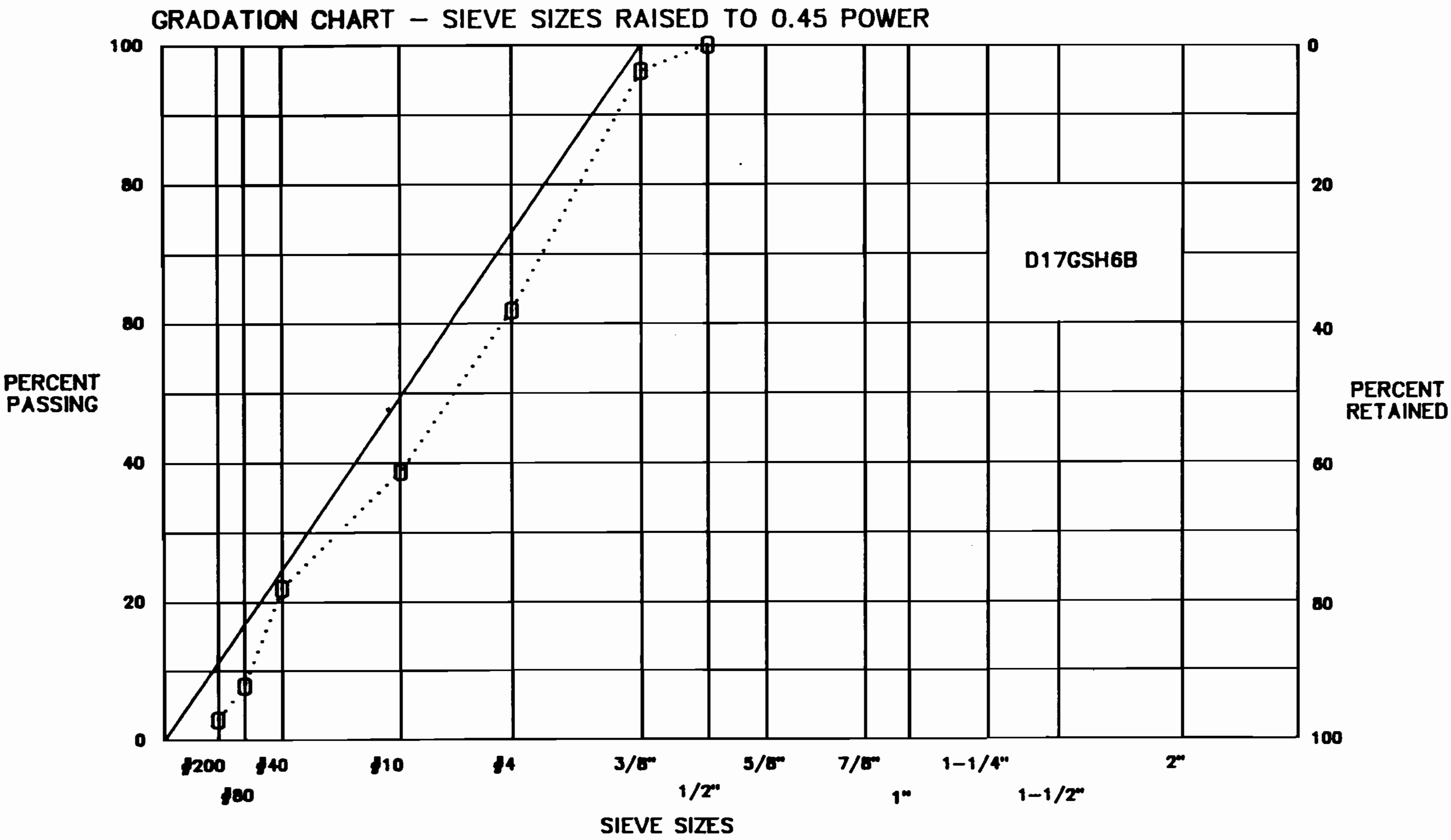
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



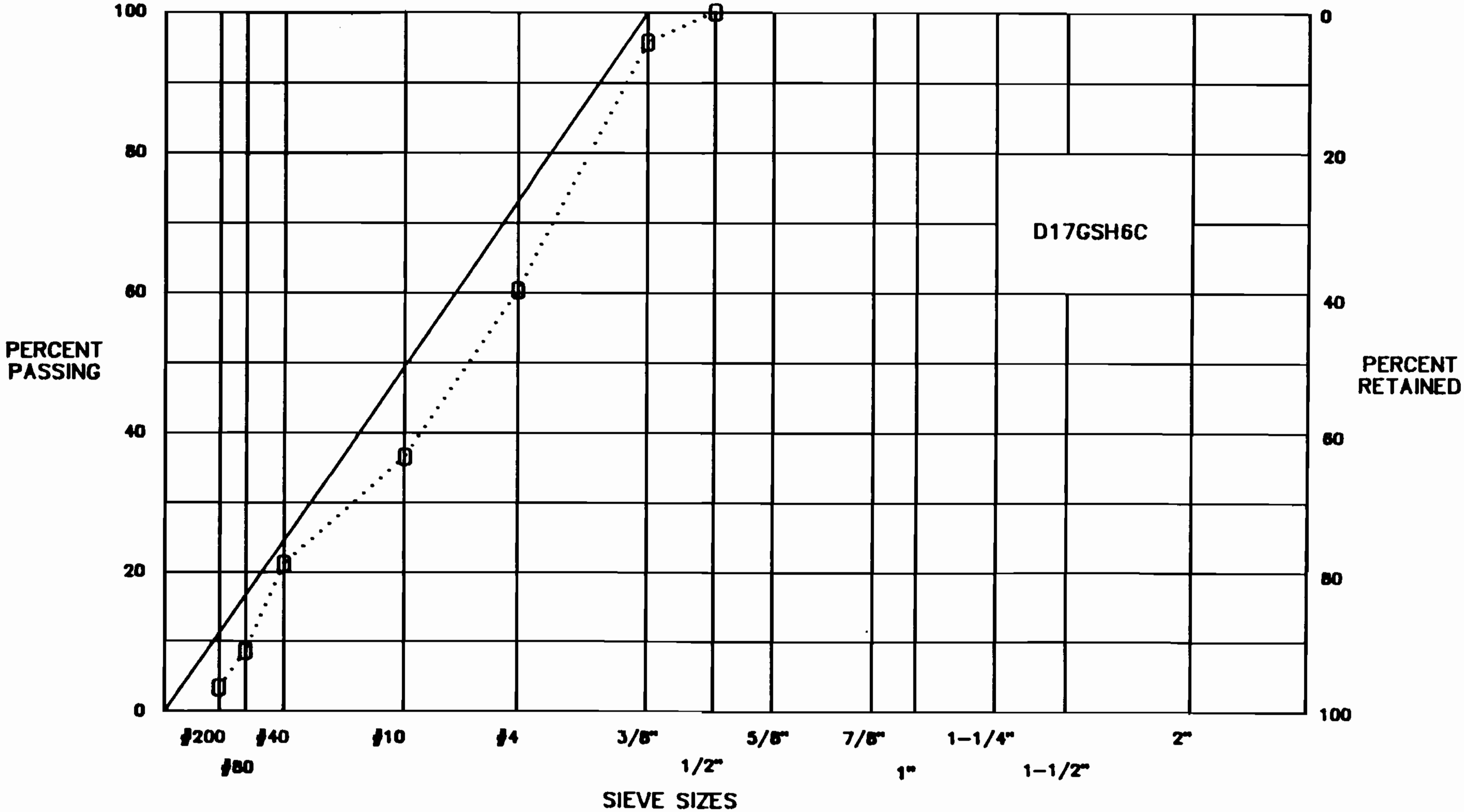

GRADATION CHART - SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
D17GS105
100
80
60
40
20
0
0
20
40
60
80
100
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

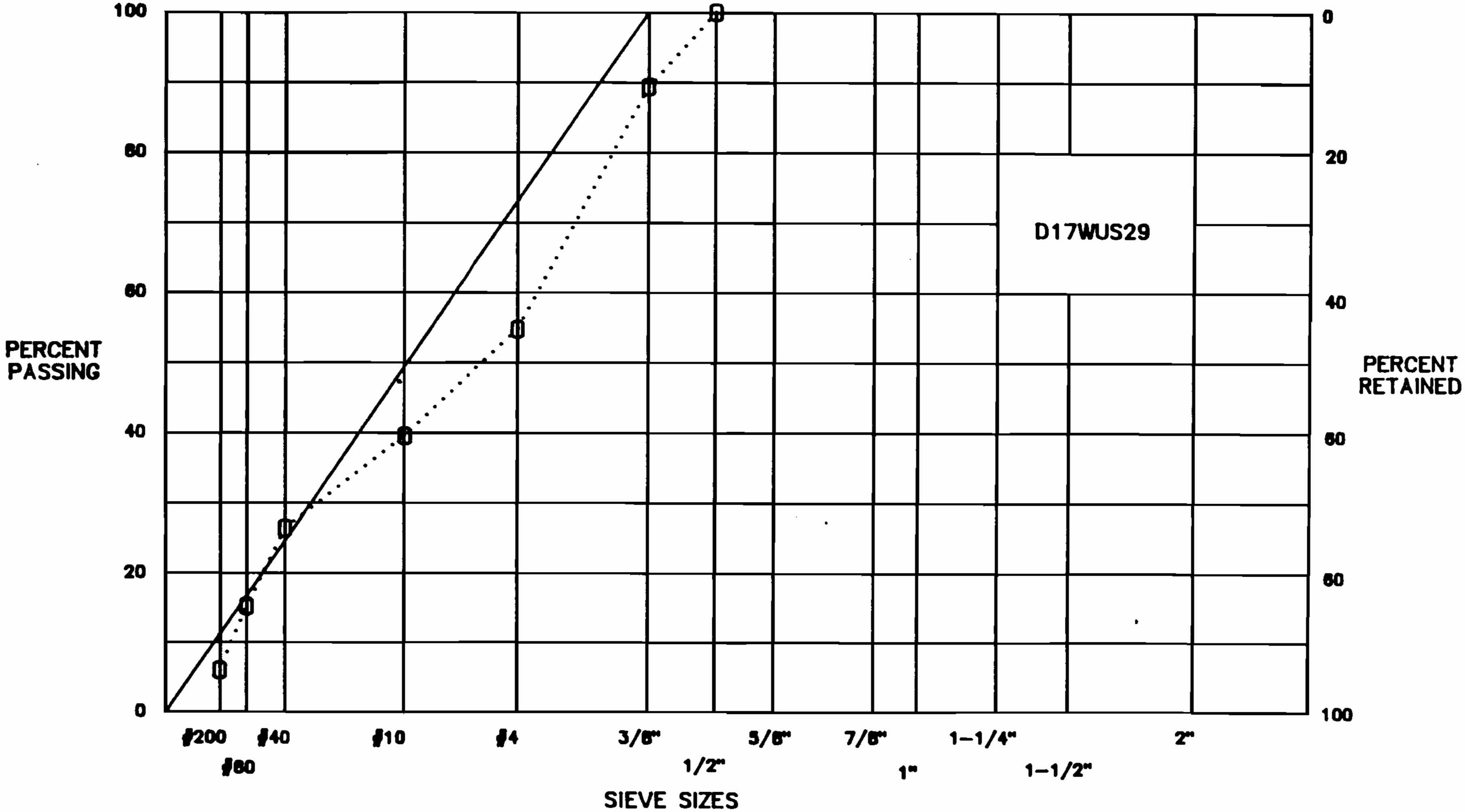



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
D17GSH6B
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

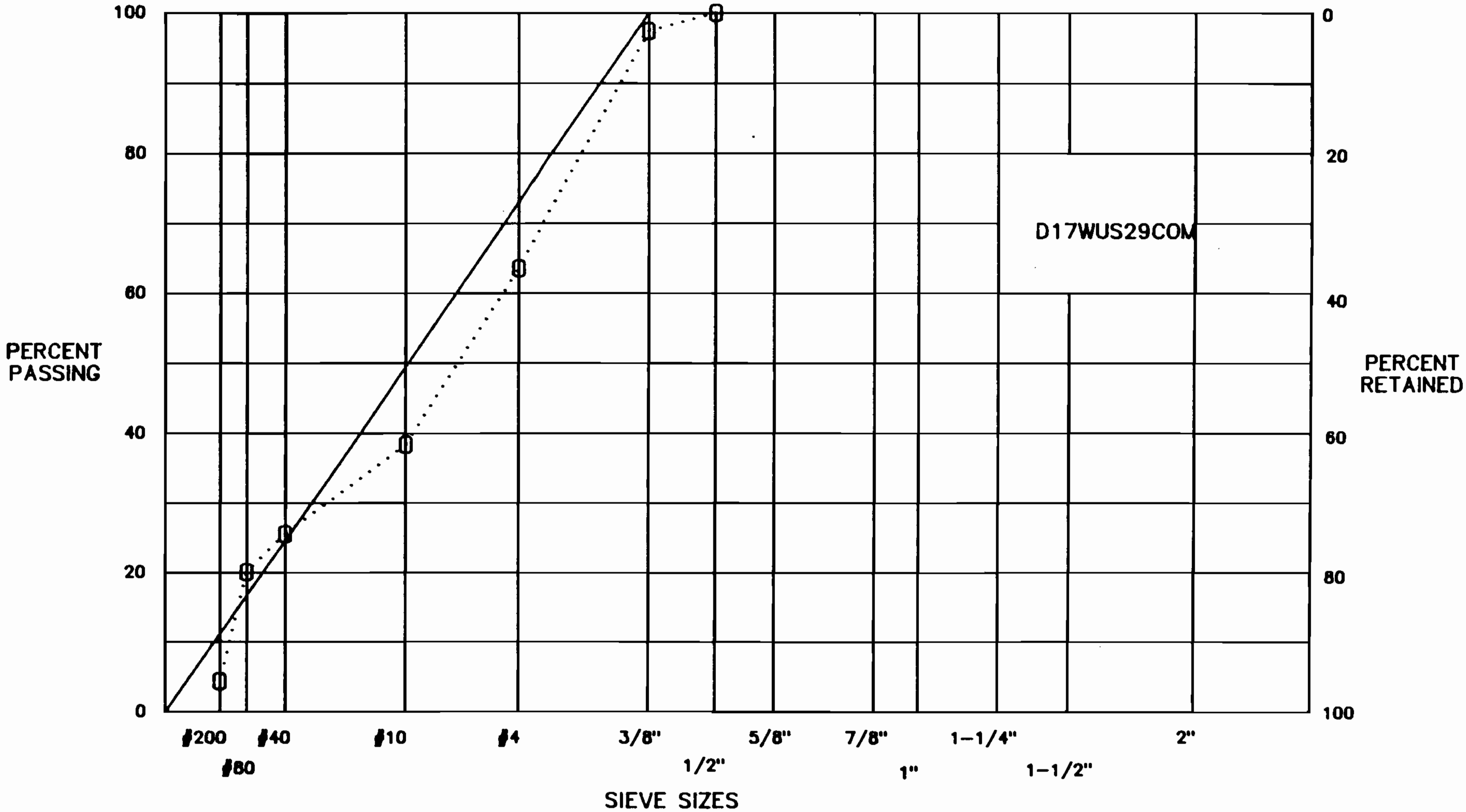
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

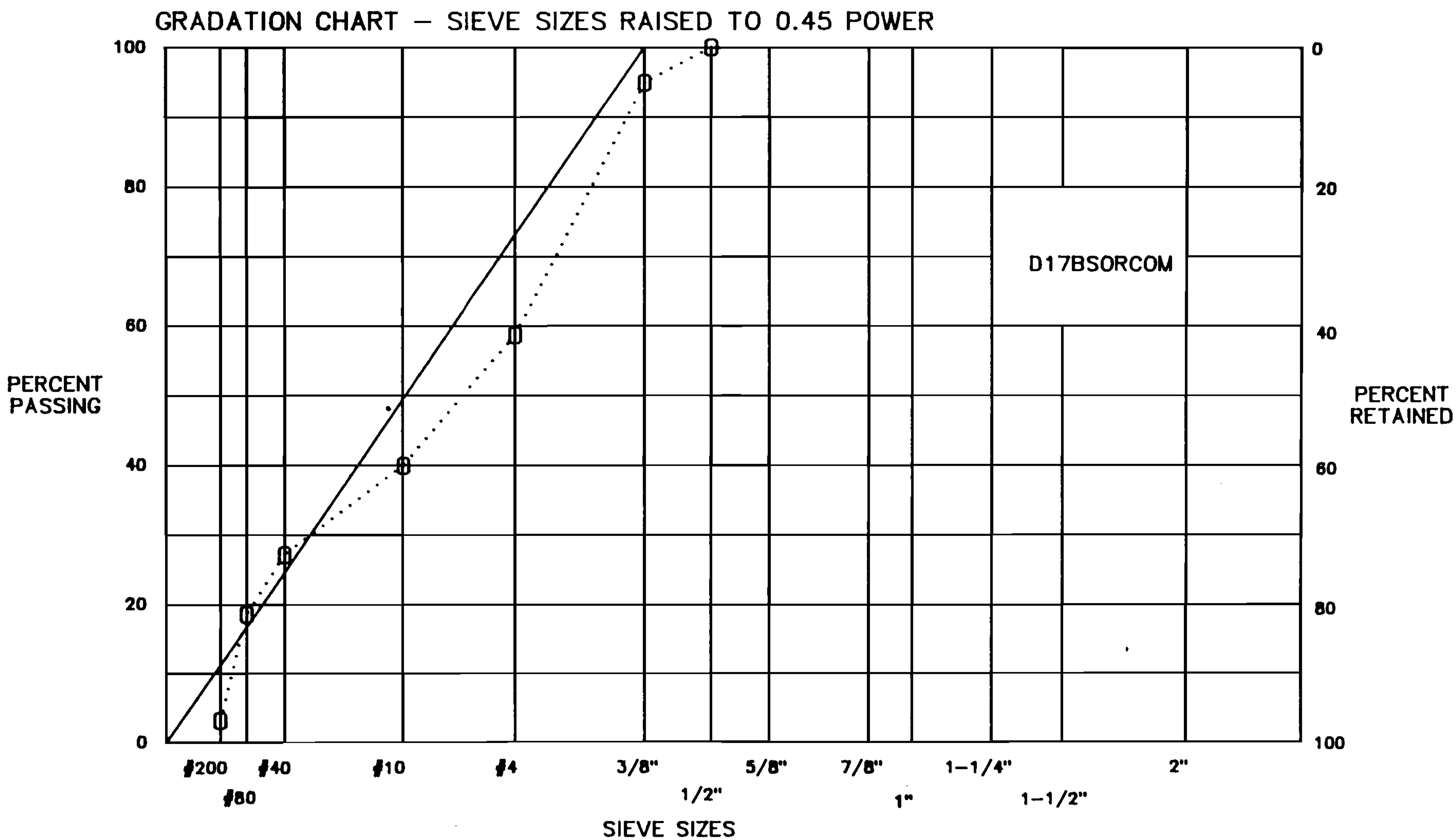


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

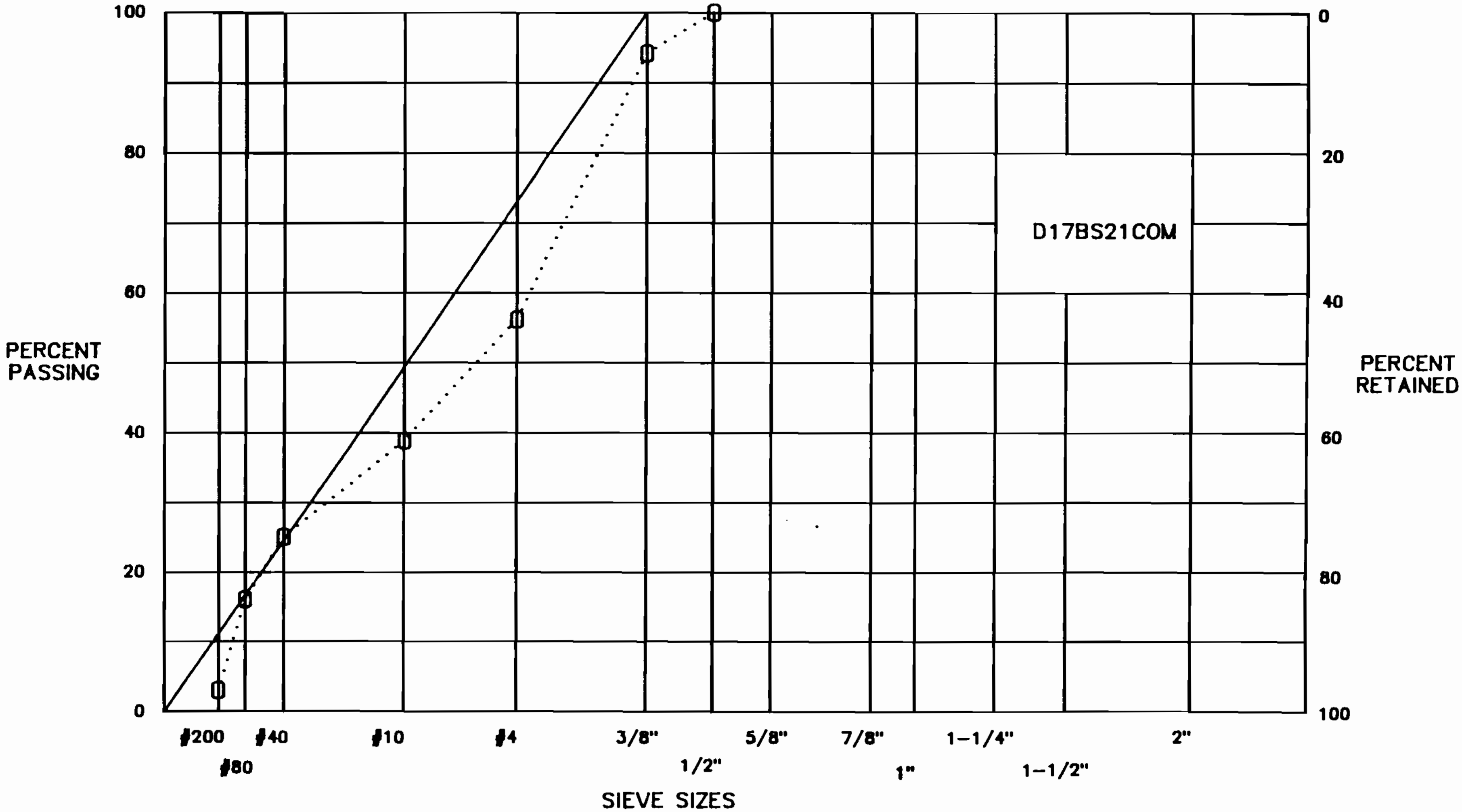


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

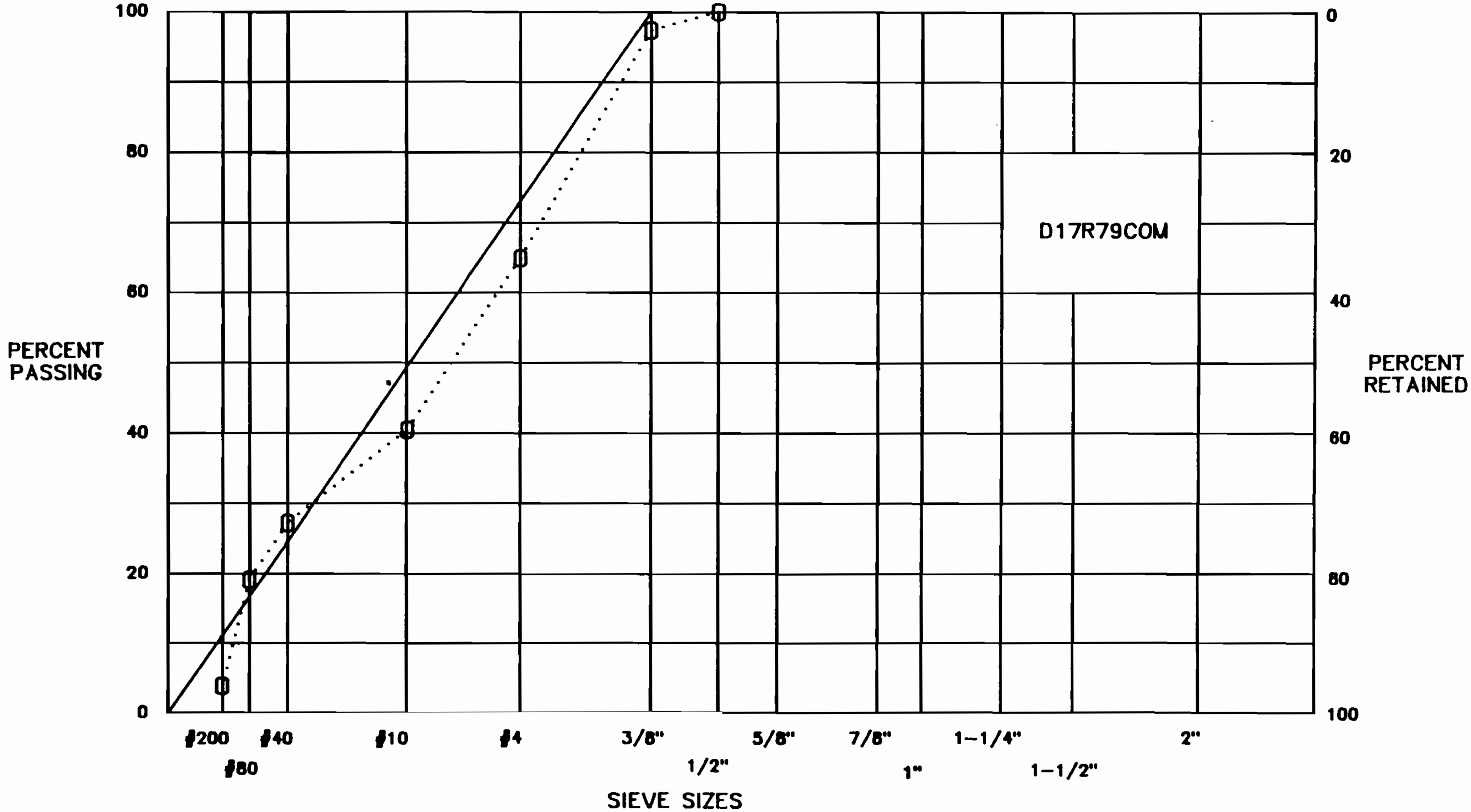


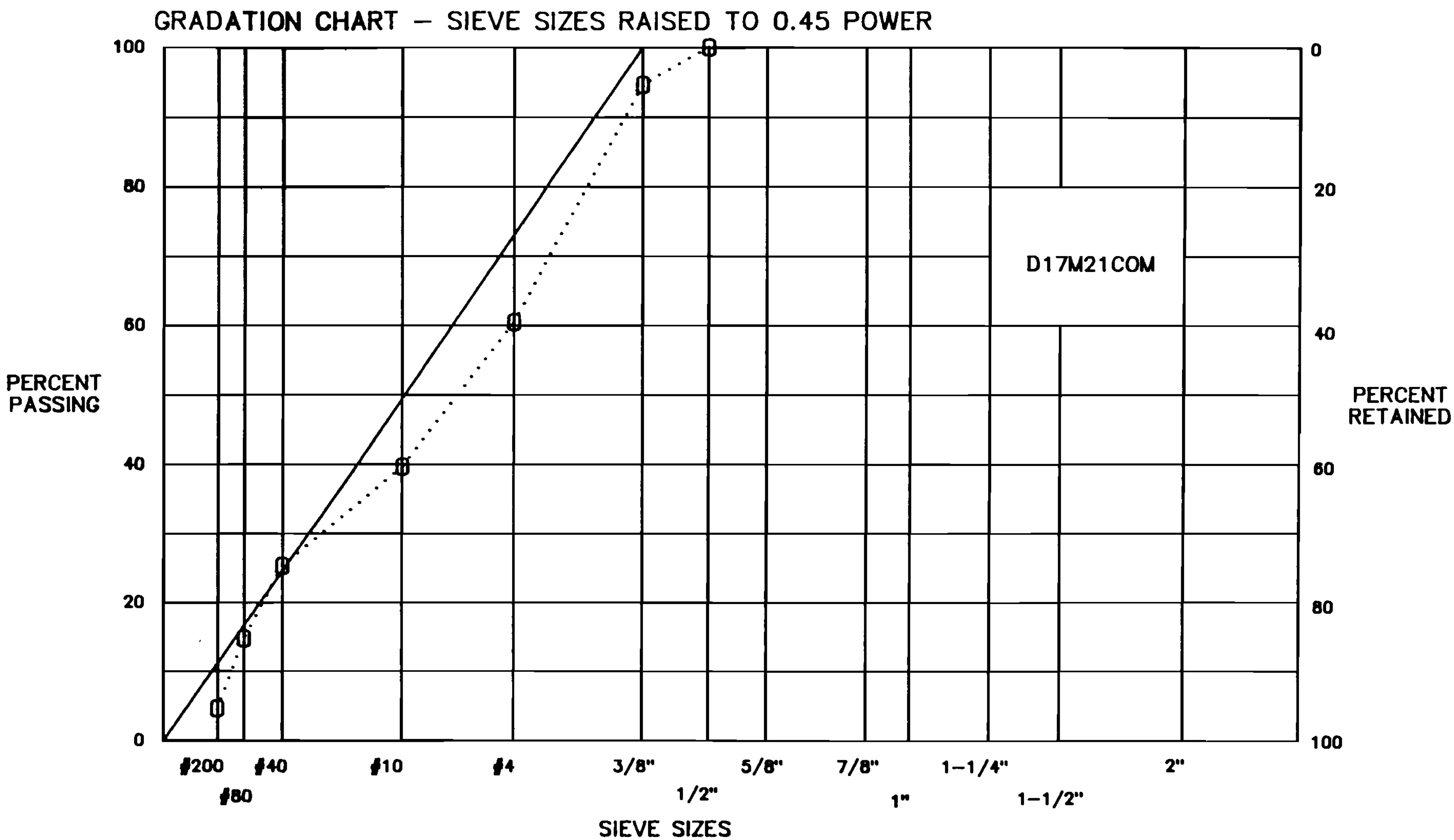

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
100
80
60
40
20
0
PERCENT RETAINED
0
20
40
60
80
100
D17BSORCOM
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

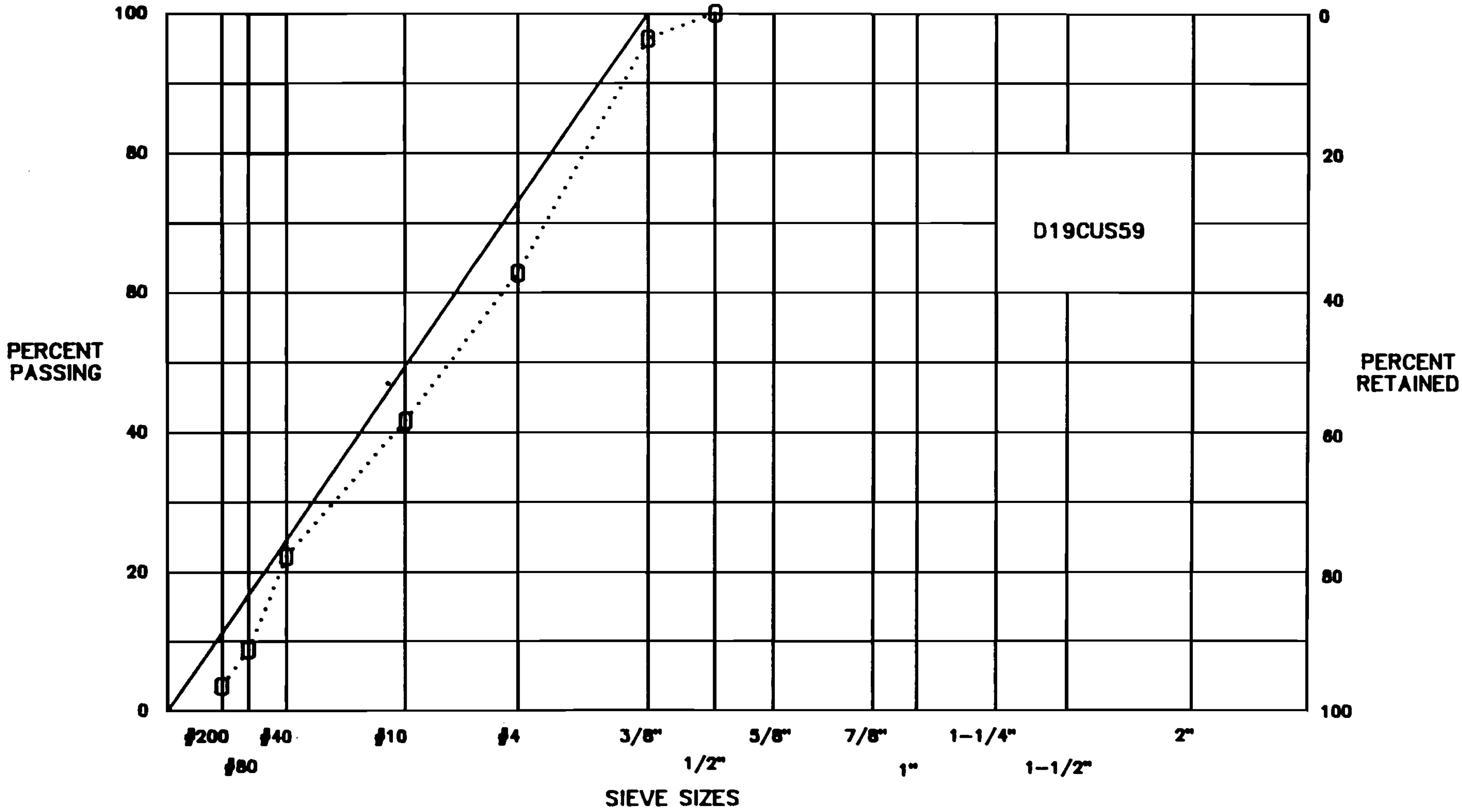


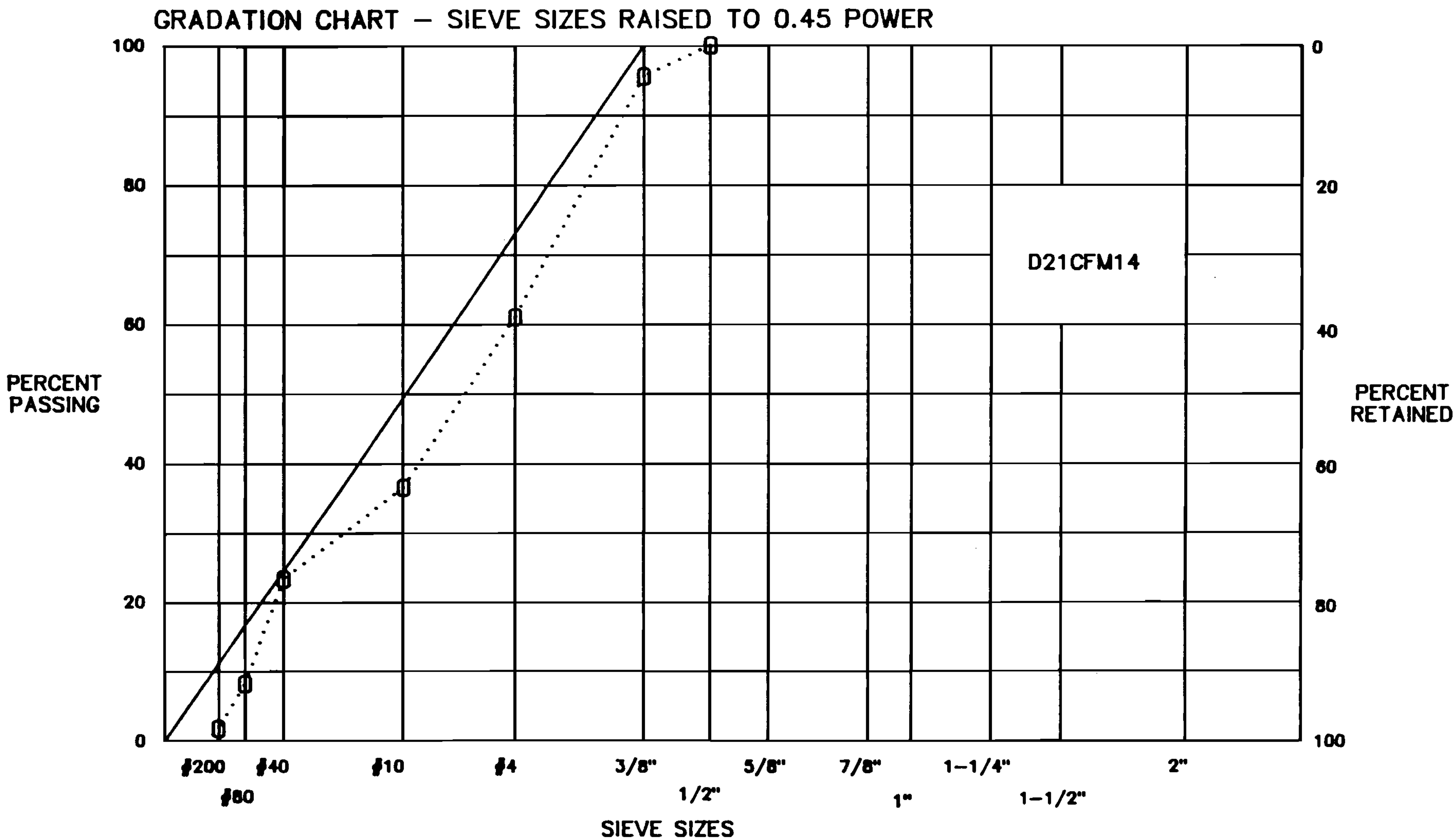
GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER

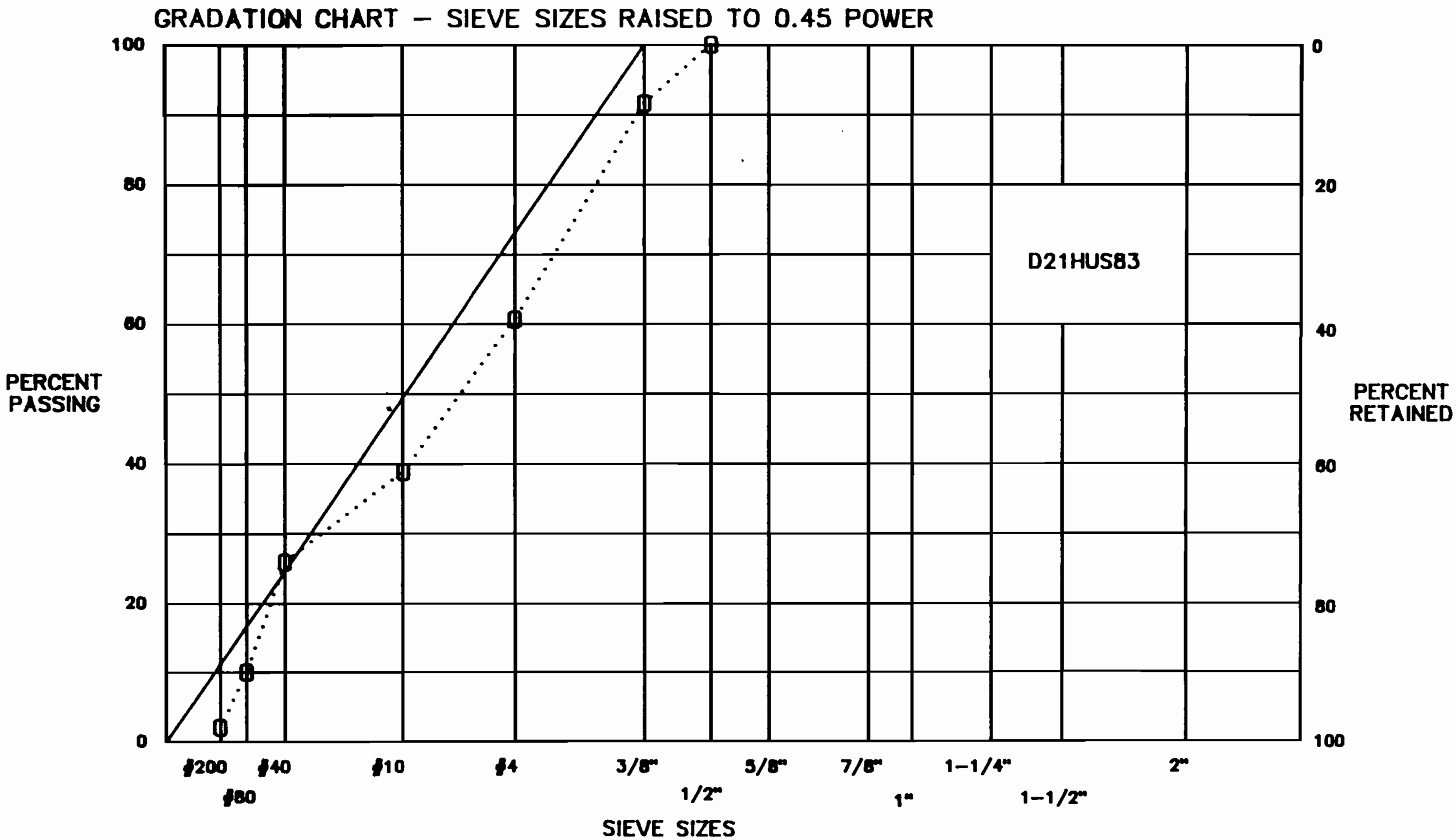



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
0
20
40
60
80
100
D17M21COM
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

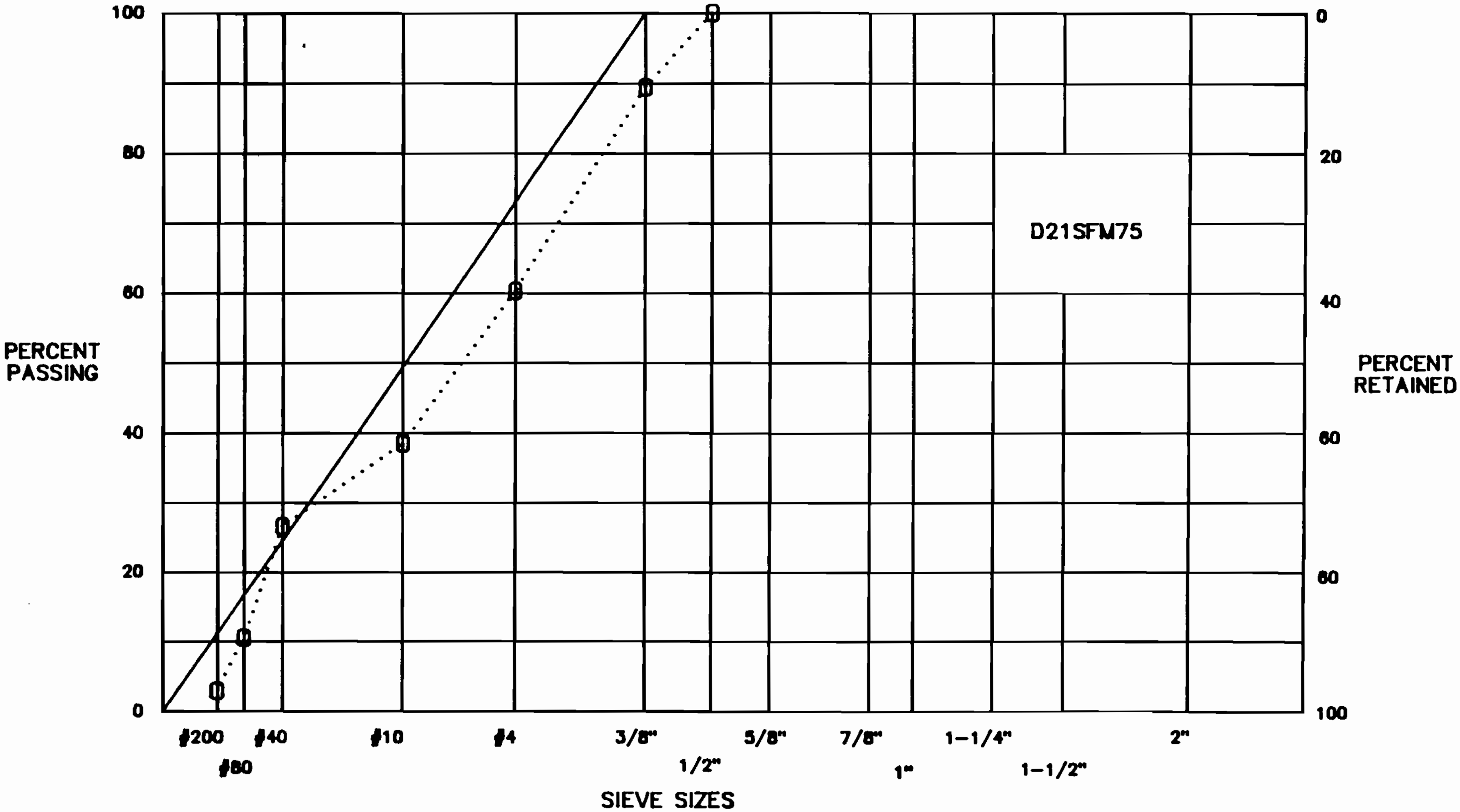
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

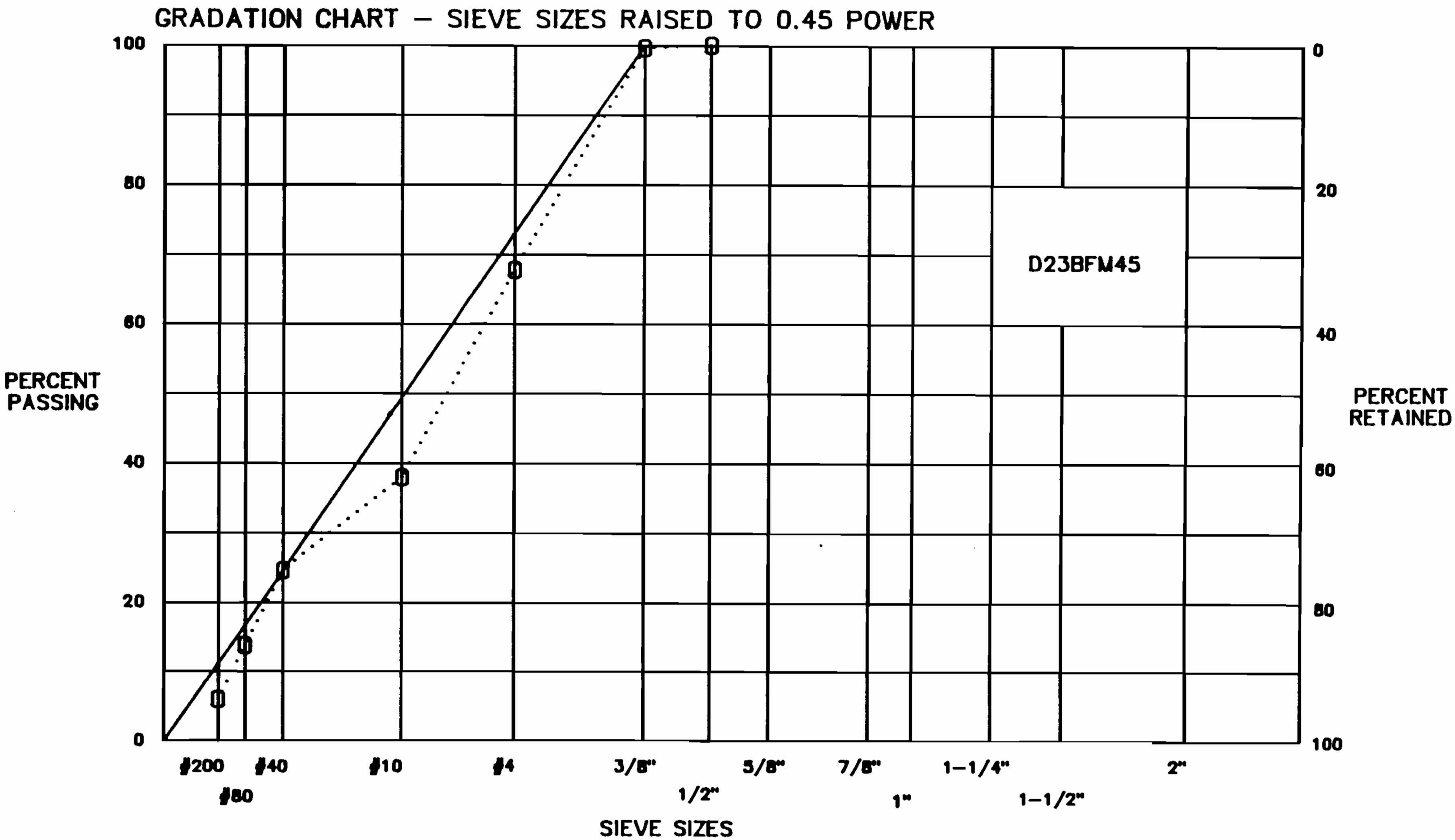



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
0
20
40
60
80
100
D21CFM14
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

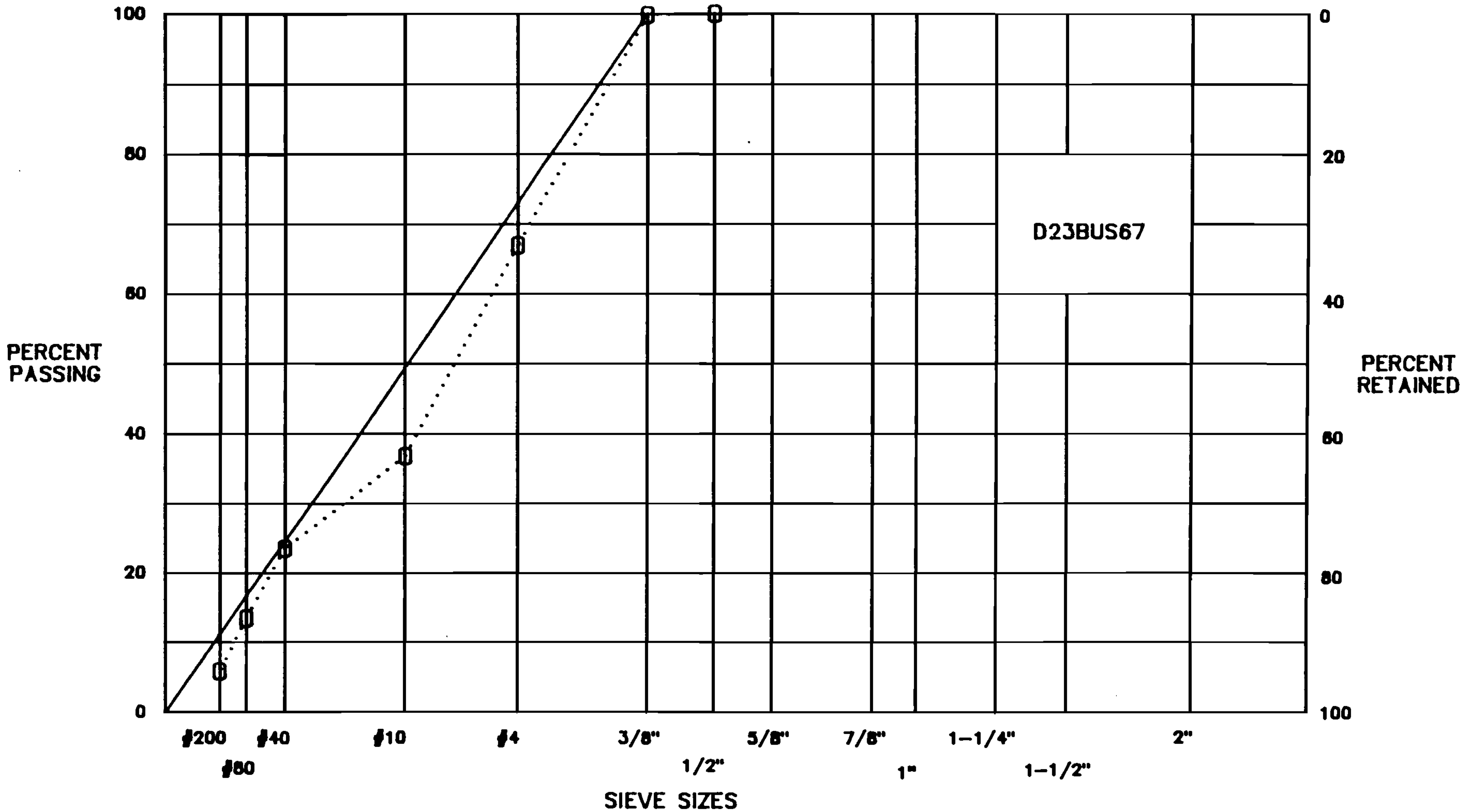

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
100
80
60
40
20
0
PERCENT PASSING
0
20
40
60
80
100
PERCENT RETAINED
D21HUS83
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

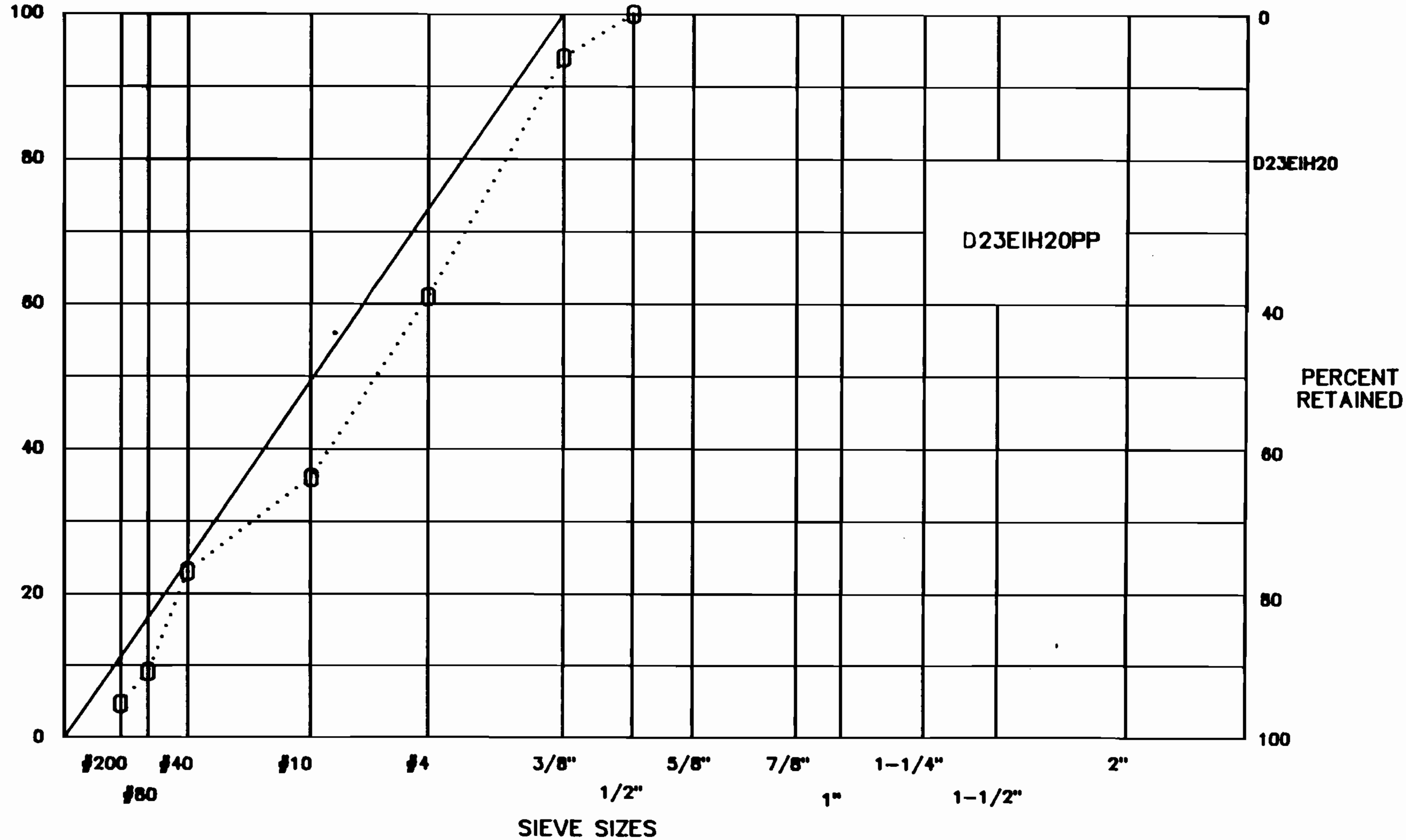



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
0
20
40
60
80
100
D23BFM45
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

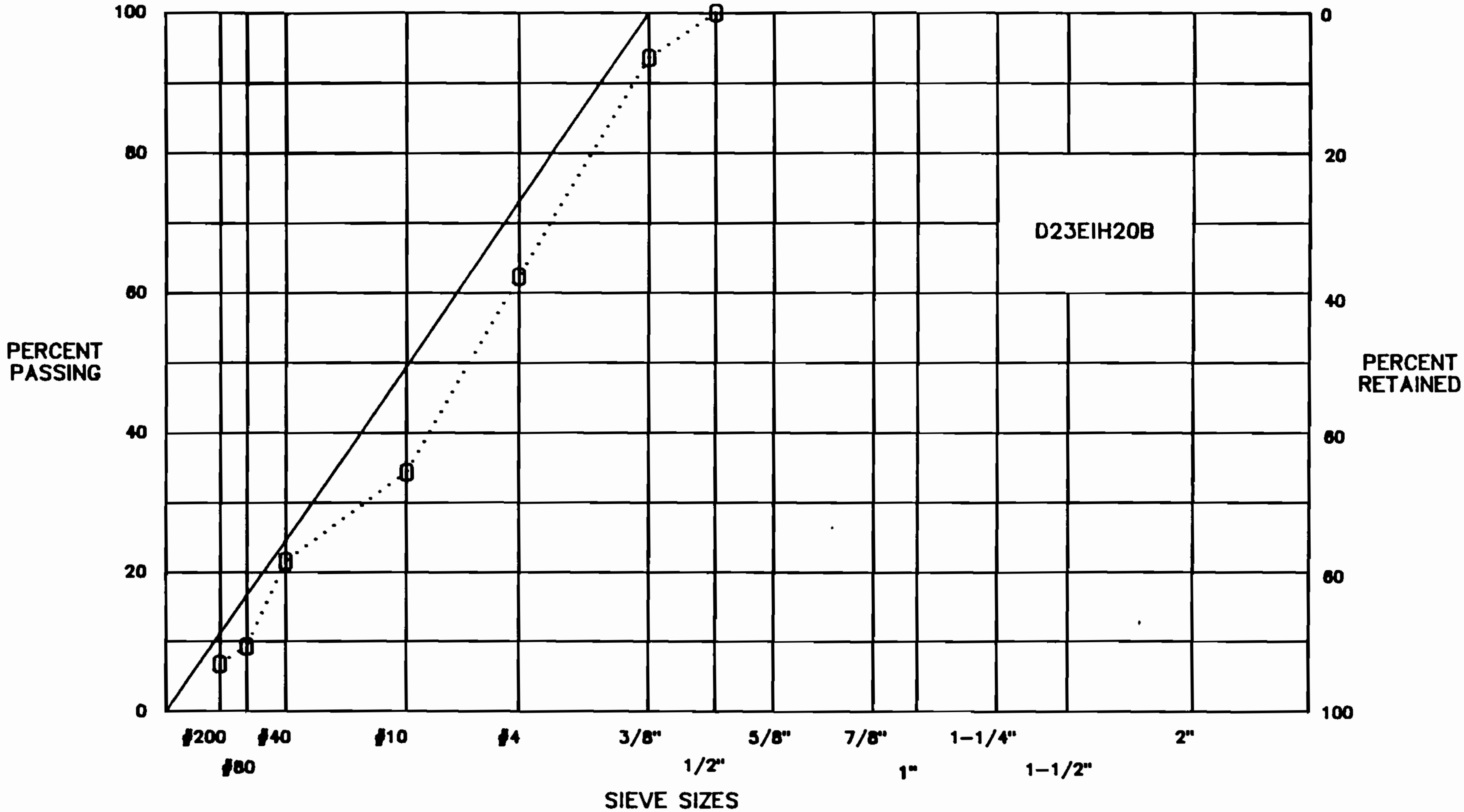
GRADATION CHART — SIEVE SIZES RAISED TO 0.45 POWER

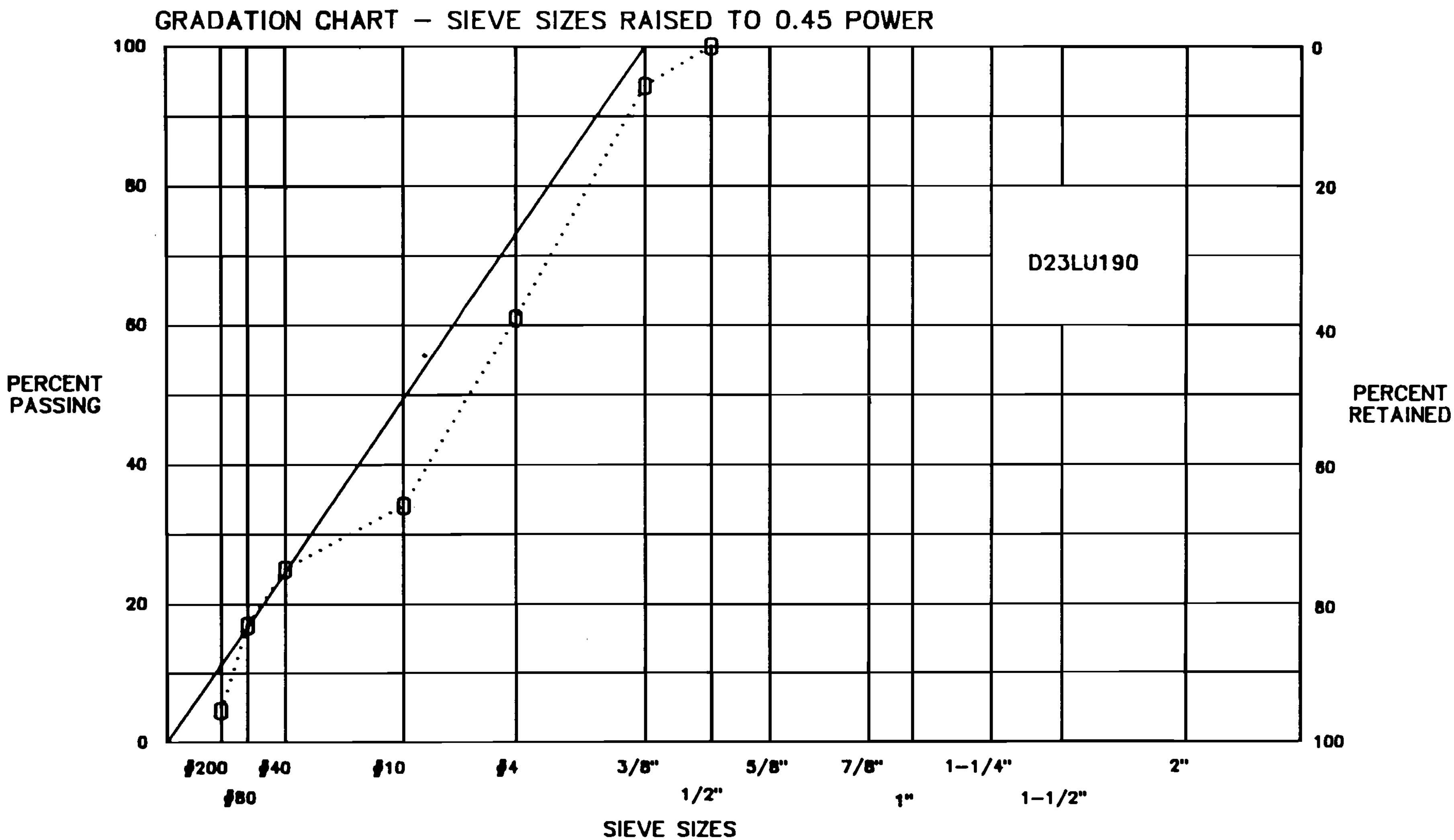


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

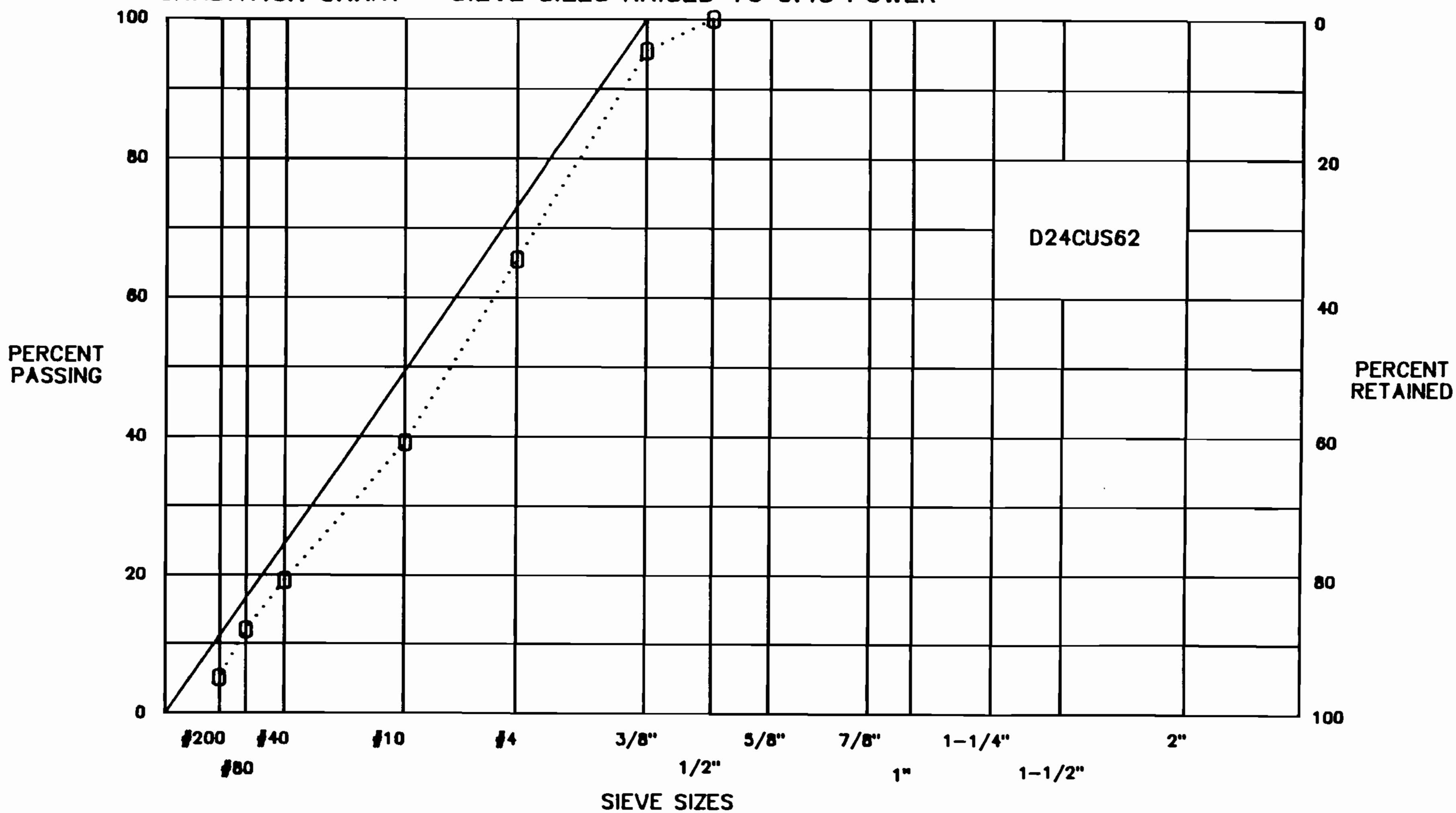


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER




GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
100
80
60
40
20
0
0
20
40
60
80
100
D23LU190
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



0.45 Power gradation charts
For Type G mixtures

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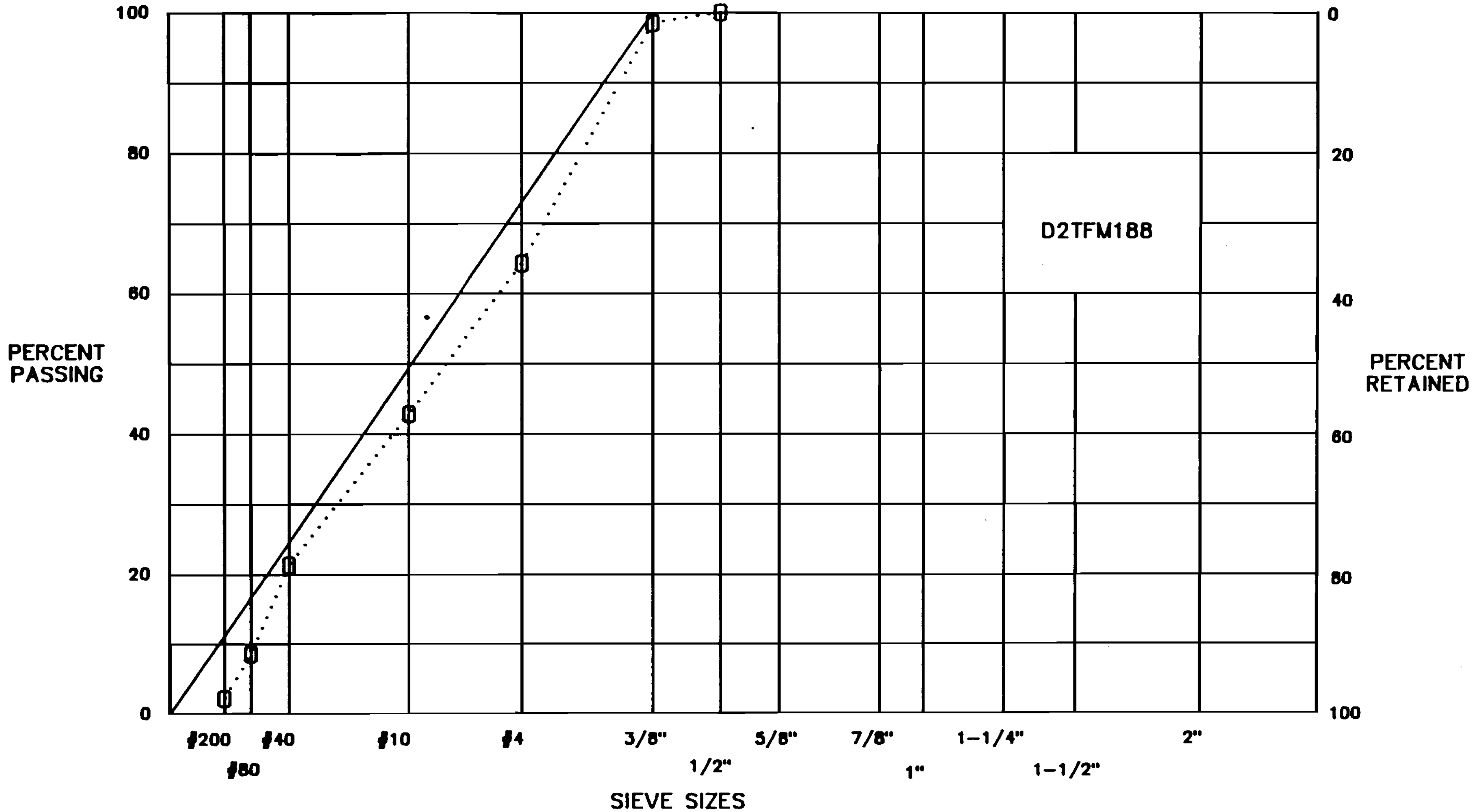
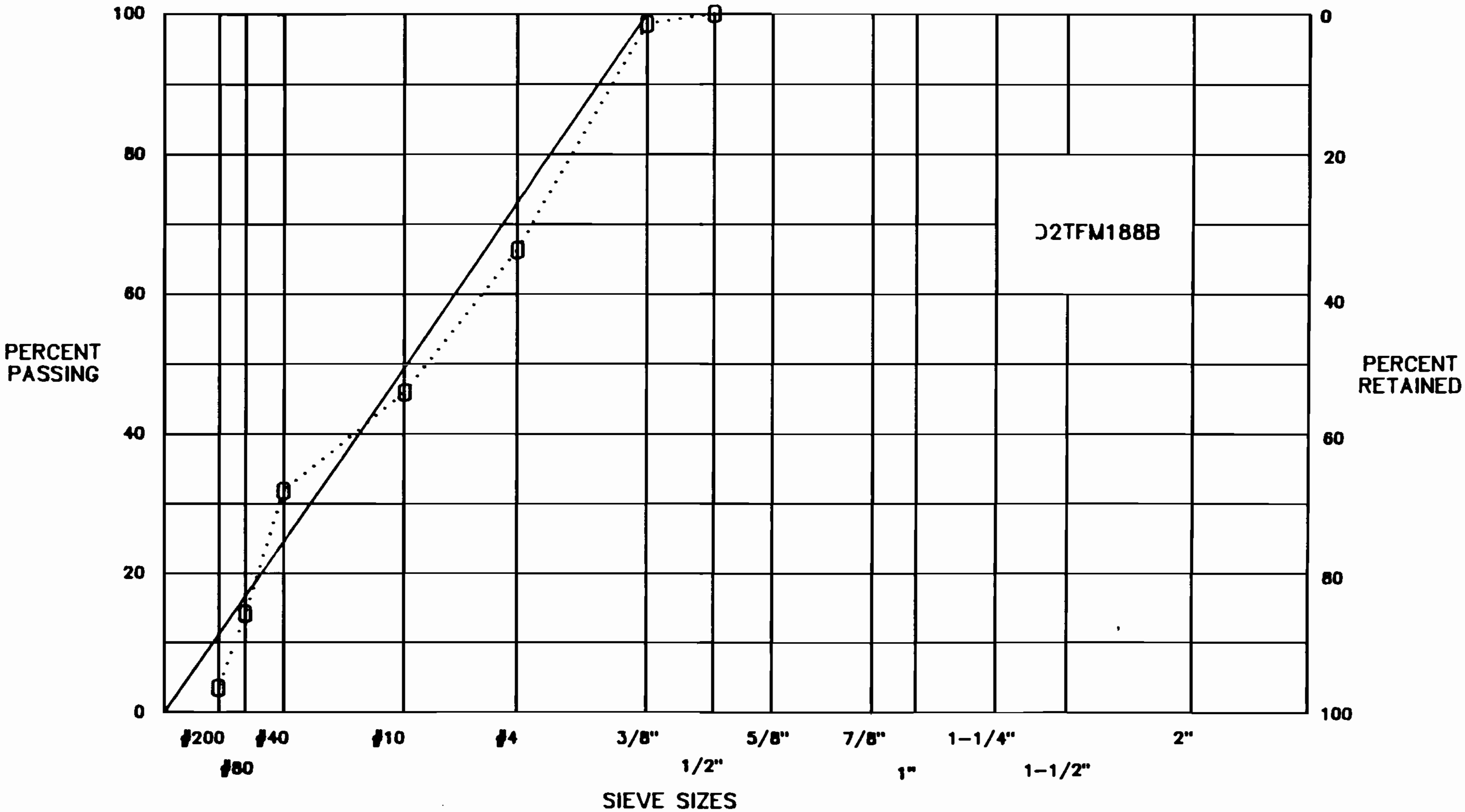
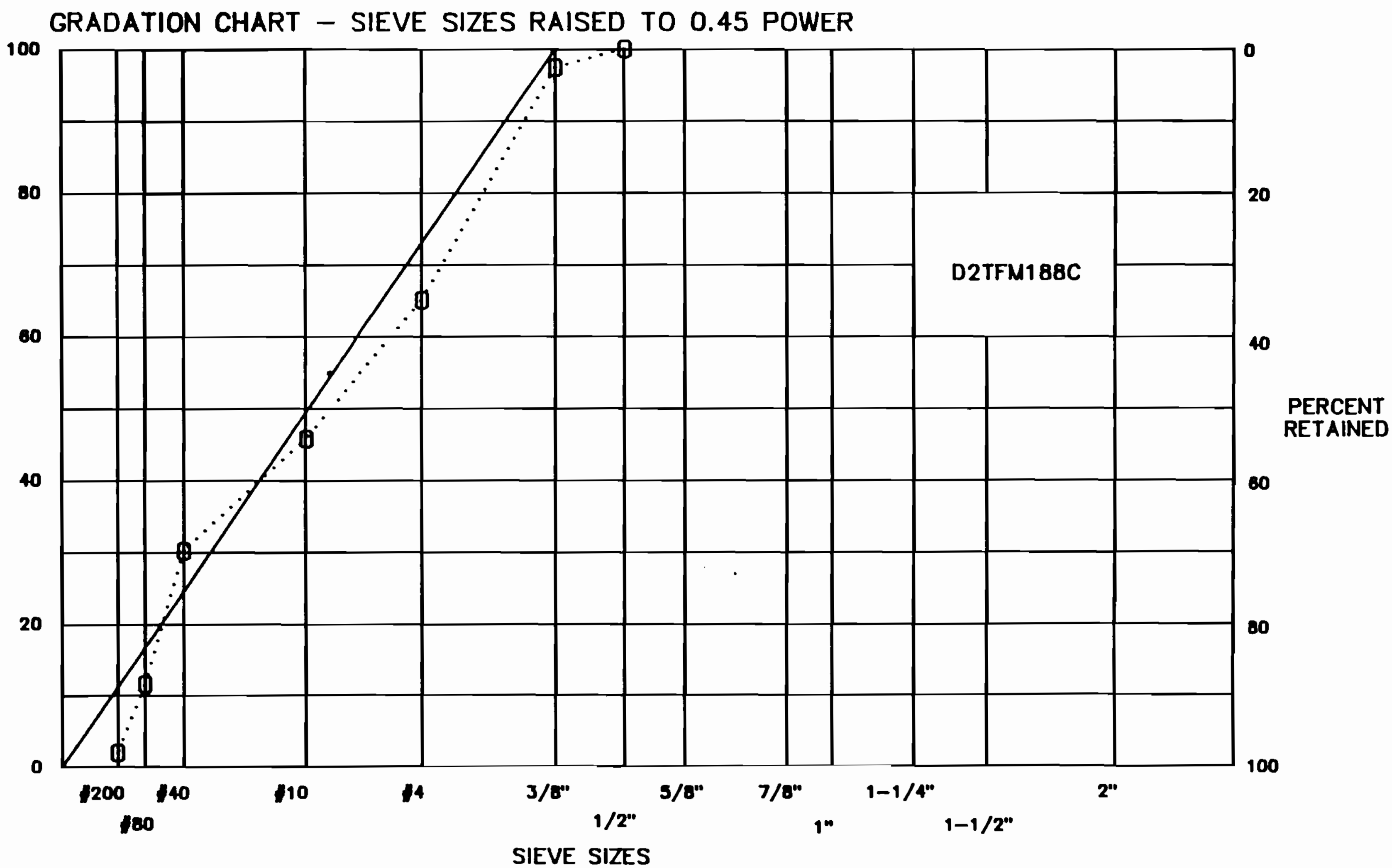
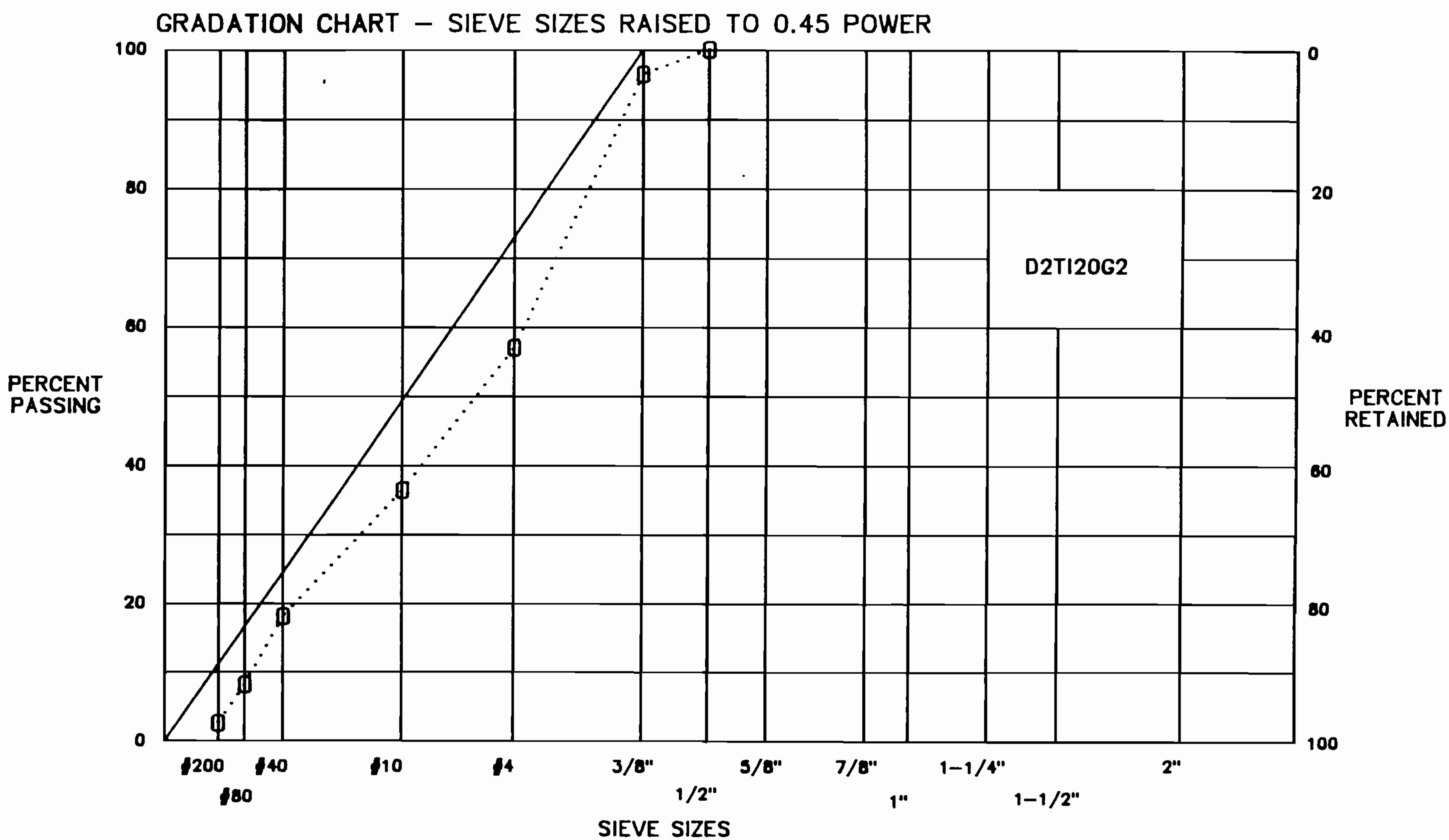
GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

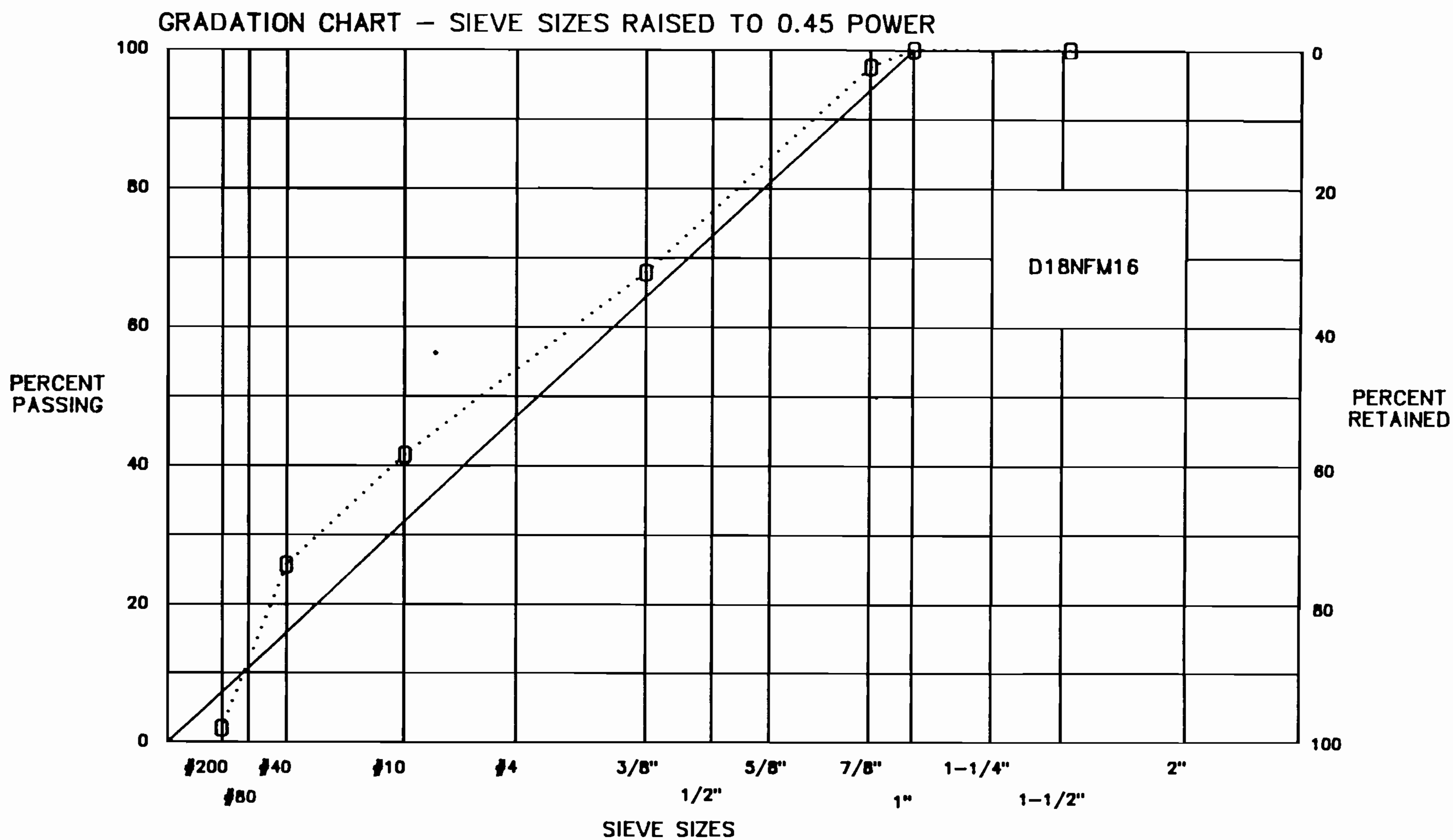


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER

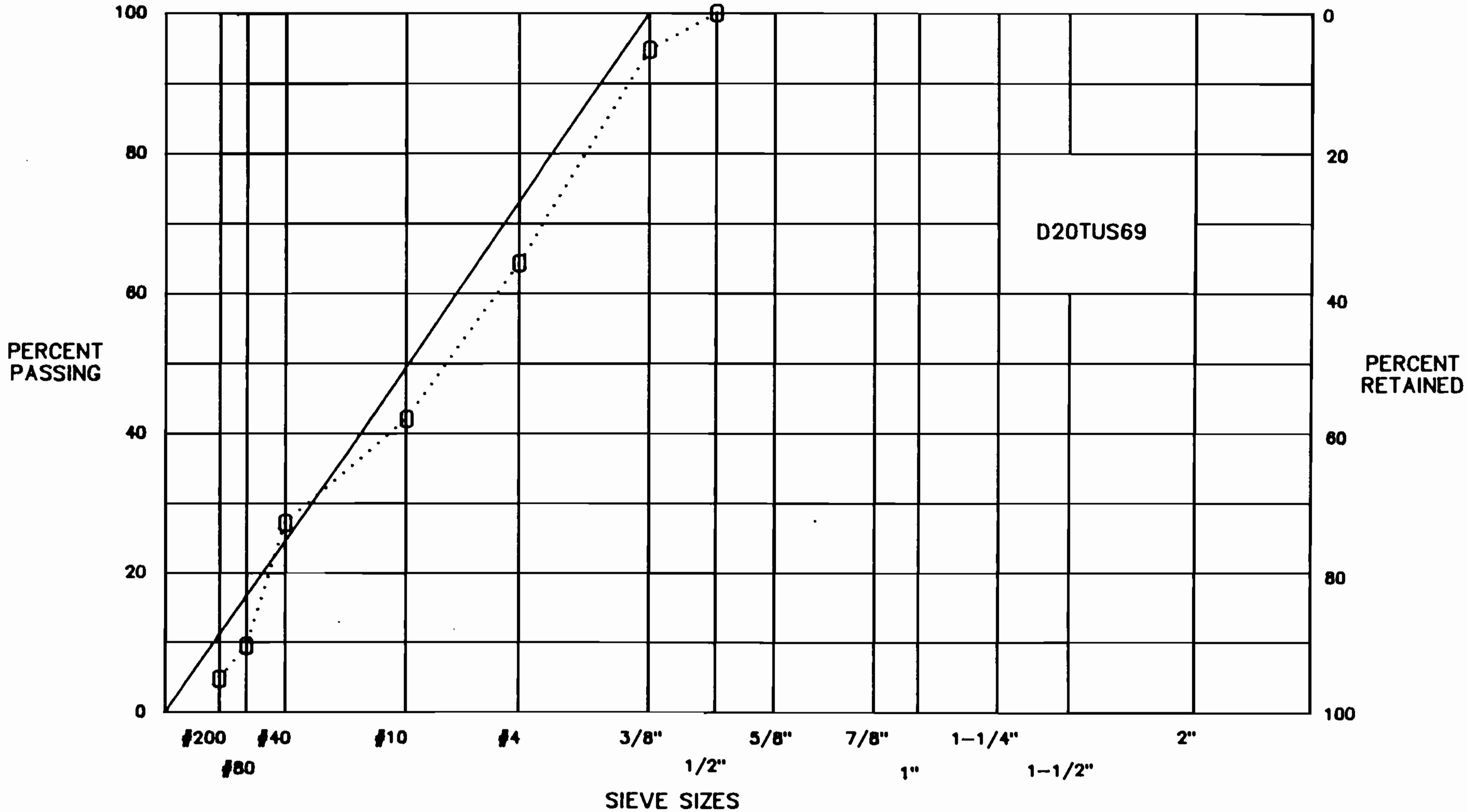



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
100
80
60
40
20
0
PERCENT
PASSING
0
20
40
60
80
100
PERCENT
RETAINED
D2TFM188C
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
PERCENT PASSING
PERCENT RETAINED
D2TI20G2
100
80
60
40
20
0
0
20
40
60
80
100
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES


GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER
100
80
60
40
20
0
PERCENT PASSING
0
20
40
60
80
100
PERCENT RETAINED
D18NFM16
#200
#80
#40
#10
#4
3/8"
1/2"
5/8"
7/8"
1"
1-1/4"
1-1/2"
2"
SIEVE SIZES

GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER



GRADATION CHART – SIEVE SIZES RAISED TO 0.45 POWER