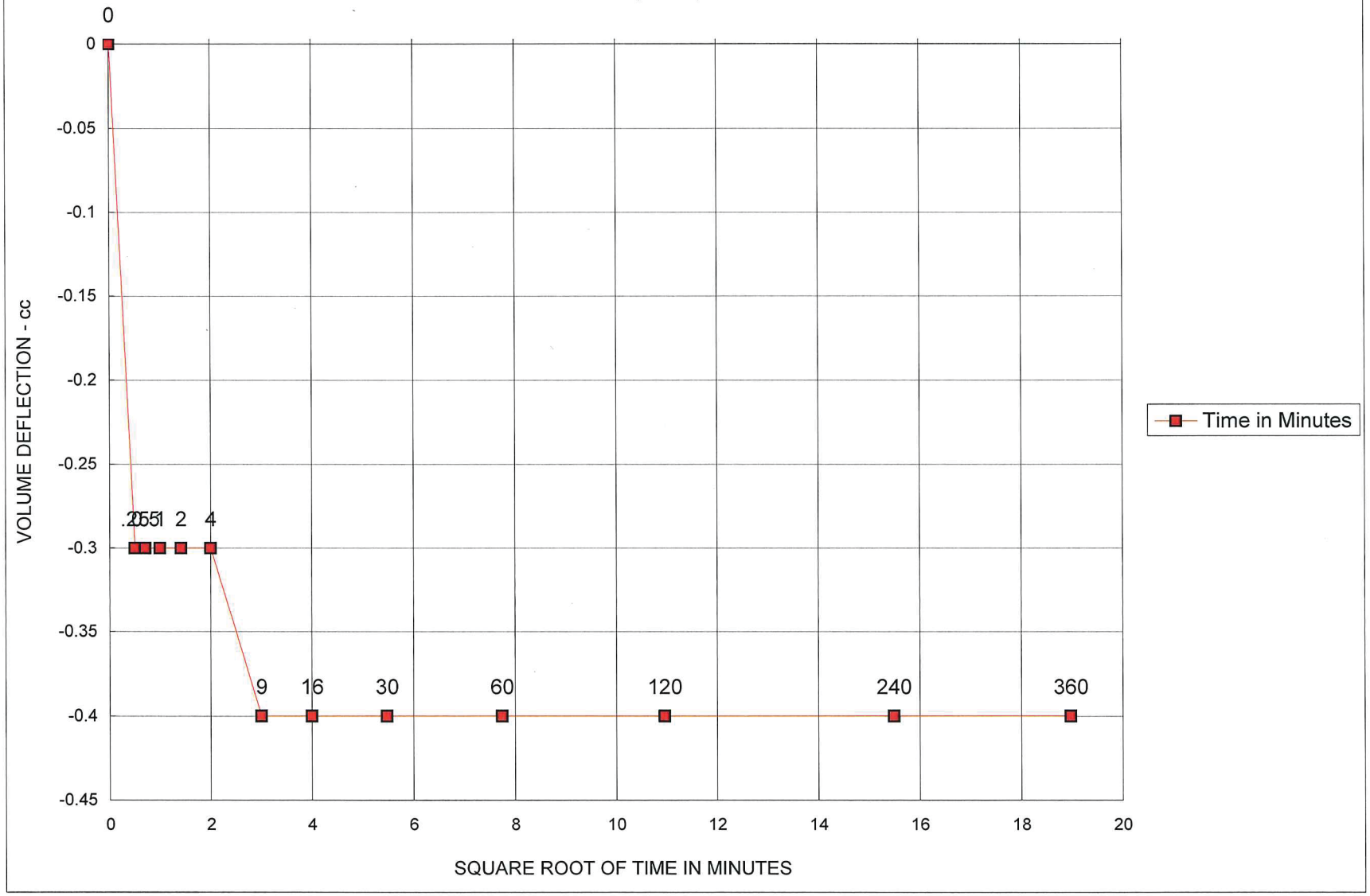
CONSOLIDATION DATA

North Borrow, 0-10', NB-B2-04 90%

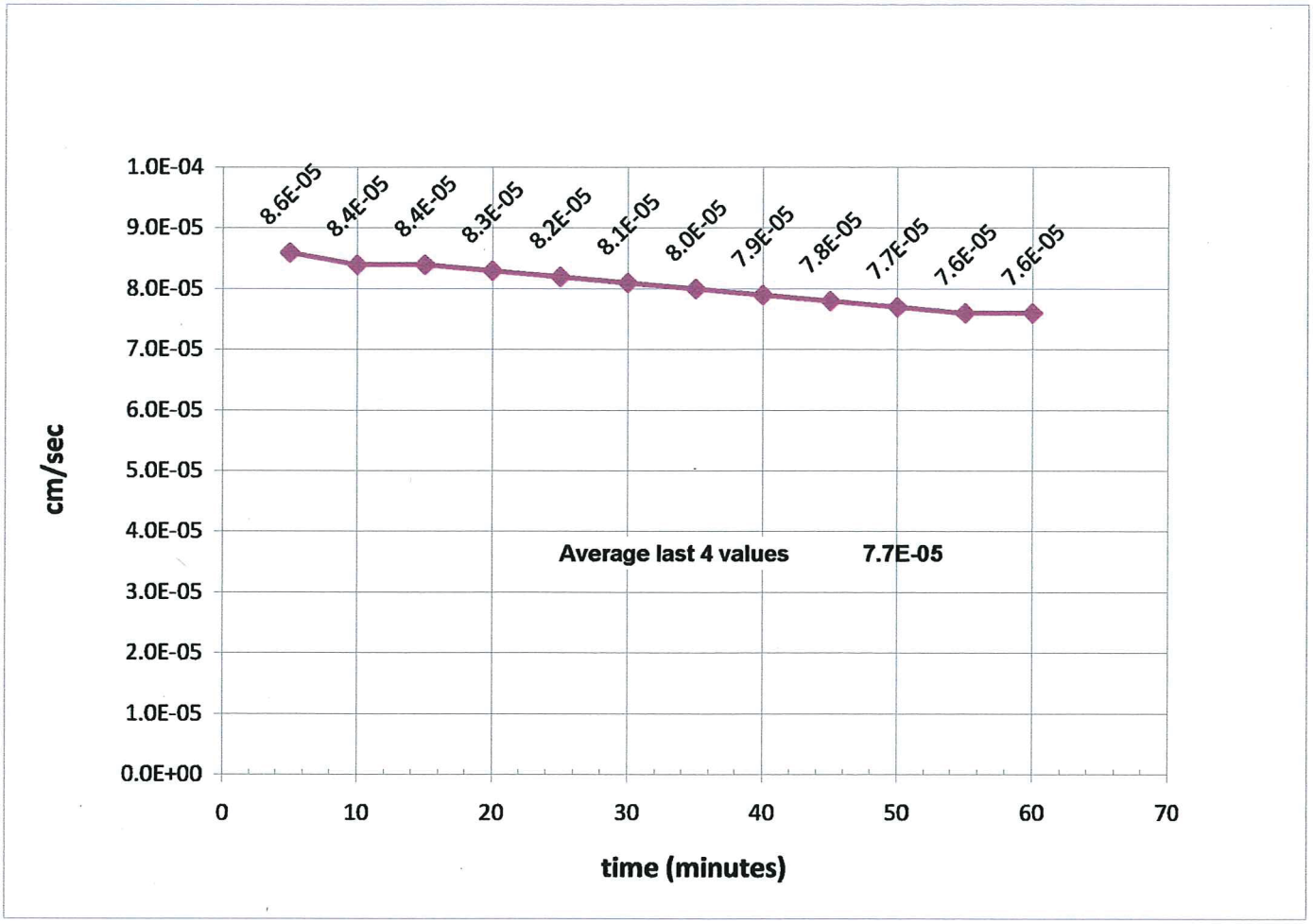


ATT
ADVANCED TERRA TESTING

ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	North Borrow		
Job Number:	2512-77	Depth:	0-10'		
Project:	--	Sample Number:	NB-B2-04 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/28/2014	Technician:	CAL



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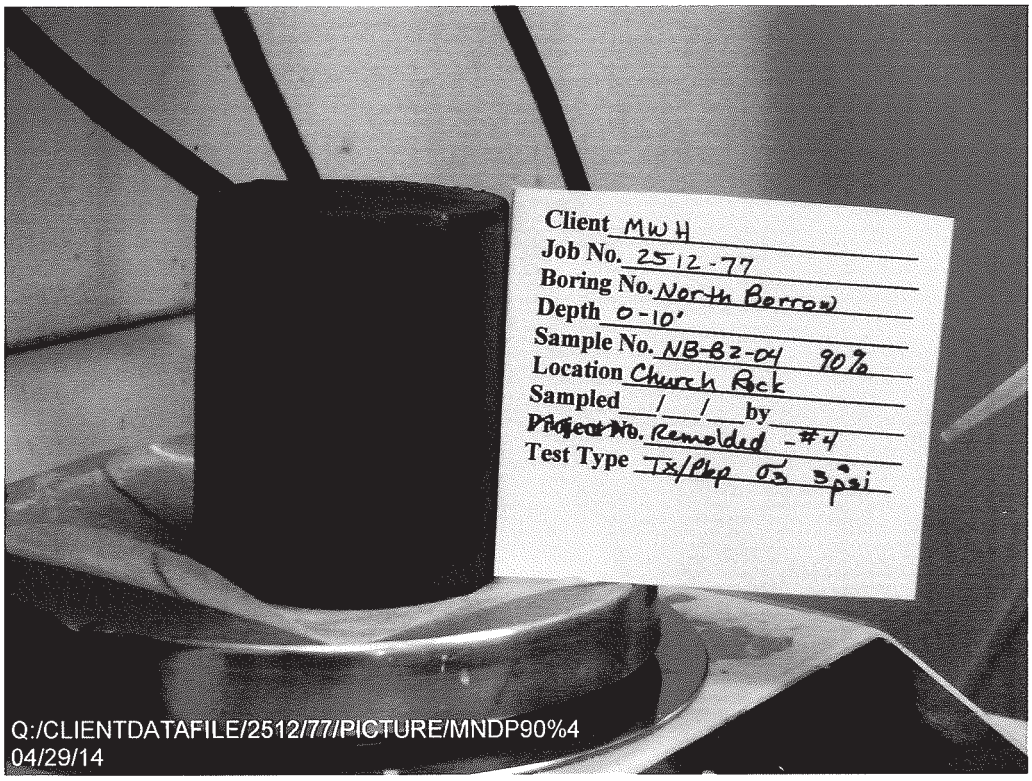
Date:	4/29/2014	Checked By:	CAL
File Name:	2512_77_PrelimPerm_ASTMD-5084-methodD_29.xls	Date:	4/29/14



Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP90%4
04/29/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-25'	TEST STARTED	04/11/14 CAL
SAMPLE NO.	SB-B1-04 90%	TEST FINISHED	04/28/14 CAL
LOCATION	Church Rock	CELL NUMBER	11P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	403.4	463.2
Wt. Wet Soil & Pan (g)	410.4	470.1
Wt. Dry Soil & Pan (g)	379.2	379.2
Wt. Lost Moisture (g)	31.2	90.9
Wt. of Pan Only (g)	6.9	6.9
Wt. of Dry Soil (g)	372.2	372.2
Moisture Content %	8.4	24.4
Wet Density PCF	112.8	129.1
Dry Density PCF	104.0	103.7

Init. Diameter (in)	2.403	(cm)	6.104
Init. Area (sq in)	4.535	(sq cm)	29.261
Init. Height (in)	3.005	(cm)	7.633
Vol. Bef. Consol. (cu ft)	0.00789		
Vol. After Consol. (cu ft)	0.00791		
Porosity %	40.59		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	5
Percentage of Pump setting	100
Q (cc/s)	5.81E-03
Height	3.001
Diameter	2.408
Pressure (psi)	0.156
Area after consol. (cm*cm)	29.383
Gradient	1.439
Permeability k (cm/s)	1.4E-04
Permeability k (m/s)	1.4E-06
Back Pressure (psi)	108.0
Cell Pressure (psi)	111.0
Ave. Effective Stress (psi)	2.922
Average temperature degree C:	22.0

Data entry by: DAW Date: 04/29/2014

Checked by: CAL Date: 4/29/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_26.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	South Borrow	SAMPLED	--
DEPTH	0-25'	TEST STARTED	04/11/14 CAL
SAMPLE NO.	SB-B1-04 90%	TEST FINISHED	04/28/14 CAL
LOCATION	Church Rock	SETUP NO.	11P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.1	10.6				
50.0	48.0	8.6	9.7	38.1	46.1	8.0	0.80
60.0	58.0	9.6	11.3	48.9	56.7	7.8	0.78
70.0	68.0	11.2	12.1	58.8	67.1	8.3	0.83
80.0	78.0	12.3	13.1	68.7	77.2	8.5	0.85
90.0	88.0	13.2	13.9	78.4	87.3	8.9	0.89
100.0	98.0	14.3	14.9	88.1	97.4	9.3	0.93
110.0	108.0	15.0	15.7	98.7	108.0	9.3	0.93
120.0		15.7	15.7	108.3	117.8	9.5	0.95

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.30	0.00
0.25	0.50	0.60	-0.30
0.5	0.71	0.60	-0.30
1	1.00	0.60	-0.30
2	1.41	0.60	-0.30
4	2.00	0.60	-0.30
9	3.00	0.60	-0.30
16	4.00	0.60	-0.30
30	5.48	0.60	-0.30
60	7.75	0.60	-0.30
120	10.95	0.60	-0.30
240	15.49	0.60	-0.30
360	18.97	0.60	-0.30

Initial Height (in)	3.005	Init. Vol. (CC)	223.368
Height Change (in)	0.004	Vol. Change (CC)	14.900
Ht. After Cons. (in)	3.001	Cell Exp. (CC)	15.546
Initial Area (sq in)	4.535	Net Change (CC)	-0.645
Area After Cons. (sq in)	4.554	Cons. Vol. (CC)	224.013

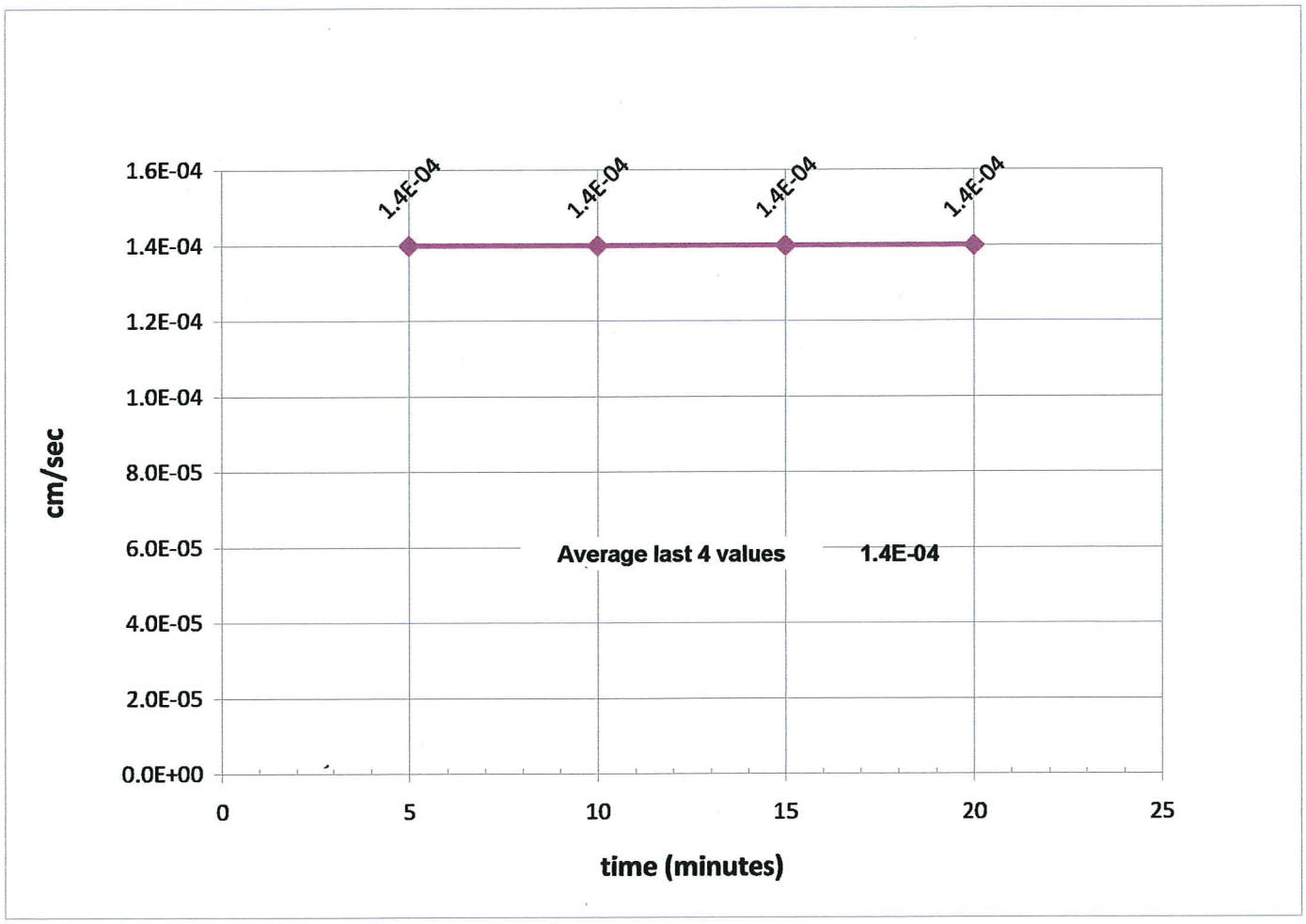
Data entry by: DAW Date: 04/29/2014
Checked by: CM Date: 4/29/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_26.xls

ATT
ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

ADVANCED TERRA TESTING

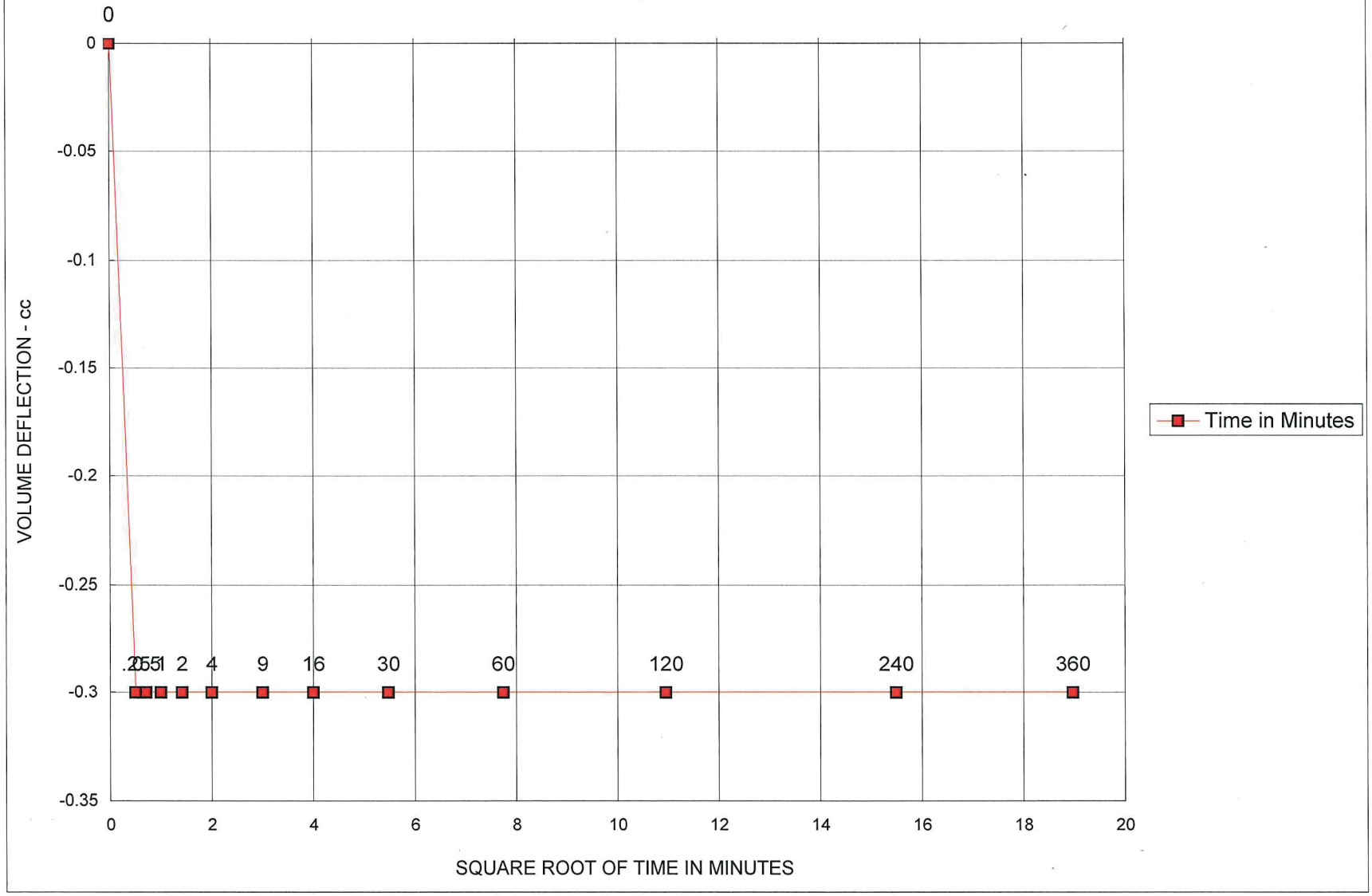
Client:	MWH	Boring Number:	South Borrow		
Job Number:	2512-77	Depth:	0-25'		
Project:	--	Sample Number:	SB-B1-04 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/18/2014	Technician:	CAL



Data Entered By:	CAL		
Date:	4/29/2014	Checked By:	CAL
File Name:	2512_77_PrelimPerm_ASTMD-5084-methodD_28.xls	Date:	4/29/14

CONSOLIDATION DATA

South Borrow, 0-25', SB-B1-04 90%



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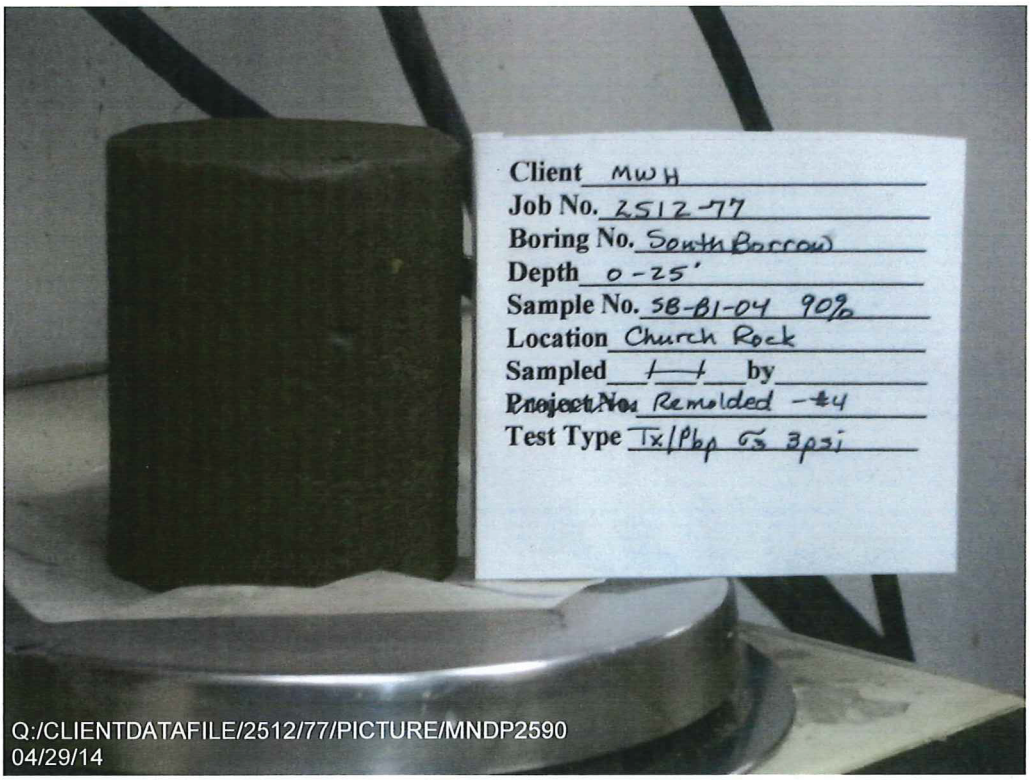
ADVANCED TERRA TESTING


Client MWH
Job No. 2512-77
Boring No. South Borrow
Depth 0-25'
Sample No. SB-B1-04 90%
Location Church Rock
Sampled / / by
Project No. Remolded -#4
Test Type Tx/Pbp σ3 3psi
Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP2590
04/29/14

PERMEABILITY TEST - BACK PRESSURE SATURATED - FLOW PUMP METHOD

ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	West Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	04/11/14 CAL
SAMPLE NO.	WB-B2-05 90%	TEST FINISHED	04/23/14 CAL
LOCATION	Church Rock	CELL NUMBER	9P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

MOISTURE/DENSITY DATA	BEFORE TEST	AFTER TEST
Wt. Soil + Moisture (g)	389.3	450.9
Wt. Wet Soil & Pan (g)	396.3	457.9
Wt. Dry Soil & Pan (g)	370.8	370.8
Wt. Lost Moisture (g)	25.5	87.1
Wt. of Pan Only (g)	7.0	7.0
Wt. of Dry Soil (g)	363.8	363.8
Moisture Content %	7.0	23.9
Wet Density PCF	109.1	132.6
Dry Density PCF	101.9	107.0

Init. Diameter (in)	2.405	(cm)	6.109
Init. Area (sq in)	4.543	(sq cm)	29.310
Init. Height (in)	2.993	(cm)	7.602
Vol. Bef. Consol. (cu ft)	0.00787		
Vol. After Consol. (cu ft)	0.00750		
Porosity %	41.00		

FLOW PUMP CALCULATIONS

Pump Setting (gear number)	6
Percentage of Pump setting	100
Q (cc/s)	2.31E-03
Height	2.941
Diameter	2.368
Pressure (psi)	0.134
Area after consol. (cm*cm)	28.422
Gradient	1.261
Permeability k (cm/s)	6.4E-05
Permeability k (m/s)	6.4E-07
Back Pressure (psi)	88.0
Cell Pressure (psi)	91.0
Ave. Effective Stress (psi)	2.933
Average temperature degree C:	23.5

Data entry by: DAW Date: 04/25/2014

Checked by: cm Date: 4/29/14

FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_25.xls

ATT ADVANCED TERRA TESTING

TRIAXAL TEST DATA
ASTM D 5084

CLIENT	MWH	JOB NO.	2512-77
BORING NO.	West Borrow	SAMPLED	--
DEPTH	10-20'	TEST STARTED	04/11/14 CAL
SAMPLE NO.	WB-B2-05 90%	TEST FINISHED	04/23/14 CAL
LOCATION	Church Rock	SETUP NO.	9P
PROJECT NO.	--	SATURATED TEST	Yes
SOIL DESCR.	Remolded -#4	TEST TYPE	TX/Pbp/Tap Water
		CONF. PRES. PSF	432

SATURATION DATA

Cell Pres. (PSI)	Back Pres. (PSI)	Burette Reading (CC)		Pore Pressure (PSI)		Change	B
		Close	Open	Close	Open		
40.0	38.0	2.1	19.4				
50.0	48.0	19.4	21.2	38.9	47.1	8.2	0.82
60.0	58.0	21.2	22.4	48.7	56.9	8.2	0.82
70.0	68.0	22.7	23.6	58.7	67.7	9.0	0.90
80.0	78.0	23.8	24.7	68.7	77.8	9.1	0.91
90.0	88.0	25.1	25.9	78.5	88.0	9.5	0.95
100.0		26.1	26.2	88.6	98.2	9.6	0.96

CONSOLIDATION DATA

Elapsed Time (Min)	SQRT Time (Min)	Burette Reading (CC)	Volume Defl. (cc)
0.00	0.00	0.20	0.00
0.25	0.50	0.50	-0.30
0.5	0.71	0.50	-0.30
1	1.00	0.50	-0.30
2	1.41	0.60	-0.40
4	2.00	0.60	-0.40
9	3.00	0.60	-0.40
16	4.00	0.70	-0.50
30	5.48	0.75	-0.55
60	7.75	0.80	-0.60
120	10.95	0.90	-0.70
240	15.49	0.90	-0.70
360	18.97	1.00	-0.80

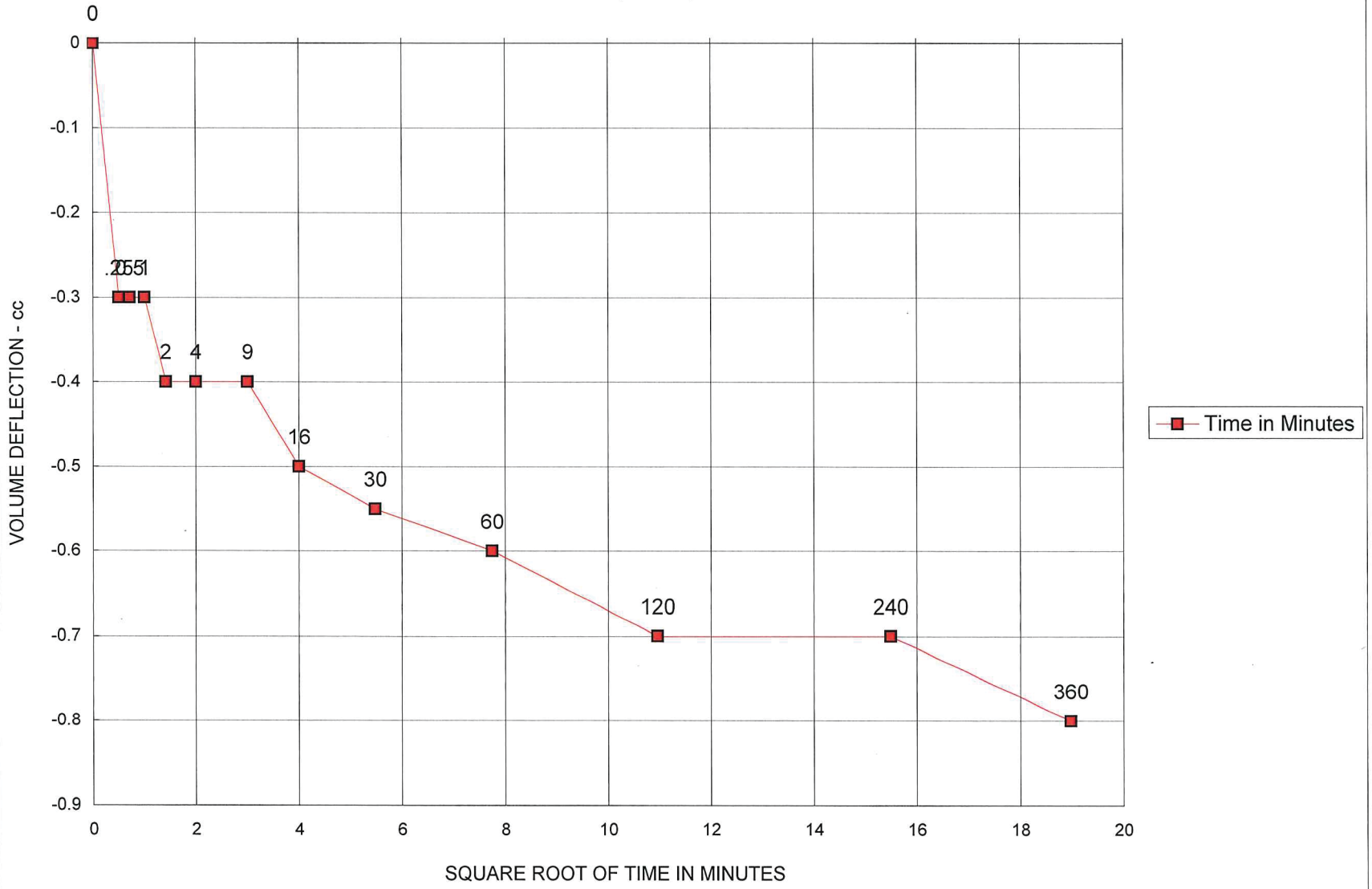
Initial Height (in)	2.993	Init. Vol. (CC)	222.846
Height Change (in)	0.052	Vol. Change (CC)	25.100
Ht. After Cons. (in)	2.941	Cell Exp. (CC)	14.611
Initial Area (sq in)	4.543	Net Change (CC)	10.489
Area After Cons. (sq in)	4.405	Cons. Vol. (CC)	212.358

Data entry by: DAW Date: 04/25/2014
Checked by: CAL Date: 4/29/14
FileName: 2512_77_HarvardFlowPump-Perm-ASTMD-5084-R1_25.xls

ATT
ADVANCED TERRA TESTING

CONSOLIDATION DATA

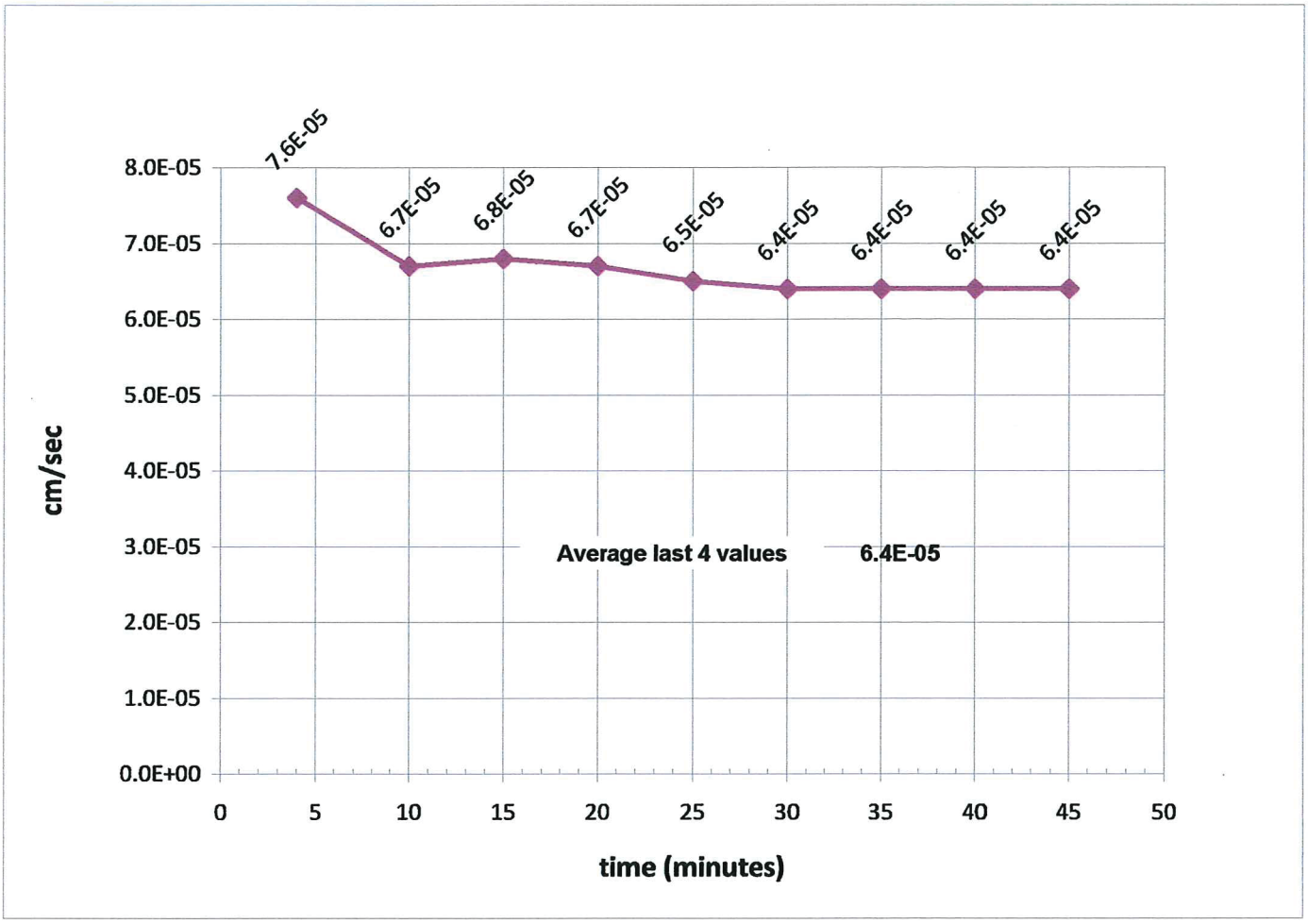
West Borrow, 10-20', WB-B2-05 90%



ATT
ADVANCED TERRA TESTING

Preliminary Flow Pump Test Data
ASTM D5084

Client:	MWH	Boring Number:	West Borrow		
Job Number:	2512-77	Depth:	10-20'		
Project:	--	Sample Number:	WB-B2-05 90%		
Location:	Church Rock	Sampled Date:	--	Sampled By:	--
Project Number:	--	Test Date:	4/23/2014	Technician:	CAL



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File Name: 2512_77_PrelimPerm_ASTMD-5084-methodD_26.xls

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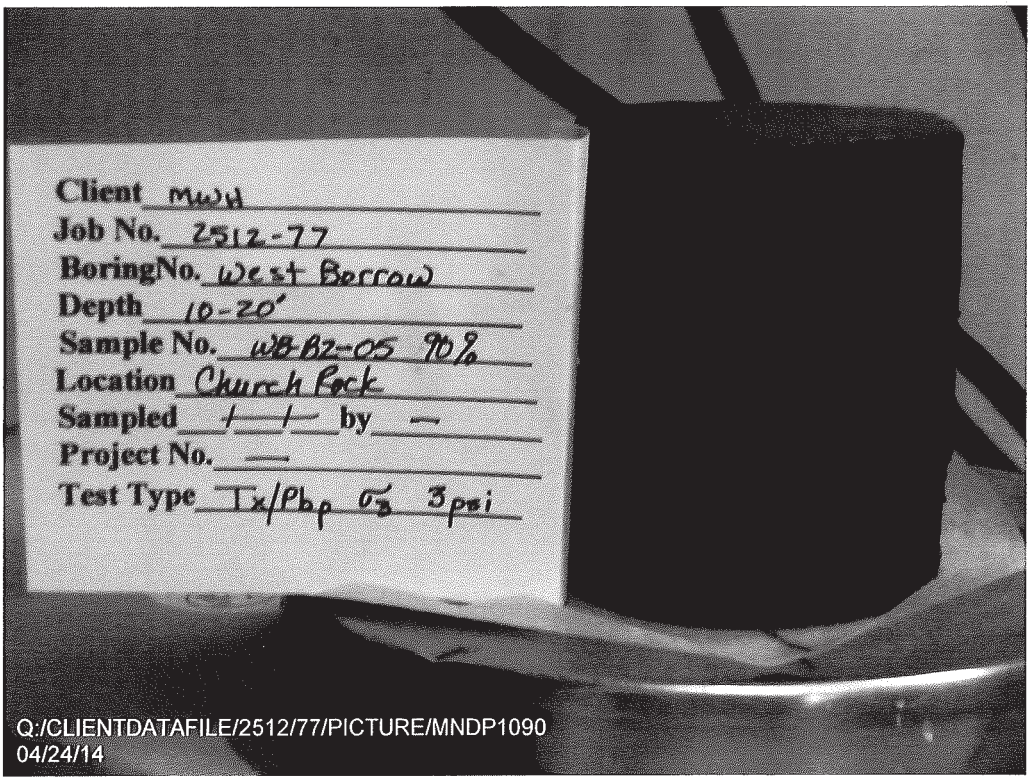
Date: 04/29/14



Q:/CLIENTDATAFILE/2512/77/PICTURE/MNDP1090
04/24/14

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

MASS DATA

Sample Description	Ring Mass g	As Rec. Mass g	Sat. Mass g	0.1 Bar Mass g	0.2 Bar Mass g	0.33 Bar Mass g	0.5 Bar Mass g	1 Bar Mass g	3 Bar Mass g	5 Bar Mass g		Dry Mass Filter, Ring, & Dish (g)	Dish Wt. g
Filter Mass g		0.205	0.724	0.551	0.499	0.438	0.381	0.339	0.275	0.247			
DH-B1-03, 0-10'	10.658	43.277	54.246	48.947	47.645	46.436	45.813	45.127	43.029	42.880		43.911	2.348
DH-B1-03, 0-10'-R	10.706	43.313	53.199	49.048	48.006	46.666	46.008	45.335	43.345	43.158		44.157	2.295
DH-B1-10, 35-45'	10.712	45.454	50.444	48.525	47.949	47.296	46.919	46.417	44.180	43.797		44.324	2.370
DH-B1-10, 35-45'-R	10.357	45.185	49.769	48.018	47.500	46.801	46.407	45.975	43.863	43.552		44.009	2.371
EB-B4-06, 10-20'	10.668	44.264	51.823	47.784	47.206	46.300	45.803	45.264	43.439	43.258		44.156	2.374
EB-B4-06, 10-20'-R	10.614	44.166	51.508	47.770	47.100	46.293	45.774	45.267	43.325	43.087		44.126	2.365
EB-B6-03, 0-10'	10.557	43.711	51.409	49.159	48.480	47.562	46.954	46.143	44.725	43.859		43.383	2.401
EB-B6-03, 0-10'-R	10.556	43.689	51.295	48.982	48.424	47.538	46.972	46.180	44.940	43.899		43.416	2.374
NB-B2-04, 0-10'	10.618	42.703	50.229	48.416	47.428	45.966	45.302	44.639	42.515	42.372		43.198	2.350
NB-B2-04, 0-10'-R	10.455	42.524	50.224	48.190	47.403	45.764	45.125	44.442	42.319	42.174		43.079	2.368

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETE.WK4

ADVANCED TERRA TESTING, Inc. ATT

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

Moisture Content Data: % D.M. = Moisture Content By Dry Mass; % Vol. = Moisture Content By Volume

Sample Description	Sample Conditions						0.1 Bar			0.2 Bar		
	Dry Mass (g)	Unit Wt. (g/cc)	Sat. Mass (g)	Total H2O (g)	Sat. M.C. % D.M.	Sat. M.C. % Vol.	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.
DH-B1-03, 0-10'	30.700	1.588	42.864	12.164	39.62	62.91	7.038	22.93	36.40	5.788	18.85	29.93
DH-B1-03, 0-10'-R	30.951	1.601	41.769	10.818	34.95	55.95	6.840	22.10	35.37	5.850	18.90	30.25
DH-B1-10, 35-45'	31.037	1.605	39.008	7.971	25.68	41.22	6.225	20.06	32.19	5.701	18.37	29.48
DH-B1-10, 35-45'-R	31.076	1.607	38.688	7.612	24.49	39.37	6.034	19.42	31.21	5.568	17.92	28.80
EB-B4-06, 10-20'	30.909	1.599	40.431	9.522	30.81	49.24	5.656	18.30	29.25	5.130	16.60	26.53
EB-B4-06, 10-20'-R	30.942	1.600	40.170	9.228	29.82	47.72	5.663	18.30	29.29	5.045	16.30	26.09
EB-B6-03, 0-10'	30.220	1.563	40.128	9.908	32.79	51.24	7.831	25.91	40.50	7.204	23.84	37.26
EB-B6-03, 0-10'-R	30.281	1.566	40.015	9.734	32.15	50.34	7.594	25.08	39.27	7.088	23.41	36.66
NB-B2-04, 0-10'	30.025	1.553	38.887	8.862	29.52	45.83	7.222	24.05	37.35	6.286	20.94	32.51
NB-B2-04, 0-10'-R	30.051	1.554	39.045	8.994	29.93	46.51	7.133	23.74	36.89	6.398	21.29	33.09

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETE.WK4

ADVANCED TERRA TESTING, INC. ATT

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

Moisture Content Data: % D.M. = Moisture Content By Dry Mass; % Vol. = Moisture Content By Volume

Sample Description	0.33 Bar			0.5 Bar			1 Bar			3 Bar		
	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.
DH-B1-03, 0-10'	4.640	15.11	24.00	4.074	13.27	21.07	3.430	11.17	17.74	1.396	4.55	7.22
DH-B1-03, 0-10'-R	4.571	14.77	23.64	3.970	12.83	20.53	3.339	10.79	17.27	1.413	4.57	7.31
DH-B1-10, 35-45'	5.109	16.46	26.42	4.789	15.43	24.77	4.329	13.95	22.39	2.156	6.95	11.15
DH-B1-10, 35-45'-R	4.930	15.86	25.50	4.593	14.78	23.75	4.203	13.52	21.74	2.155	6.93	11.15
EB-B4-06, 10-20'	4.285	13.86	22.16	3.845	12.44	19.89	3.348	10.83	17.31	1.587	5.13	8.21
EB-B4-06, 10-20'-R	4.299	13.89	22.23	3.837	12.40	19.84	3.372	10.90	17.44	1.494	4.83	7.73
EB-B6-03, 0-10'	6.347	21.00	32.82	5.796	19.18	29.98	5.027	16.63	26.00	3.673	12.15	19.00
EB-B6-03, 0-10'-R	6.263	20.68	32.39	5.754	19.00	29.76	5.004	16.53	25.88	3.828	12.64	19.80
NB-B2-04, 0-10'	4.885	16.27	25.26	4.278	14.25	22.12	3.657	12.18	18.91	1.597	5.32	8.26
NB-B2-04, 0-10'-R	4.820	16.04	24.93	4.238	14.10	21.92	3.597	11.97	18.60	1.538	5.12	7.95

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETE.WK4

ADVANCED TERRA TESTING, INC. ATT

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

Moisture Content Data: % D.M. = Moisture Content By Dry Mass; % Vol. = Moisture Content By Volume

Sample Description	5 Bar		
	Retained H2O	% DM	% Vol.
DH-B1-03, 0-10'	1.275	4.15	6.59
DH-B1-03, 0-10'-R	1.254	4.05	6.49
DH-B1-10, 35-45'	1.801	5.80	9.31
DH-B1-10, 35-45'-R	1.872	6.02	9.68
EB-B4-06, 10-20'	1.434	4.64	7.42
EB-B4-06, 10-20'-R	1.284	4.15	6.64
EB-B6-03, 0-10'	2.835	9.38	14.66
EB-B6-03, 0-10'-R	2.815	9.30	14.56
NB-B2-04, 0-10'	1.482	4.94	7.66
NB-B2-04, 0-10'-R	1.421	4.73	7.35

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETE.WK4

ADVANCED TERRA TESTING, INC. ATT

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT MWH

JOB NO. 2512-77

SAMPLE DATE --
SOIL DESCR. Remolded -10
LOCATION --

TEST STARTED 04/09/14 SKL
TEST FINISHED 06/20/14 DPM

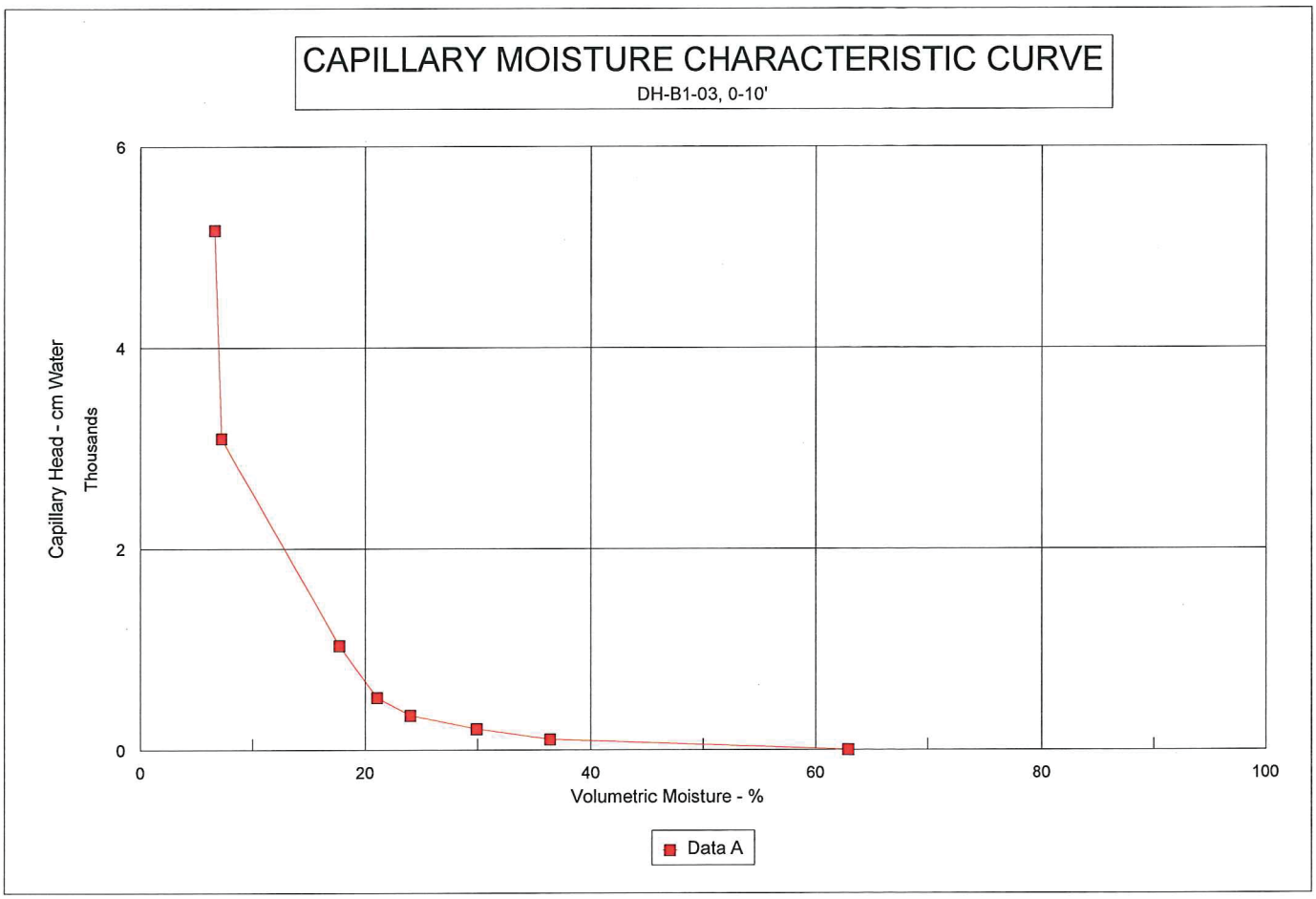
	Vol. MC % Sat.	Vol. MC % 0.1 Bar	Vol. MC % 0.2 Bar	Vol. MC % 0.33 Bar	Vol. MC % 0.5 Bar	Vol. MC % 1 Bar	Vol. MC % 3 Bar	Vol. MC % 5 Bar
DH-B1-03, 0-10'	62.91	36.40	29.93	24.00	21.07	17.74	7.22	6.59
DH-B1-03, 0-10'-R	55.95	35.37	30.25	23.64	20.53	17.27	7.31	6.49
DH-B1-10, 35-45'	41.22	32.19	29.48	26.42	24.77	22.39	11.15	9.31
DH-B1-10, 35-45'-R	39.37	31.21	28.80	25.50	23.75	21.74	11.15	9.68
EB-B4-06, 10-20'	49.24	29.25	26.53	22.16	19.89	17.31	8.21	7.42
EB-B4-06, 10-20'-R	47.72	29.29	26.09	22.23	19.84	17.44	7.73	6.64
EB-B6-03, 0-10'	51.24	40.50	37.26	32.82	29.98	26.00	19.00	14.66
EB-B6-03, 0-10'-R	50.34	39.27	36.66	32.39	29.76	25.88	19.80	14.56
NB-B2-04, 0-10'	45.83	37.35	32.51	25.26	22.12	18.91	8.26	7.66
NB-B2-04, 0-10'-R	46.51	36.89	33.09	24.93	21.92	18.60	7.95	7.35

% Saturation

	Sat.	0.1 Bar	0.2 Bar	0.33 Bar	0.5 Bar	1 Bar	3 Bar	5 Bar
DH-B1-03, 0-10'	100.00	57.86	47.58	38.15	33.49	28.20	11.48	10.48
DH-B1-03, 0-10'-R	100.00	63.23	54.08	42.25	36.70	30.87	13.06	11.59
DH-B1-10, 35-45'	100.00	78.10	71.52	64.09	60.08	54.31	27.05	22.59
DH-B1-10, 35-45'-R	100.00	79.27	73.15	64.77	60.34	55.22	28.31	24.59
EB-B4-06, 10-20'	100.00	59.40	53.88	45.00	40.38	35.16	16.67	15.06
EB-B4-06, 10-20'-R	100.00	61.37	54.67	46.59	41.58	36.54	16.19	13.91
EB-B6-03, 0-10'	100.00	79.04	72.71	64.06	58.50	50.74	37.07	28.61
EB-B6-03, 0-10'-R	100.00	78.02	72.82	64.34	59.11	51.41	39.33	28.92
NB-B2-04, 0-10'	100.00	81.49	70.93	55.12	48.27	41.27	18.02	16.72
NB-B2-04, 0-10'-R	100.00	79.31	71.14	53.59	47.12	39.99	17.10	15.80

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETE.WK4

ADVANCED TERRA TESTING, INC. ATT


CAPILLARY MOISTURE CHARACTERISTIC CURVE
DH-B1-03, 0-10'
Capillary Head - cm Water
Thousands
6
4
2
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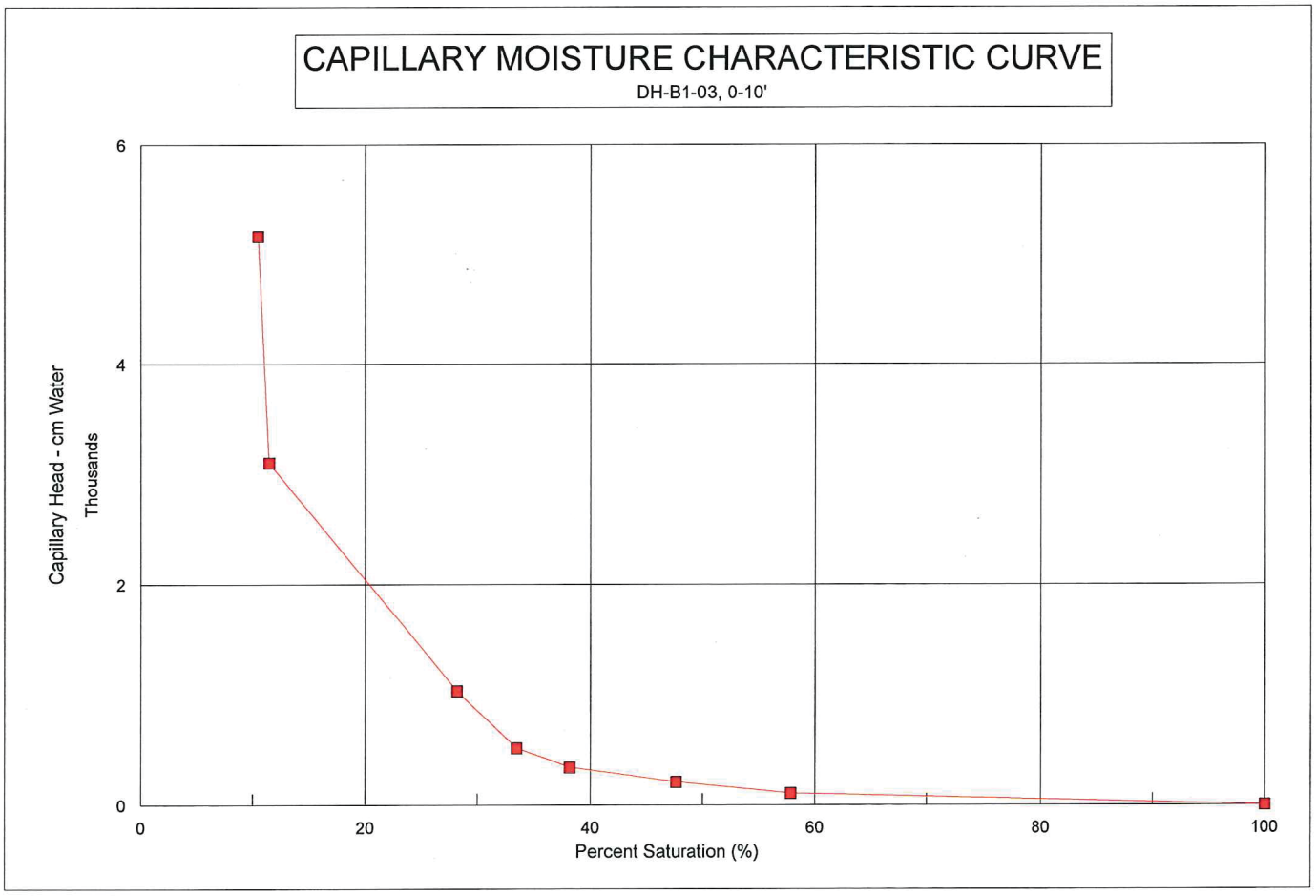
20
40
60
80
100
Volumetric Moisture - %
Data A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DH-B1-03, 0-10'
Capillary Head - cm Water
Thousands
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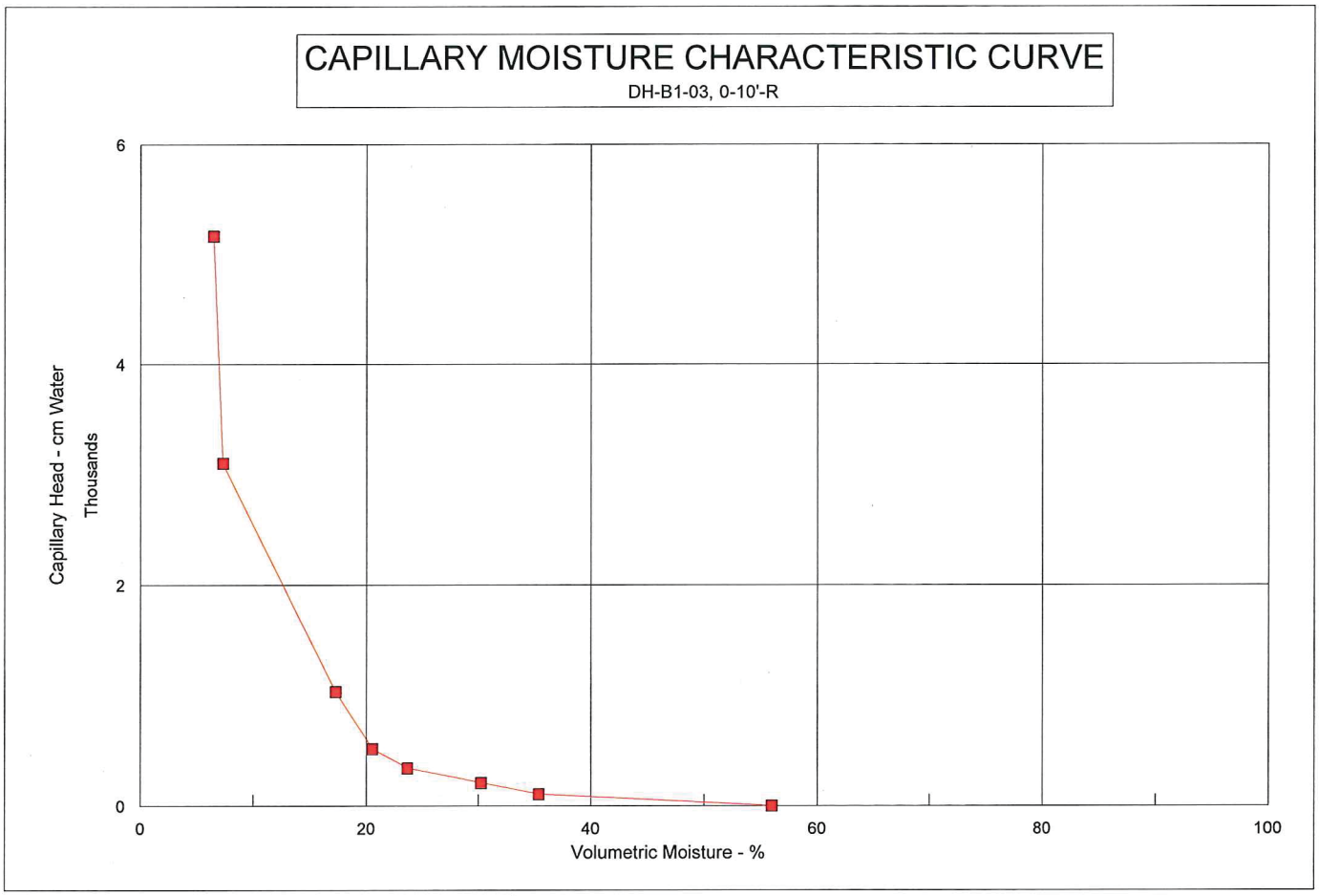
100
Percent Saturation (%)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DH-B1-03, 0-10'-R
Capillary Head - cm Water
Thousands
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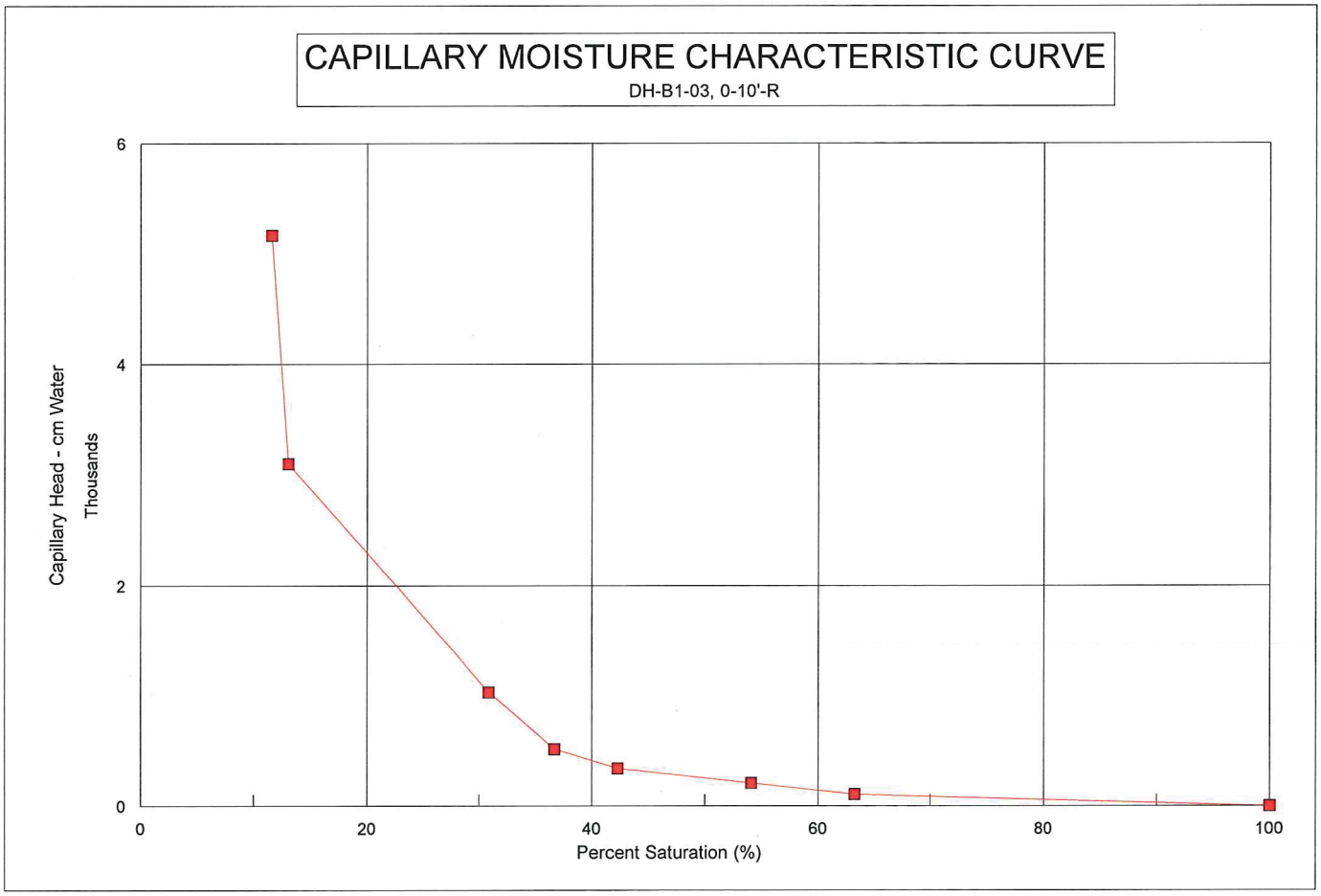
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
DH-B1-03, 0-10'-R
Capillary Head - cm Water
Thousands
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20
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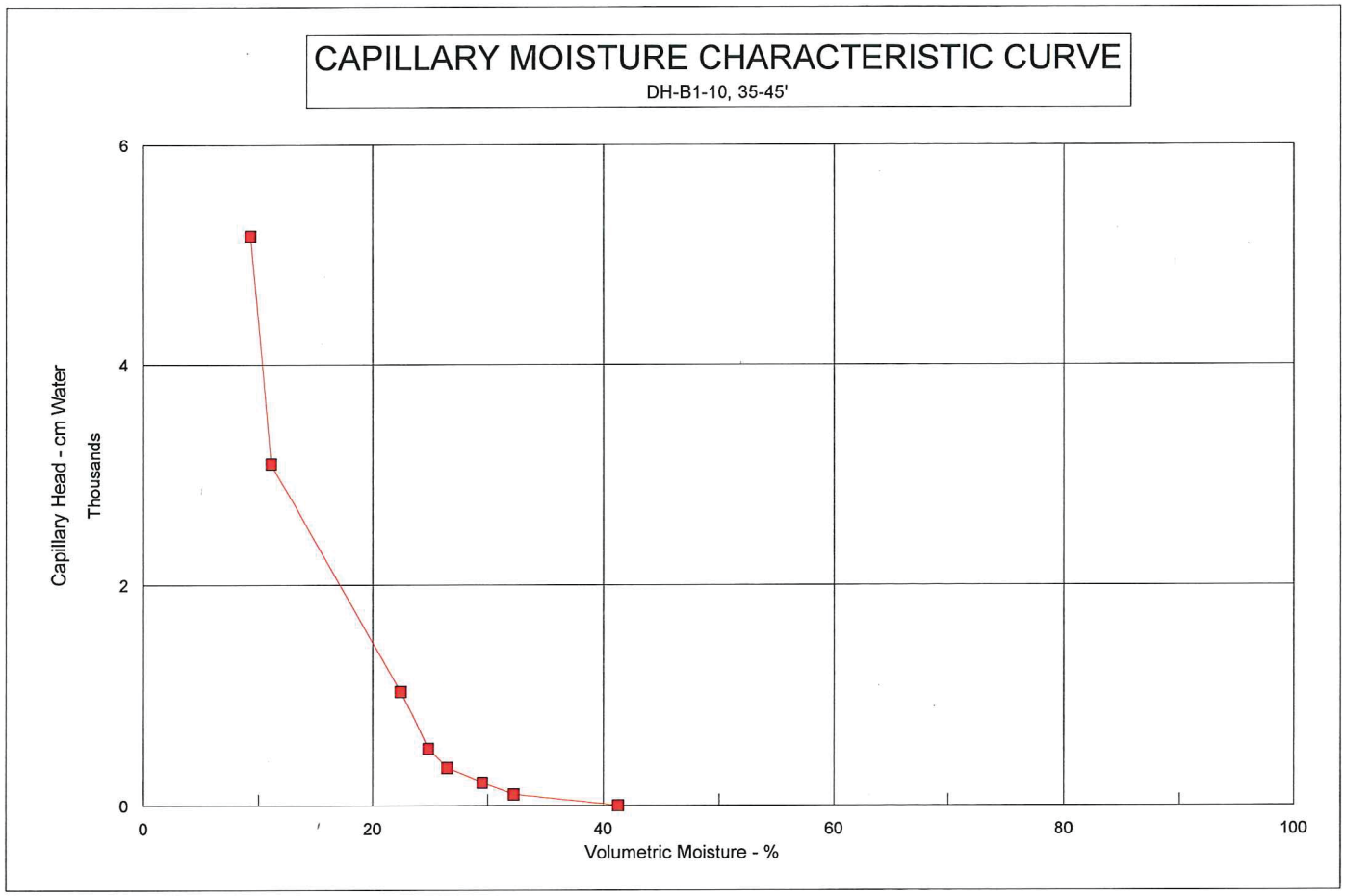
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
DH-B1-10, 35-45'
Capillary Head - cm Water
Thousands
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20
40
60
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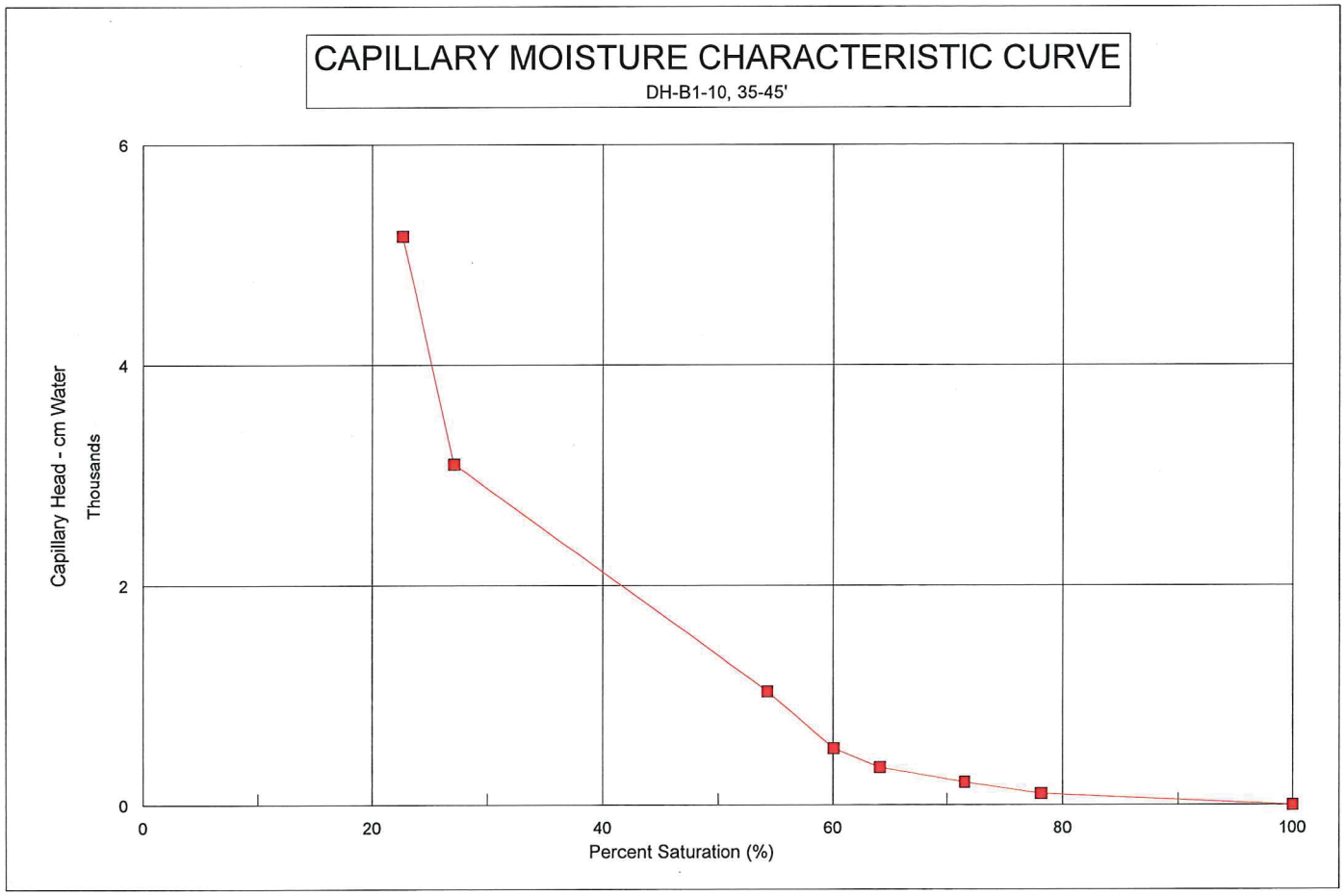
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
DH-B1-10, 35-45'
Capillary Head - cm Water
Thousands
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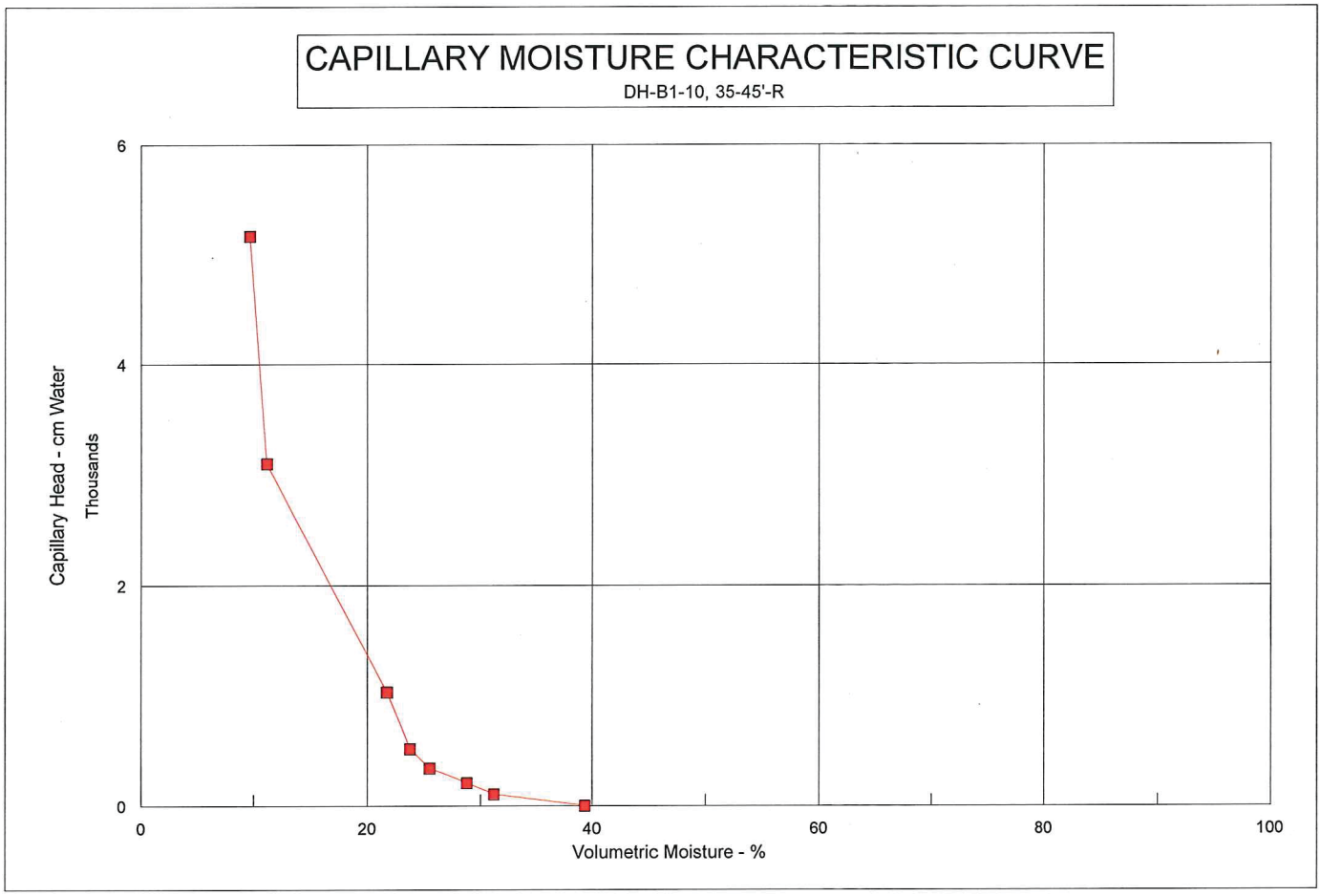
100
Percent Saturation (%)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DH-B1-10, 35-45'-R
Capillary Head - cm Water
Thousands
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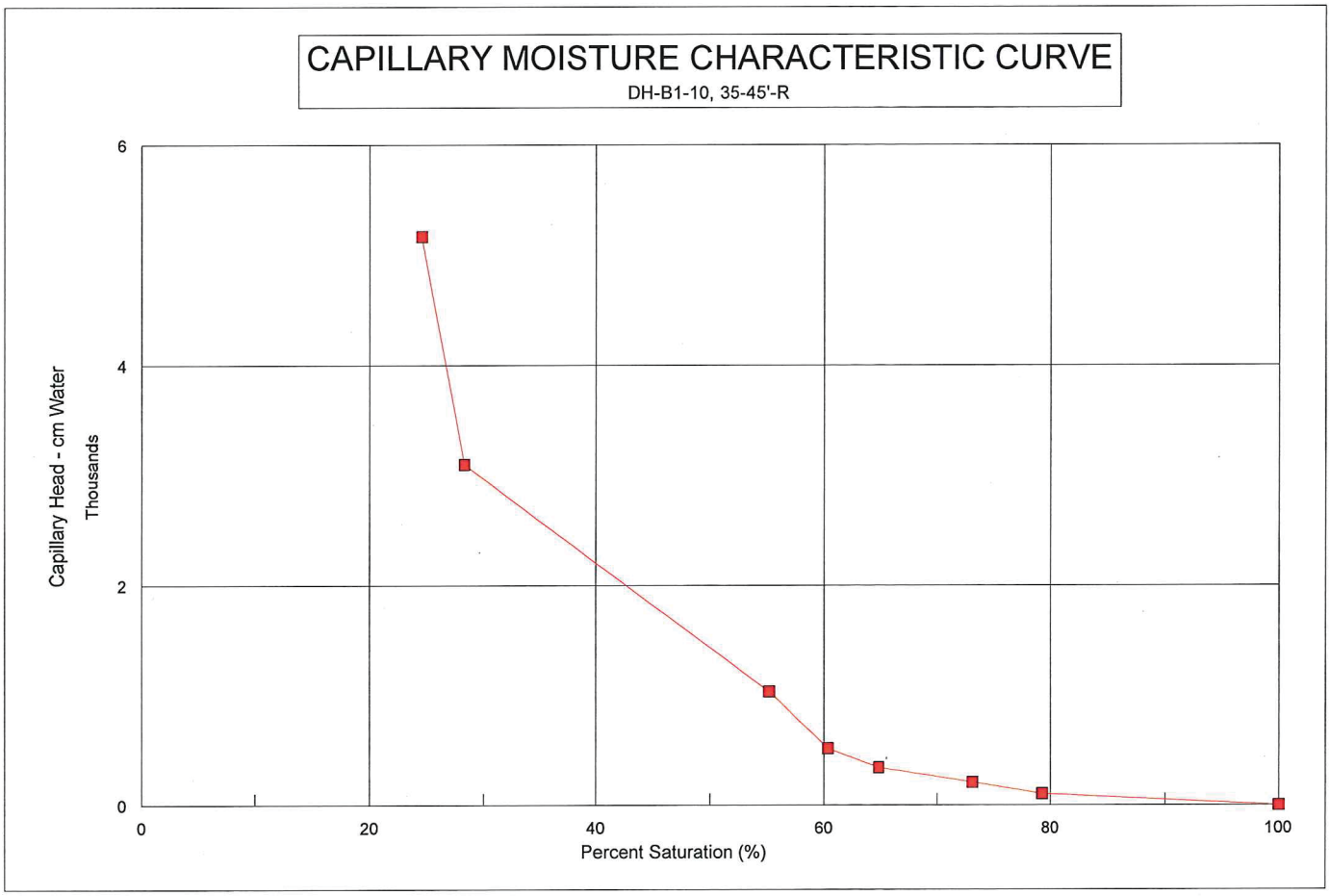
100
Volumetric Moisture - %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DH-B1-10, 35-45'-R
Capillary Head - cm Water
Thousands
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20
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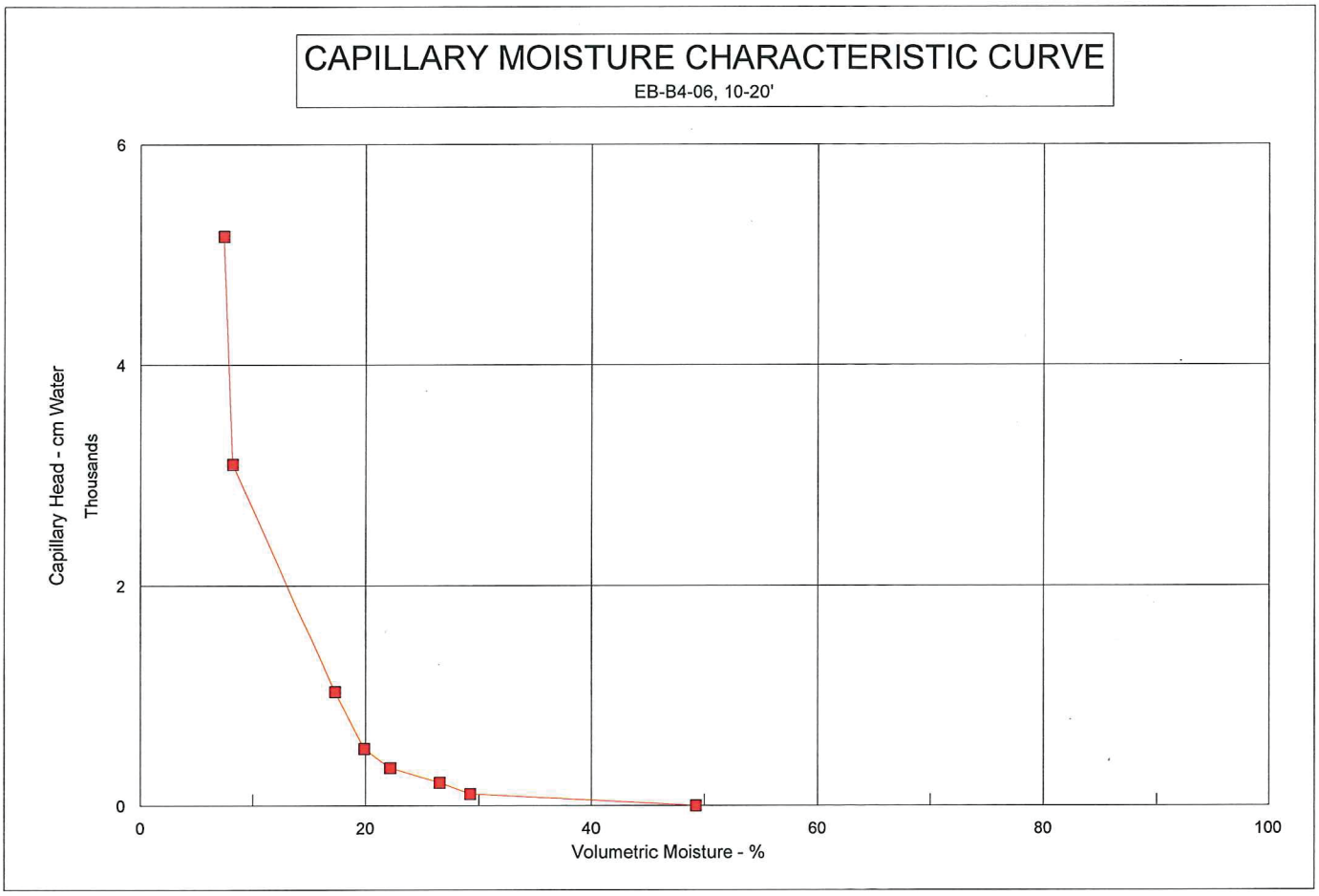
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
EB-B4-06, 10-20'
Capillary Head - cm Water
Thousands
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4
6
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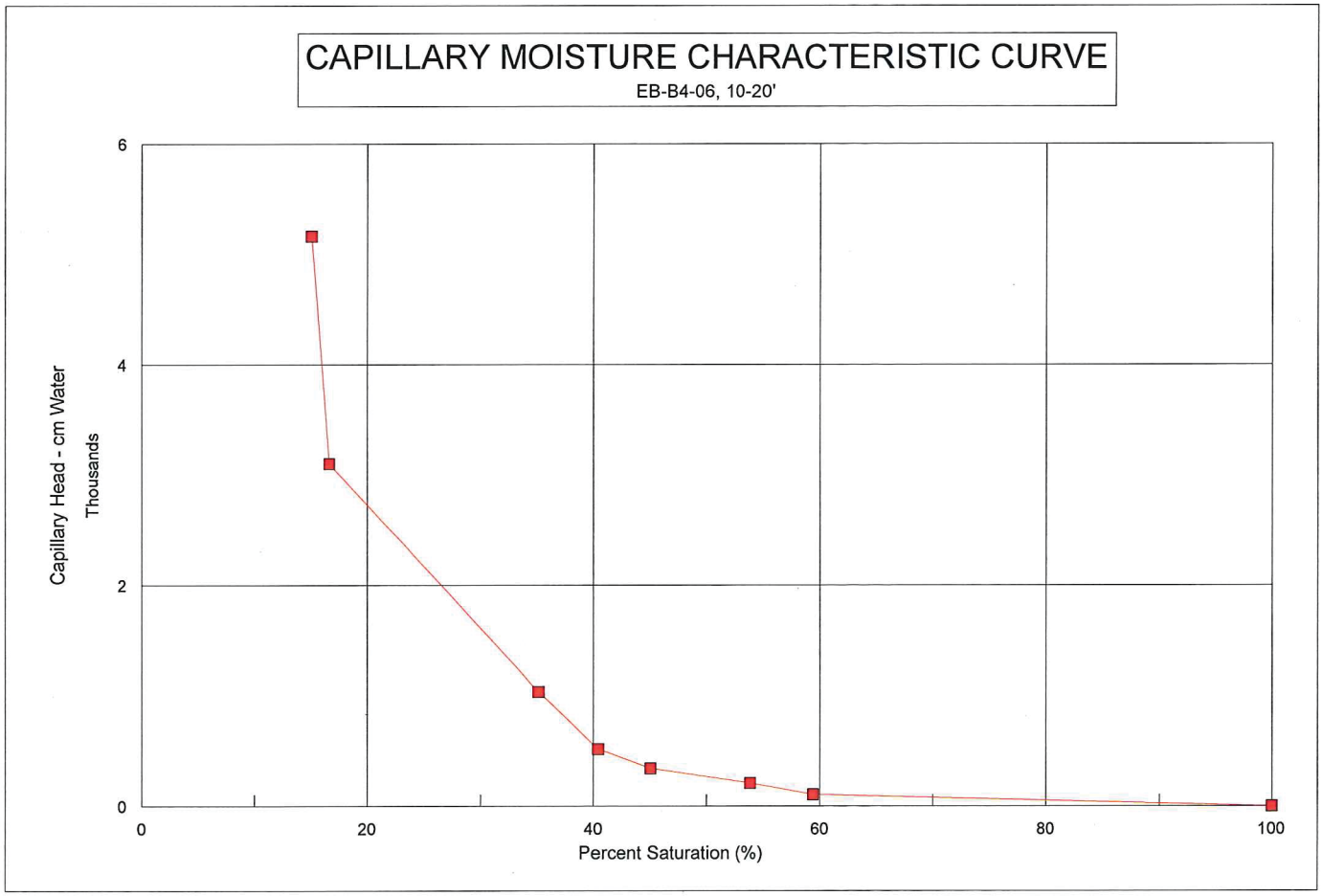
20
40
60
80
100
Volumetric Moisture - %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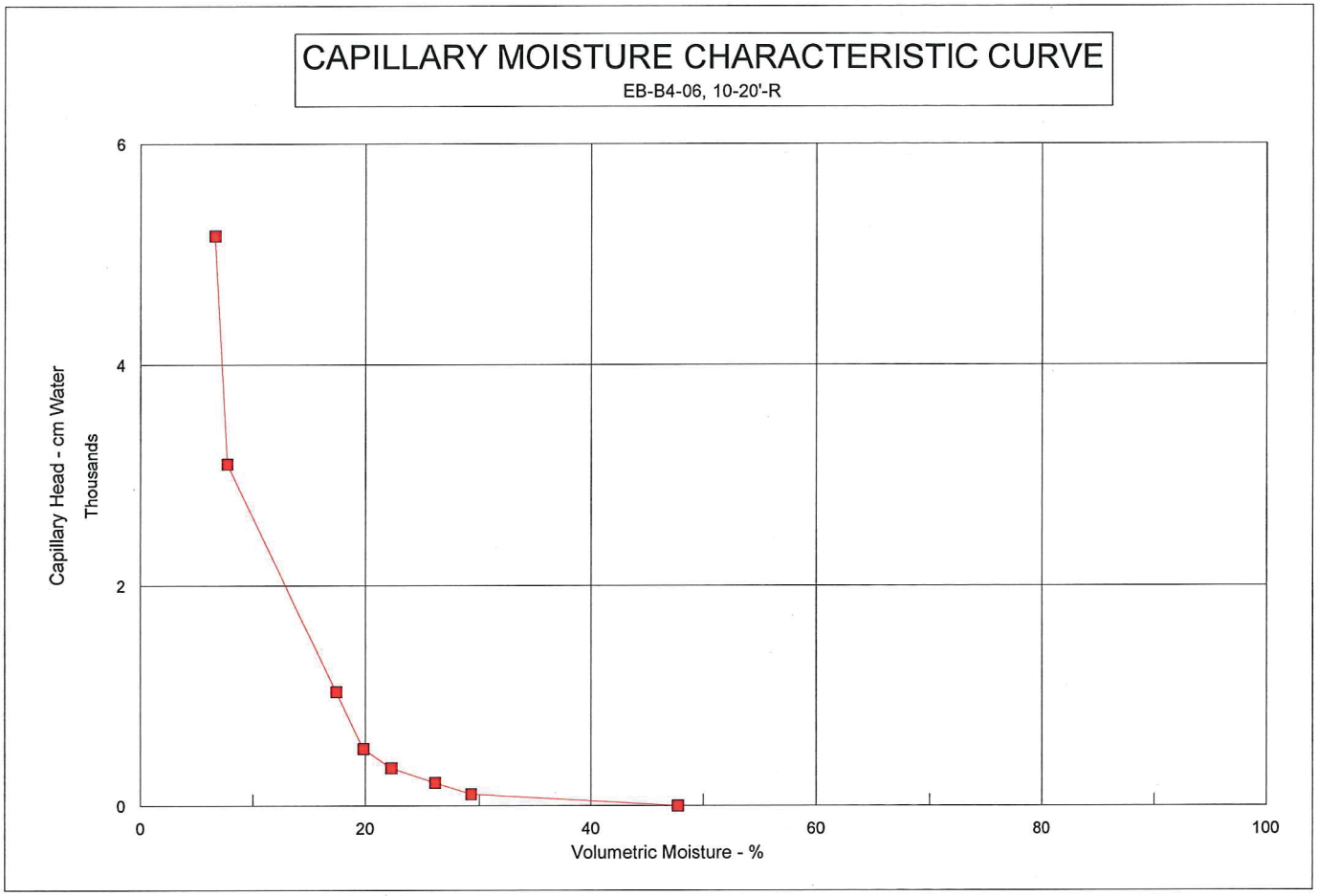
EB-B4-06, 10-20'
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Percent Saturation (%)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EB-B4-06, 10-20'-R
Capillary Head - cm Water
Thousands
0
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6
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20
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60
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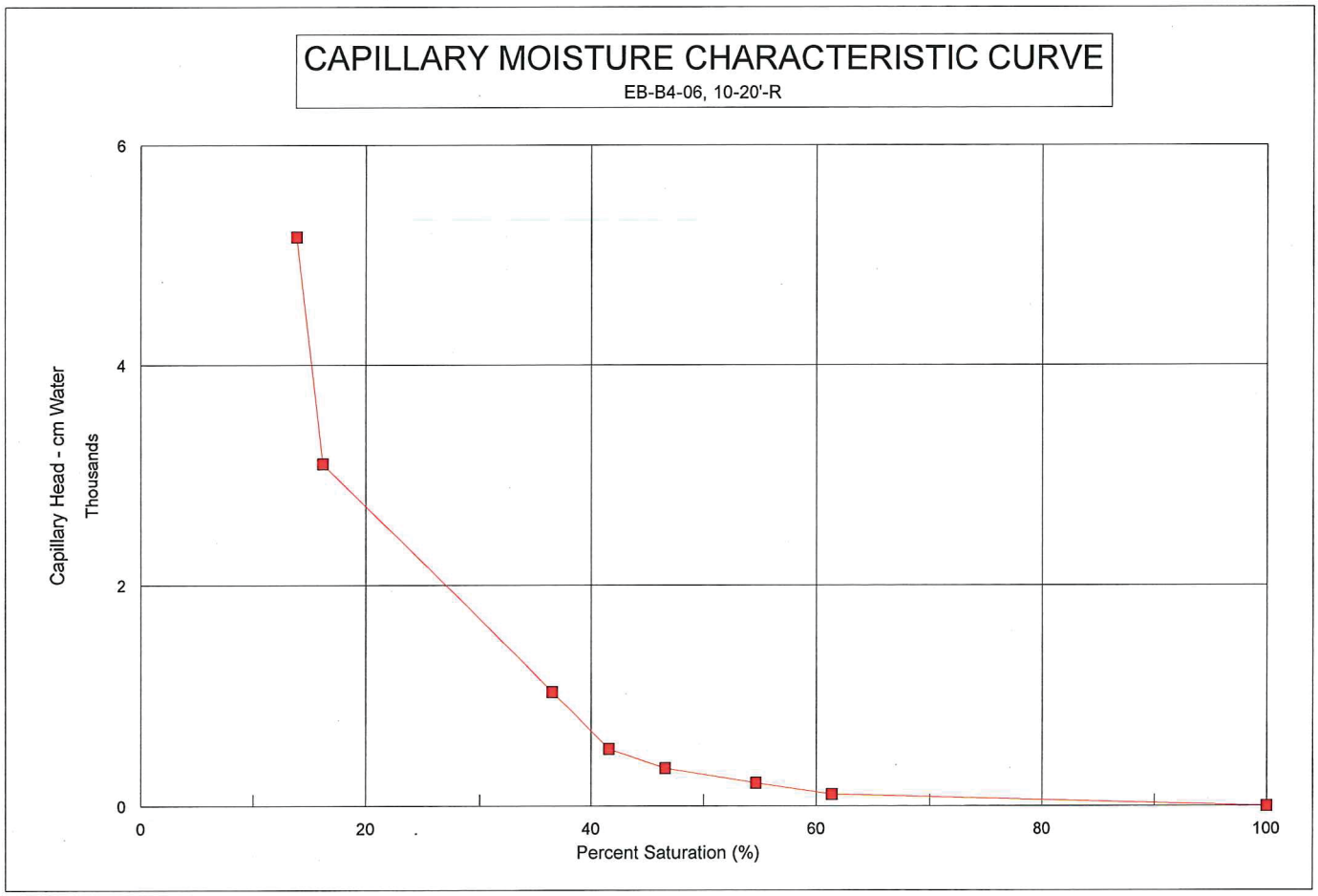
100
Volumetric Moisture - %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EB-B4-06, 10-20'-R
Capillary Head - cm Water
Thousands
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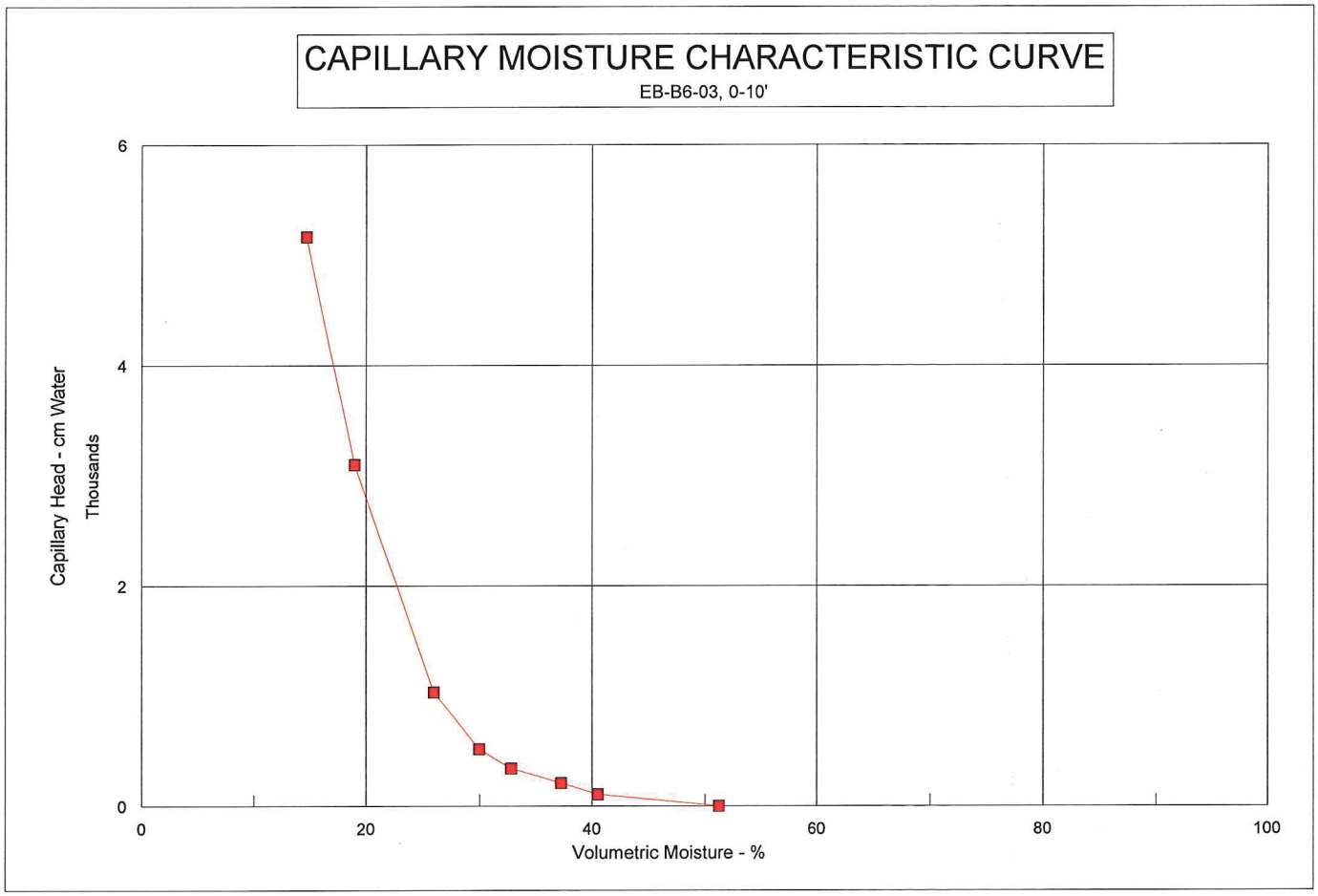
2
4
6
0
20
40
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
EB-B6-03, 0-10'
Capillary Head - cm Water
Thousands
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2
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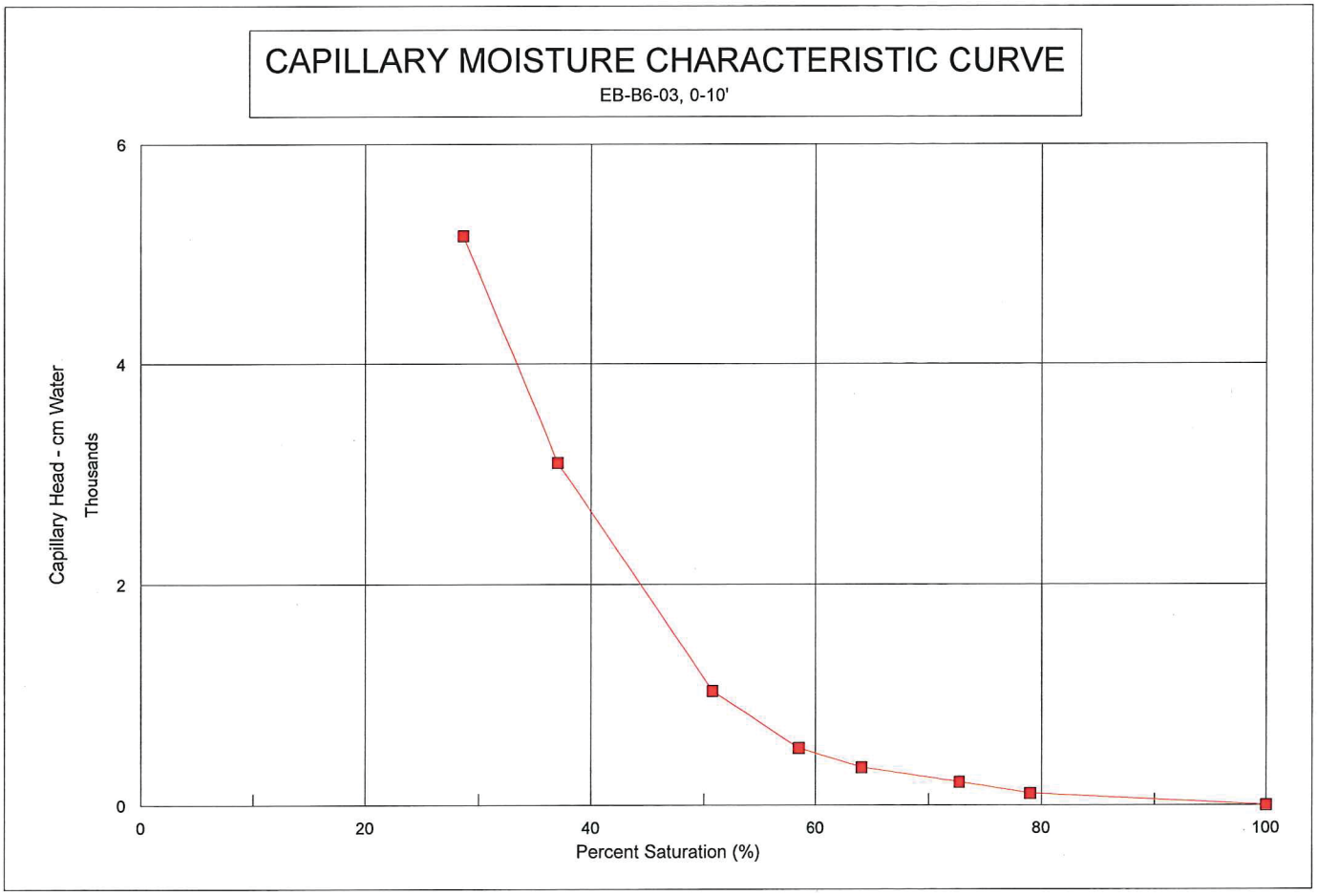
20
40
60
80
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
EB-B6-03, 0-10'
Capillary Head - cm Water
Thousands
6
4
2
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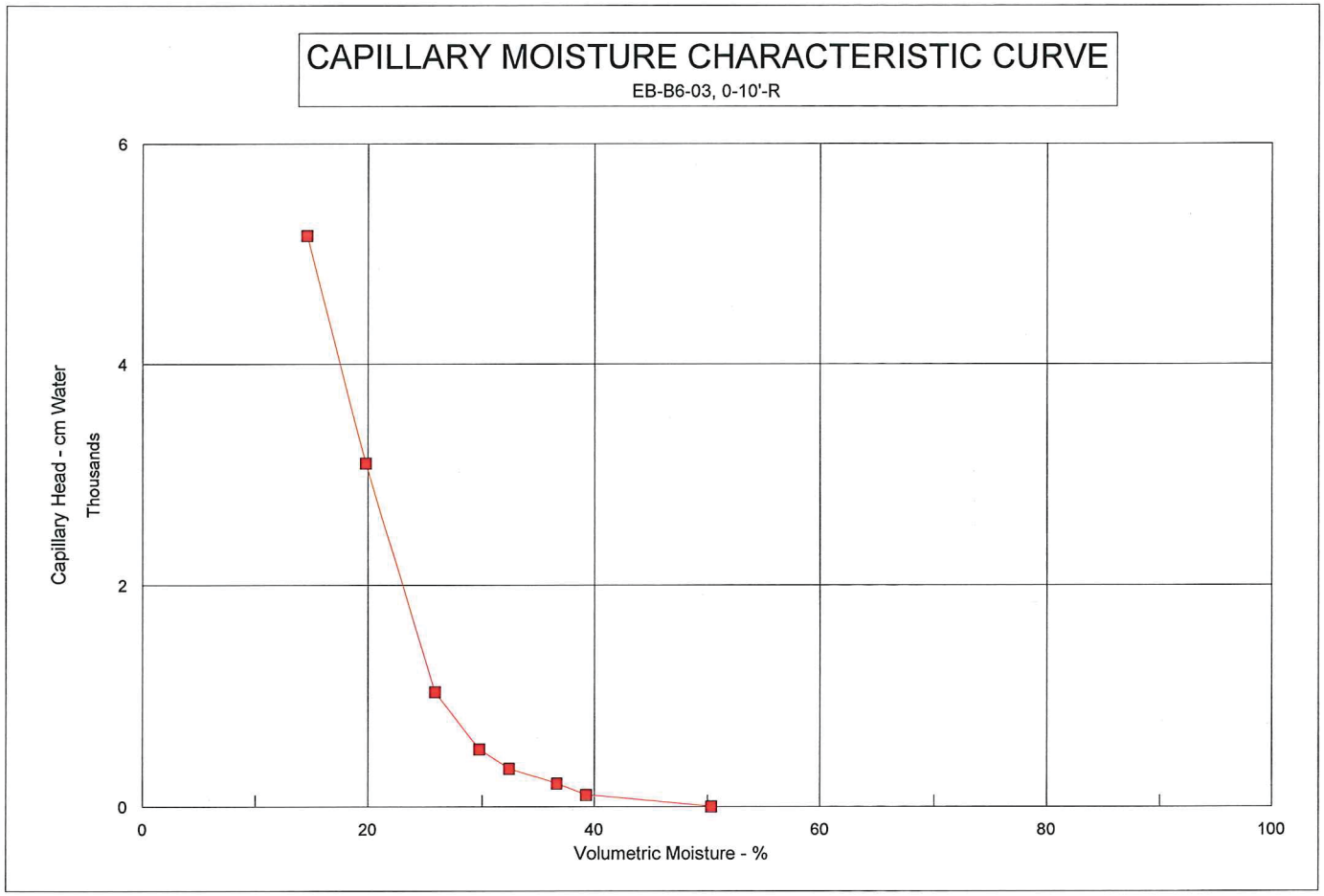
20
40
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
EB-B6-03, 0-10'-R
Capillary Head - cm Water
Thousands
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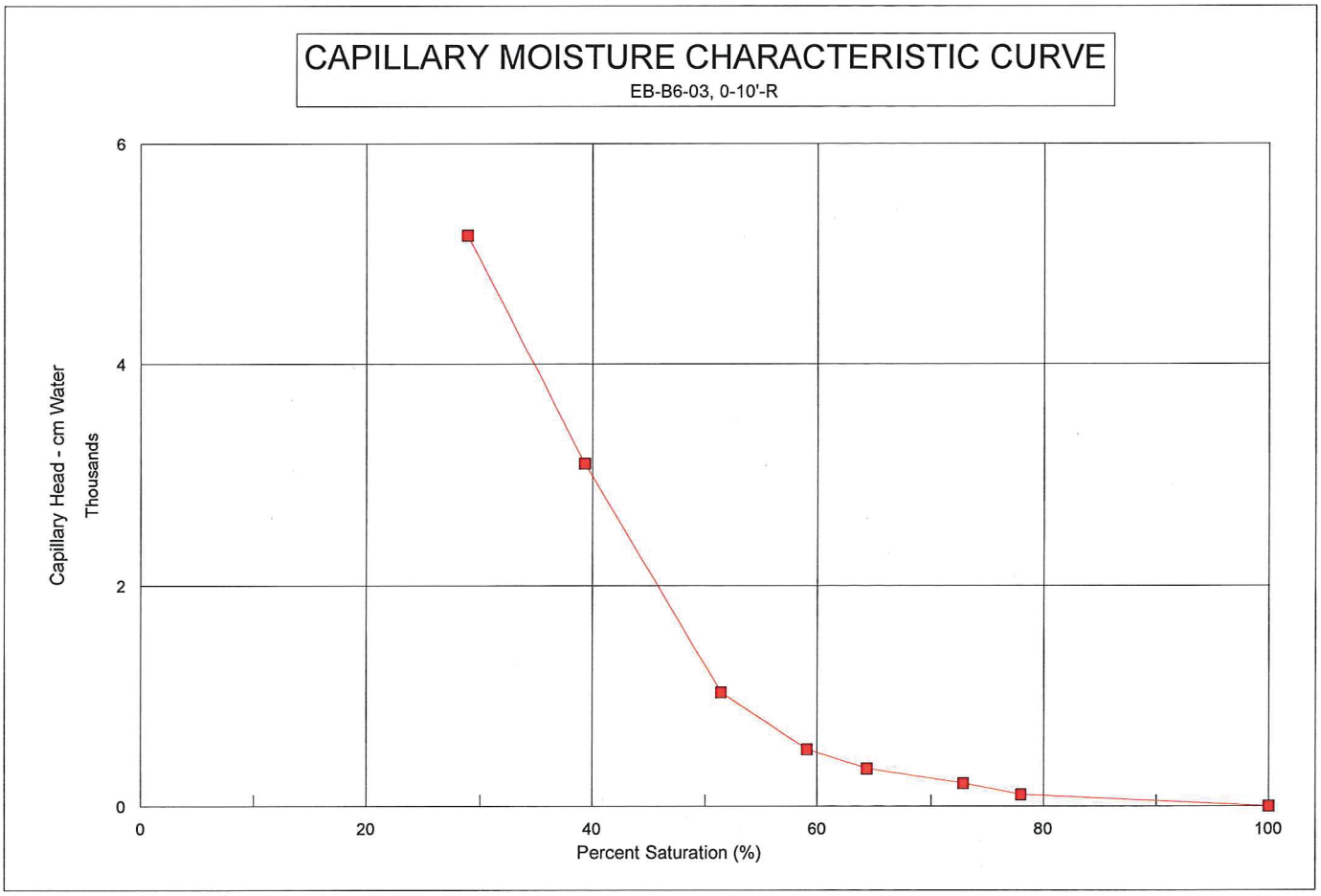
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
EB-B6-03, 0-10'-R
Capillary Head - cm Water
Thousands
6
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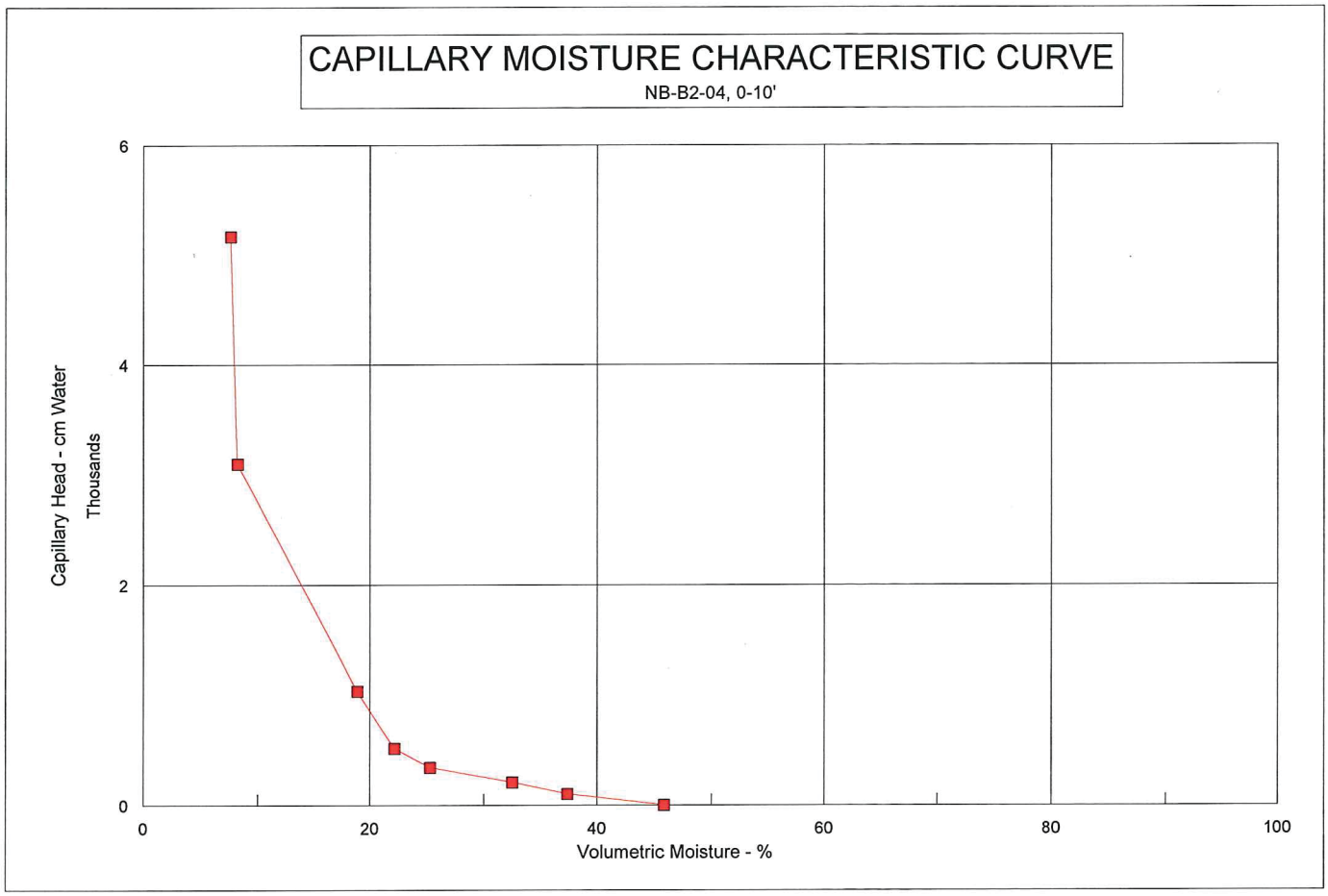
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
NB-B2-04, 0-10'
Capillary Head - cm Water
Thousands
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4
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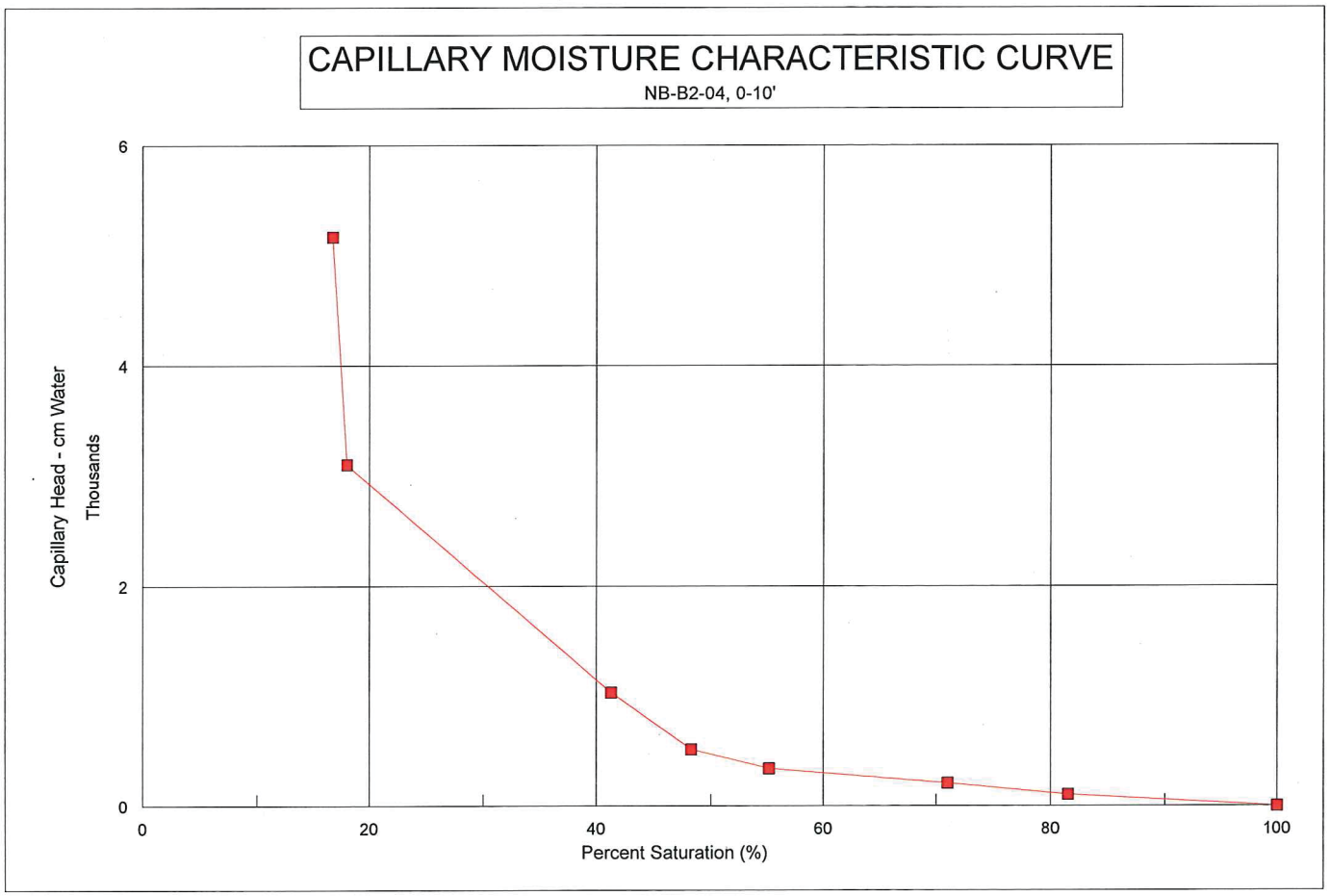
40
60
80
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
NB-B2-04, 0-10'
Capillary Head - cm Water
Thousands
6
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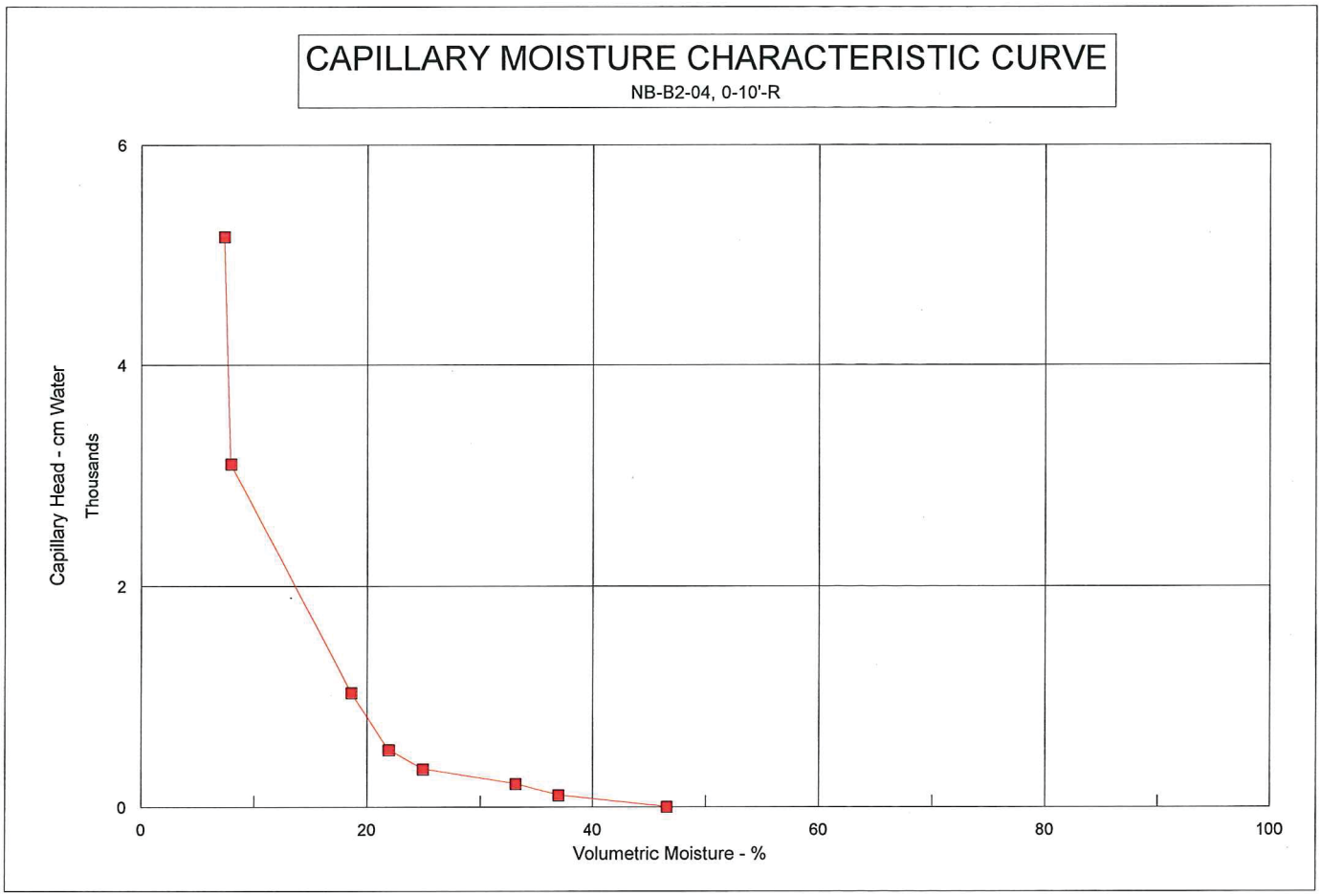
Percent Saturation (%)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NB-B2-04, 0-10'-R
Capillary Head - cm Water
Thousands
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20
40
60
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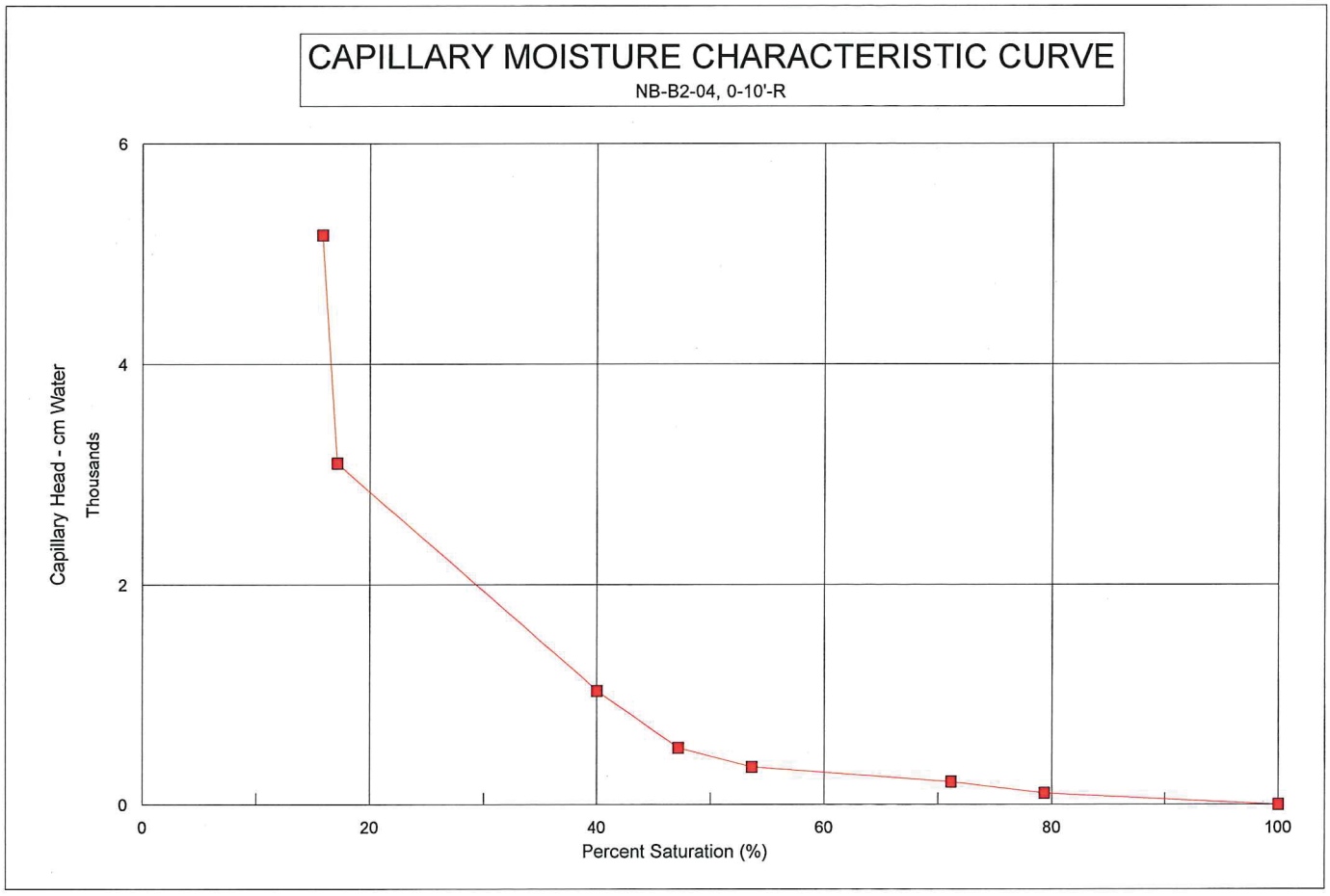
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
NB-B2-04, 0-10'-R
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Percent Saturation (%)

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

MASS DATA

Sample Description	Ring Mass g	As Rec. Mass g	Sat. Mass g	0.1 Bar Mass g	0.2 Bar Mass g	0.33 Bar Mass g	0.5 Bar Mass g	1 Bar Mass g	3 Bar Mass g	5 Bar Mass g		Dry Mass Filter, Ring, & Dish (g)	Dish Wt. g
Filter Mass g		0.205	0.724	0.551	0.499	0.438	0.381	0.339	0.275	0.270			
SB-B1-04, 0-25'	10.805	43.877	51.583	48.518	47.971	47.260	46.722	46.118	43.630	43.384		43.747	2.362
SB-B1-04, 0-25'-R	10.638	43.675	50.849	48.536	47.962	47.217	46.667	45.949	43.300	43.002		43.509	2.350
SB-B4-01, 0-15'	10.590	44.322	50.243	47.745	47.263	46.638	46.307	45.644	44.741	43.620		43.201	2.372
SB-B4-01, 0-15'-R	10.731	44.466	51.609	48.252	47.688	46.971	46.709	45.834	44.676	43.668		43.399	2.377
TI-CS01-04A, 11-24"	10.542	50.295	53.522	51.671	51.424	51.154	50.936	50.650	49.441	48.502		47.751	2.294
TI-CS01-04A, 11-24"-R	10.685	50.424	52.535	51.382	51.244	51.042	50.860	50.659	50.081	48.850		47.827	2.364
WB-B1-06, 5-10'	10.679	42.760	49.960	56.073	45.422	44.529	44.110	43.575	42.808	42.176		42.484	2.313
WB-B1-06, 5-10'-R	10.651	42.744	50.498	46.576	45.659	44.694	44.295	43.778	42.666	42.294		42.773	2.367
WB-B2-05,10-20'	10.341	42.207	49.817	47.014	46.322	45.181	44.642	43.986	42.812	42.119		42.527	2.369
WB-B2-05,10-20'-R	10.679	42.457	50.587	46.743	45.977	45.116	44.659	44.035	42.954	42.205		42.505	2.316

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETS.WK4

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

Moisture Content Data: % D.M. = Moisture Content By Dry Mass; % Vol. = Moisture Content By Volume

Sample Description	Sample Conditions						0.1 Bar			0.2 Bar		
	Dry Mass (g)	Unit Wt. (g/cc)	Sat. Mass (g)	Total H2O (g)	Sat. M.C. % D.M.	Sat. M.C. % Vol.	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.
SB-B1-04, 0-25'	30.375	1.571	40.054	9.679	31.87	50.06	6.787	22.34	35.10	6.292	20.71	32.54
SB-B1-04, 0-25'-R	30.316	1.568	39.487	9.171	30.25	47.43	7.031	23.19	36.36	6.509	21.47	33.66
SB-B4-01, 0-15'	30.034	1.553	38.929	8.895	29.62	46.00	6.570	21.88	33.98	6.140	20.44	31.75
SB-B4-01, 0-15'-R	30.086	1.556	40.154	10.068	33.46	52.07	6.884	22.88	35.60	6.372	21.18	32.95
TI-CS01-04A, 11-24"	34.710	1.795	42.256	7.546	21.74	39.03	5.868	16.91	30.35	5.673	16.34	29.34
TI-CS01-04A, 11-24"-R	34.573	1.788	41.126	6.553	18.95	33.89	5.573	16.12	28.82	5.487	15.87	28.38
WB-B1-06, 5-10'	29.287	1.515	38.557	9.270	31.65	47.94	15.556	53.12	80.45	4.957	16.93	25.64
WB-B1-06, 5-10'-R	29.550	1.528	39.123	9.573	32.40	49.51	5.824	19.71	30.12	4.959	16.78	25.65
WB-B2-05,10-20'	29.612	1.531	38.752	9.140	30.87	47.27	6.510	21.98	33.67	5.870	19.82	30.36
WB-B2-05,10-20'-R	29.305	1.516	39.184	9.879	33.71	51.09	6.208	21.18	32.11	5.494	18.75	28.41

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETS.WK4

ADVANCED TERRA TESTING, INC. ATT

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

Moisture Content Data: % D.M. = Moisture Content By Dry Mass; % Vol. = Moisture Content By Volume

Sample Description	0.33 Bar			0.5 Bar			1 Bar			3 Bar		
	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.	Retained H2O	% DM	% Vol.
SB-B1-04, 0-25'	5.642	18.57	29.18	5.161	16.99	26.69	4.599	15.14	23.78	2.175	7.16	11.25
SB-B1-04, 0-25'-R	5.825	19.21	30.13	5.332	17.59	27.58	4.656	15.36	24.08	2.071	6.83	10.71
SB-B4-01, 0-15'	5.576	18.57	28.84	5.302	17.65	27.42	4.681	15.59	24.21	3.842	12.79	19.87
SB-B4-01, 0-15'-R	5.716	19.00	29.56	5.511	18.32	28.50	4.678	15.55	24.19	3.584	11.91	18.54
TI-CS01-04A, 11-24"	5.464	15.74	28.26	5.303	15.28	27.43	5.059	14.58	26.16	3.914	11.28	20.24
TI-CS01-04A, 11-24"-R	5.346	15.46	27.65	5.221	15.10	27.00	5.062	14.64	26.18	4.548	13.15	23.52
WB-B1-06, 5-10'	4.125	14.08	21.33	3.763	12.85	19.46	3.270	11.17	16.91	2.567	8.76	13.28
WB-B1-06, 5-10'-R	4.055	13.72	20.97	3.713	12.57	19.20	3.238	10.96	16.75	2.190	7.41	11.33
WB-B2-05,10-20'	4.790	16.18	24.77	4.308	14.55	22.28	3.694	12.47	19.10	2.584	8.73	13.36
WB-B2-05,10-20'-R	4.694	16.02	24.28	4.294	14.65	22.21	3.712	12.67	19.20	2.695	9.20	13.94

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETS.WK4

ADVANCED TERRA TESTING, INC. ATT

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT	MWH	JOB NO.	2512-77
SAMPLE DATE	--	TEST STARTED	04/09/14 SKL
SOIL DESCR.	Remolded -10	TEST FINISHED	06/20/14 DPM
LOCATION	--		

Moisture Content Data: % D.M. = Moisture Content By Dry Mass; % Vol. = Moisture Content By Volume

Sample Description	5 Bar		
	Retained H2O	% DM	% Vol.
SB-B1-04, 0-25'	1.934	6.37	10.00
SB-B1-04, 0-25'-R	1.778	5.86	9.20
SB-B4-01, 0-15'	2.726	9.08	14.10
SB-B4-01, 0-15'-R	2.581	8.58	13.35
TI-CS01-04A, 11-24"	2.980	8.59	15.41
TI-CS01-04A, 11-24"-R	3.322	9.61	17.18
WB-B1-06, 5-10'	1.940	6.62	10.03
WB-B1-06, 5-10'-R	1.823	6.17	9.43
WB-B2-05,10-20'	1.896	6.40	9.81
WB-B2-05,10-20'-R	1.951	6.66	10.09

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETS.WK4

ADVANCED TERRA TESTING, INC. ATT

CAPILLARY MOISTURE RETENTION TEST
ASTM D 3152

CLIENT MWH

JOB NO. 2512-77

SAMPLE DATE --
SOIL DESCR. Remolded -10
LOCATION --

TEST STARTED 04/09/14 SKL
TEST FINISHED 06/20/14 DPM

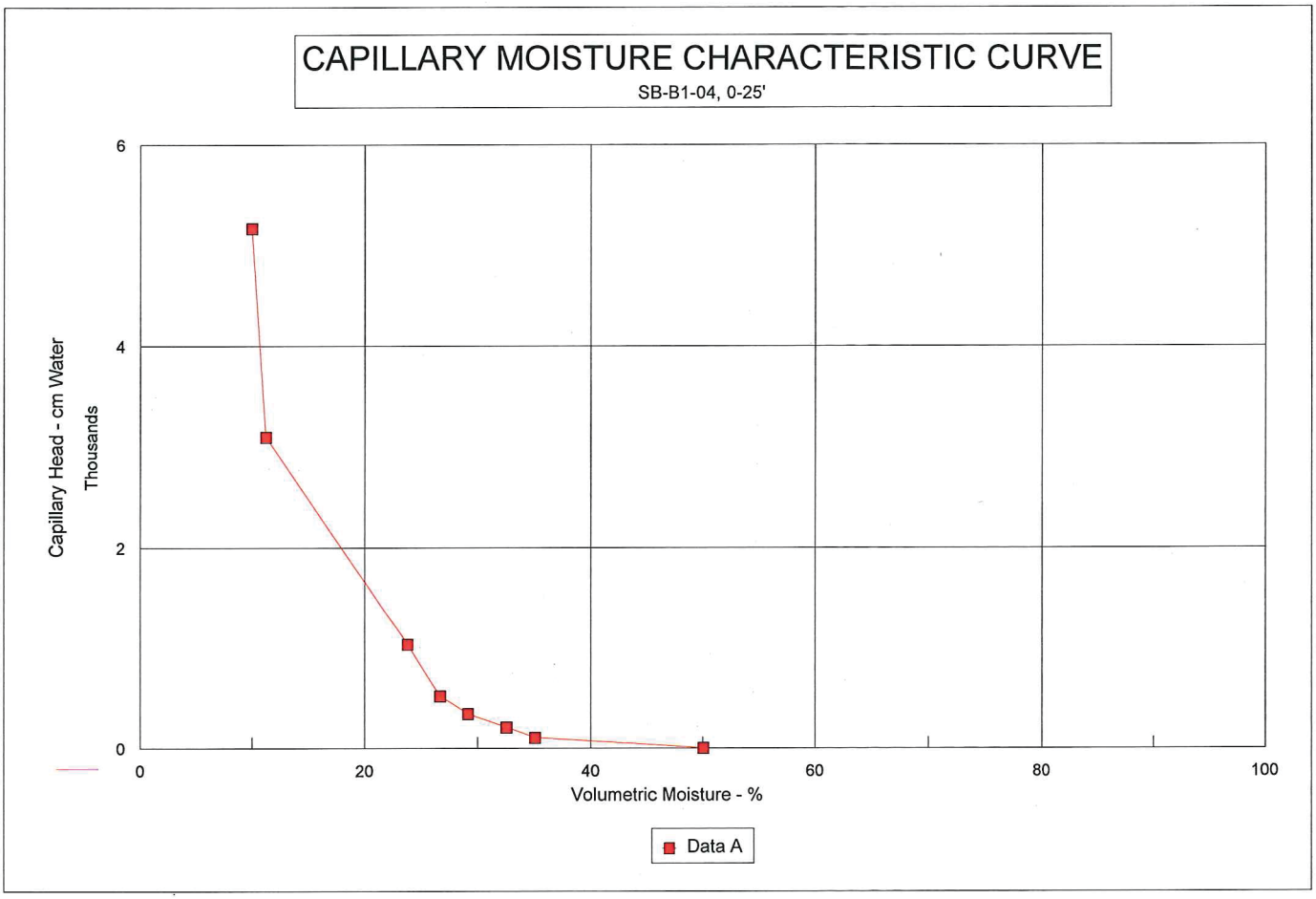
	Vol. MC % Sat.	Vol. MC % 0.1 Bar	Vol. MC % 0.2 Bar	Vol. MC % 0.33 Bar	Vol. MC % 0.5 Bar	Vol. MC % 1 Bar	Vol. MC % 3 Bar	Vol. MC % 5 Bar
SB-B1-04, 0-25'	50.06	35.10	32.54	29.18	26.69	23.78	11.25	10.00
SB-B1-04, 0-25'-R	47.43	36.36	33.66	30.13	27.58	24.08	10.71	9.20
SB-B4-01, 0-15'	46.00	33.98	31.75	28.84	27.42	24.21	19.87	14.10
SB-B4-01, 0-15'-R	52.07	35.60	32.95	29.56	28.50	24.19	18.54	13.35
TI-CS01-04A, 11-24"	39.03	30.35	29.34	28.26	27.43	26.16	20.24	15.41
TI-CS01-04A, 11-24"-R	33.89	28.82	28.38	27.65	27.00	26.18	23.52	17.18
WB-B1-06, 5-10'	47.94	80.45	25.64	21.33	19.46	16.91	13.28	10.03
WB-B1-06, 5-10'-R	49.51	30.12	25.65	20.97	19.20	16.75	11.33	9.43
WB-B2-05,10-20'	47.27	33.67	30.36	24.77	22.28	19.10	13.36	9.81
WB-B2-05,10-20'-R	51.09	32.11	28.41	24.28	22.21	19.20	13.94	10.09

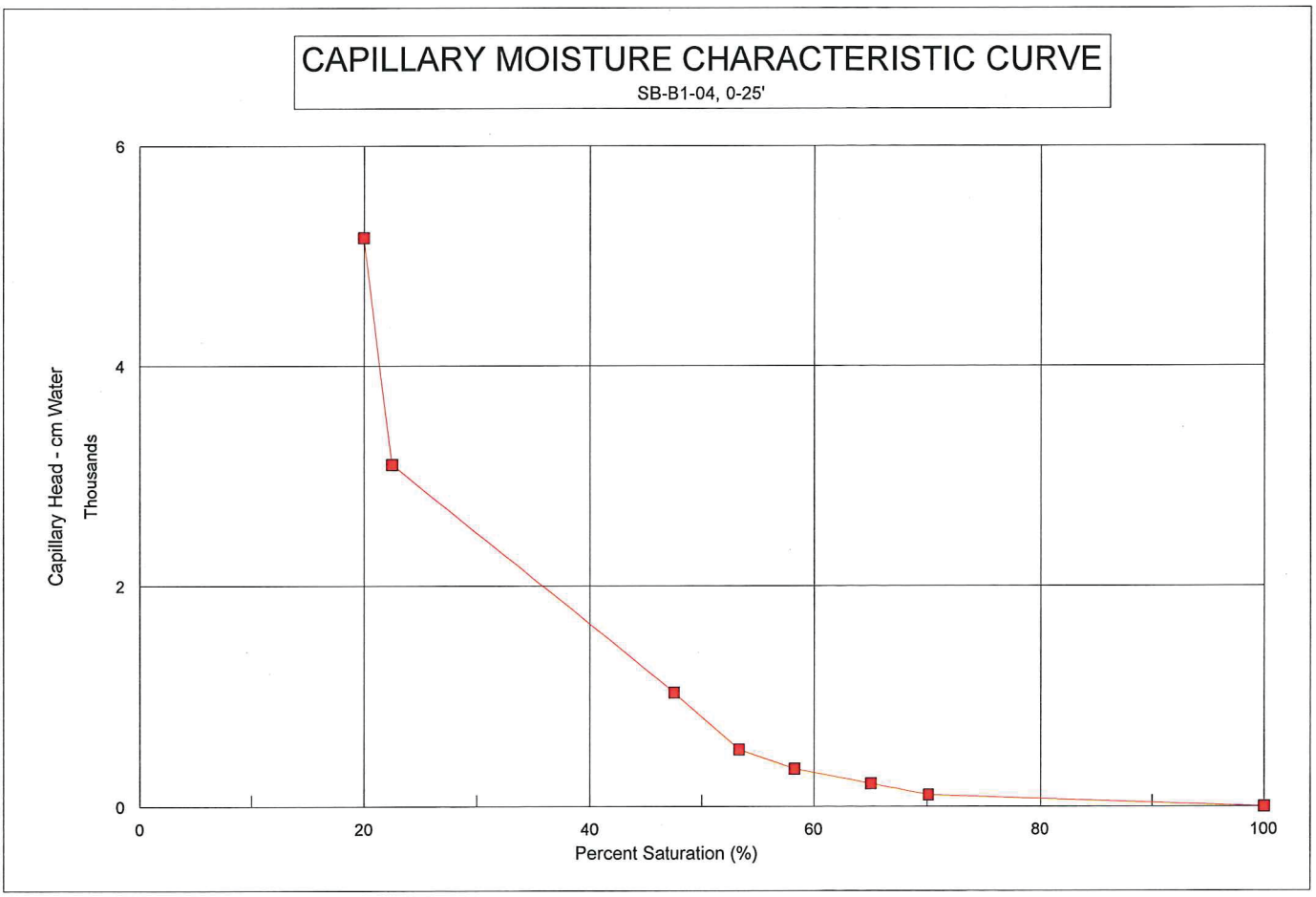
% Saturation

	Sat.	0.1 Bar	0.2 Bar	0.33 Bar	0.5 Bar	1 Bar	3 Bar	5 Bar
SB-B1-04, 0-25'	100.00	70.12	65.01	58.29	53.32	47.52	22.47	19.98
SB-B1-04, 0-25'-R	100.00	76.67	70.97	63.52	58.14	50.77	22.58	19.39
SB-B4-01, 0-15'	100.00	73.86	69.03	62.69	59.61	52.63	43.19	30.65
SB-B4-01, 0-15'-R	100.00	68.38	63.29	56.77	54.74	46.46	35.60	25.64
TI-CS01-04A, 11-24"	100.00	77.76	75.18	72.41	70.28	67.04	51.87	39.49
TI-CS01-04A, 11-24"-R	100.00	85.05	83.73	81.58	79.67	77.25	69.40	50.69
WB-B1-06, 5-10'	100.00	167.81	53.47	44.50	40.59	35.28	27.69	20.93
WB-B1-06, 5-10'-R	100.00	60.84	51.80	42.36	38.79	33.82	22.88	19.04
WB-B2-05,10-20'	100.00	71.23	64.22	52.41	47.13	40.42	28.27	20.74
WB-B2-05,10-20'-R	100.00	62.84	55.61	47.51	43.47	37.57	27.28	19.75

Data Entered By: DAW Date: 06/26/2014
Data Checked By: DPM Date: 6/26/14
Filename: CMRSETS.WK4

ADVANCED TERRA TESTING, INC. ATT


CAPILLARY MOISTURE CHARACTERISTIC CURVE
SB-B1-04, 0-25'
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Volumetric Moisture - %
Data A


CAPILLARY MOISTURE CHARACTERISTIC CURVE
SB-B1-04, 0-25'
Capillary Head - cm Water
Thousands
6
4
2
0
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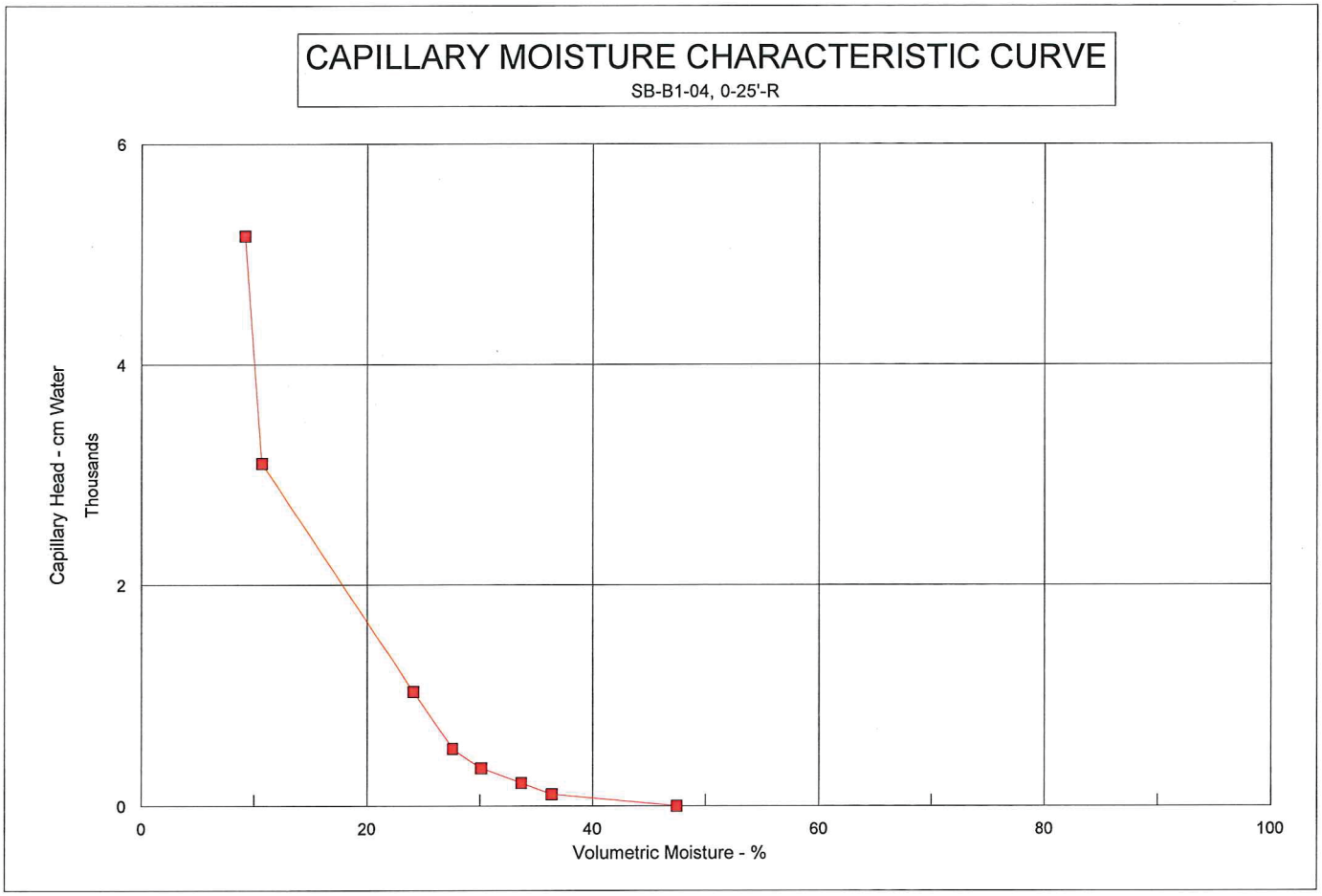
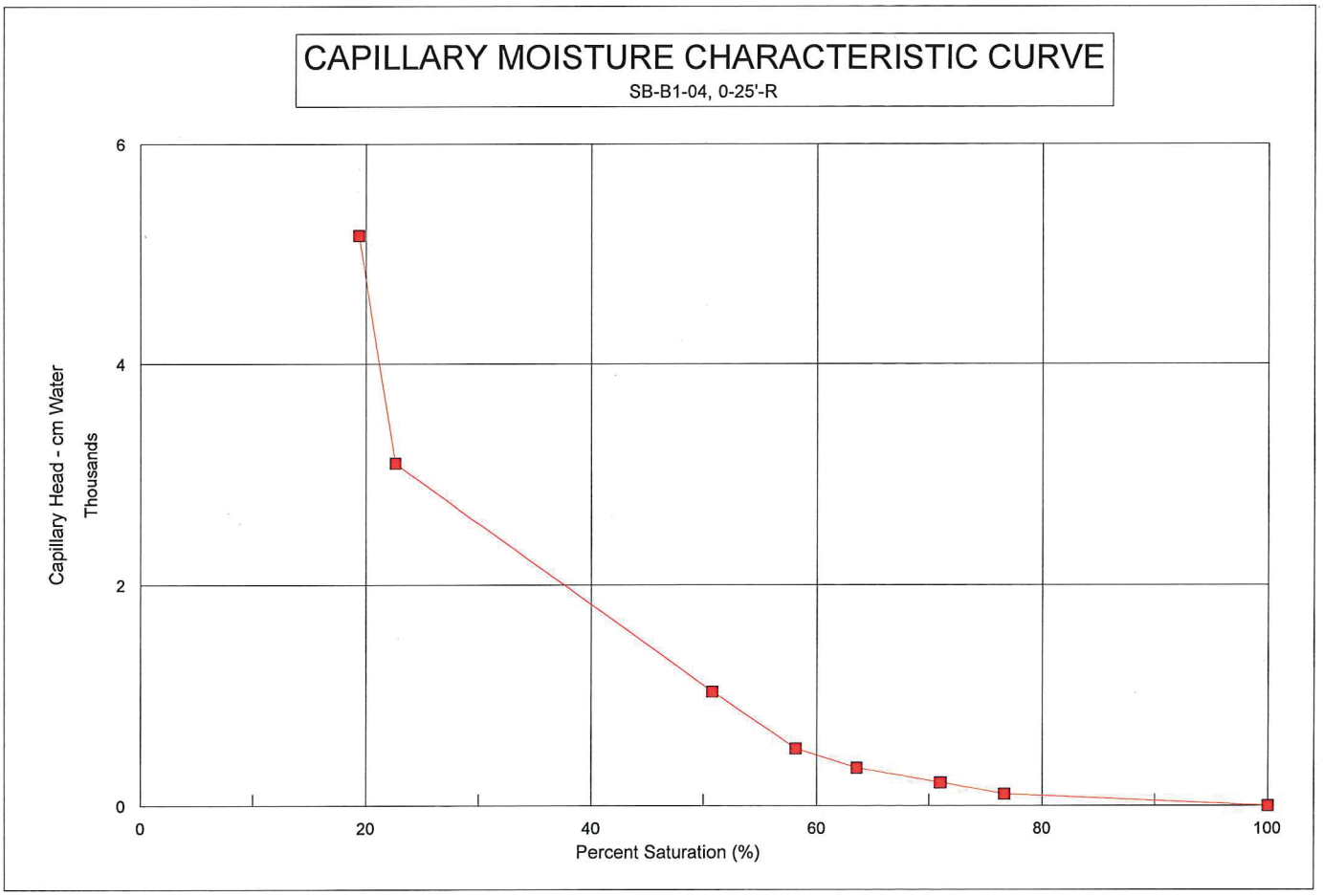
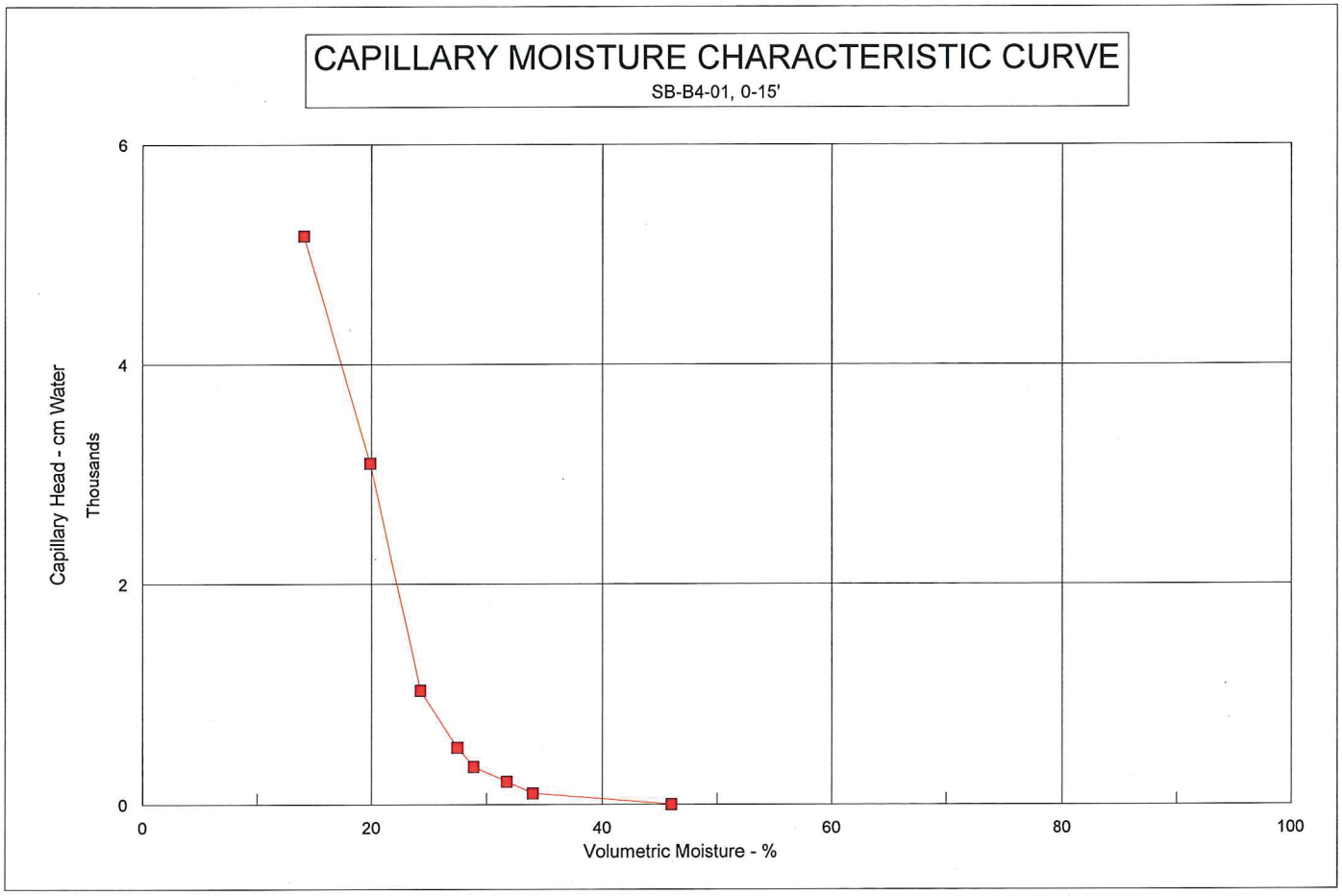
20
40
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
SB-B1-04, 0-25'-R
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
SB-B1-04, 0-25'-R
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
SB-B4-01, 0-15'
Capillary Head - cm Water
Thousands
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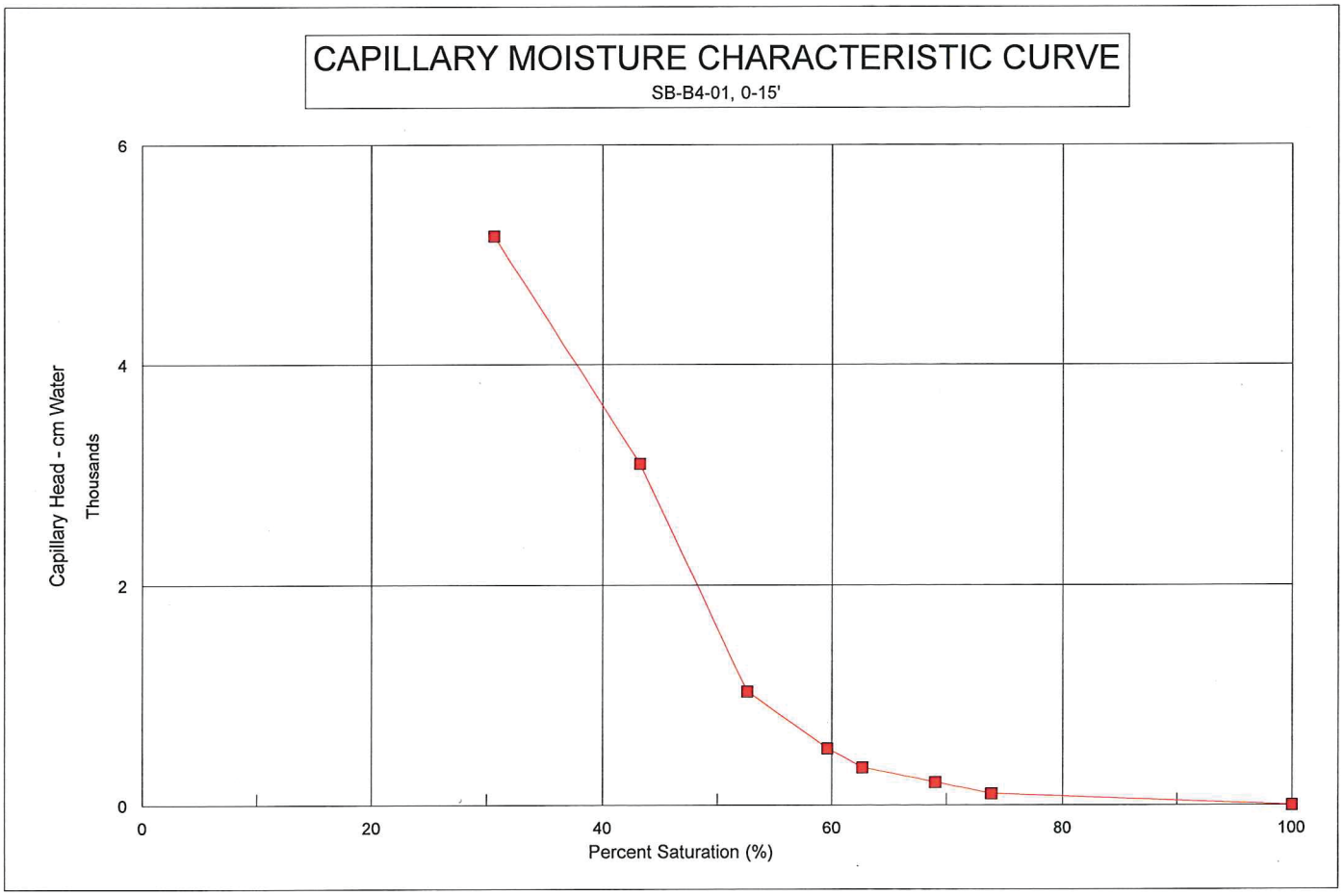
2
4
6
0
20
40
60
80
100
Volumetric Moisture - %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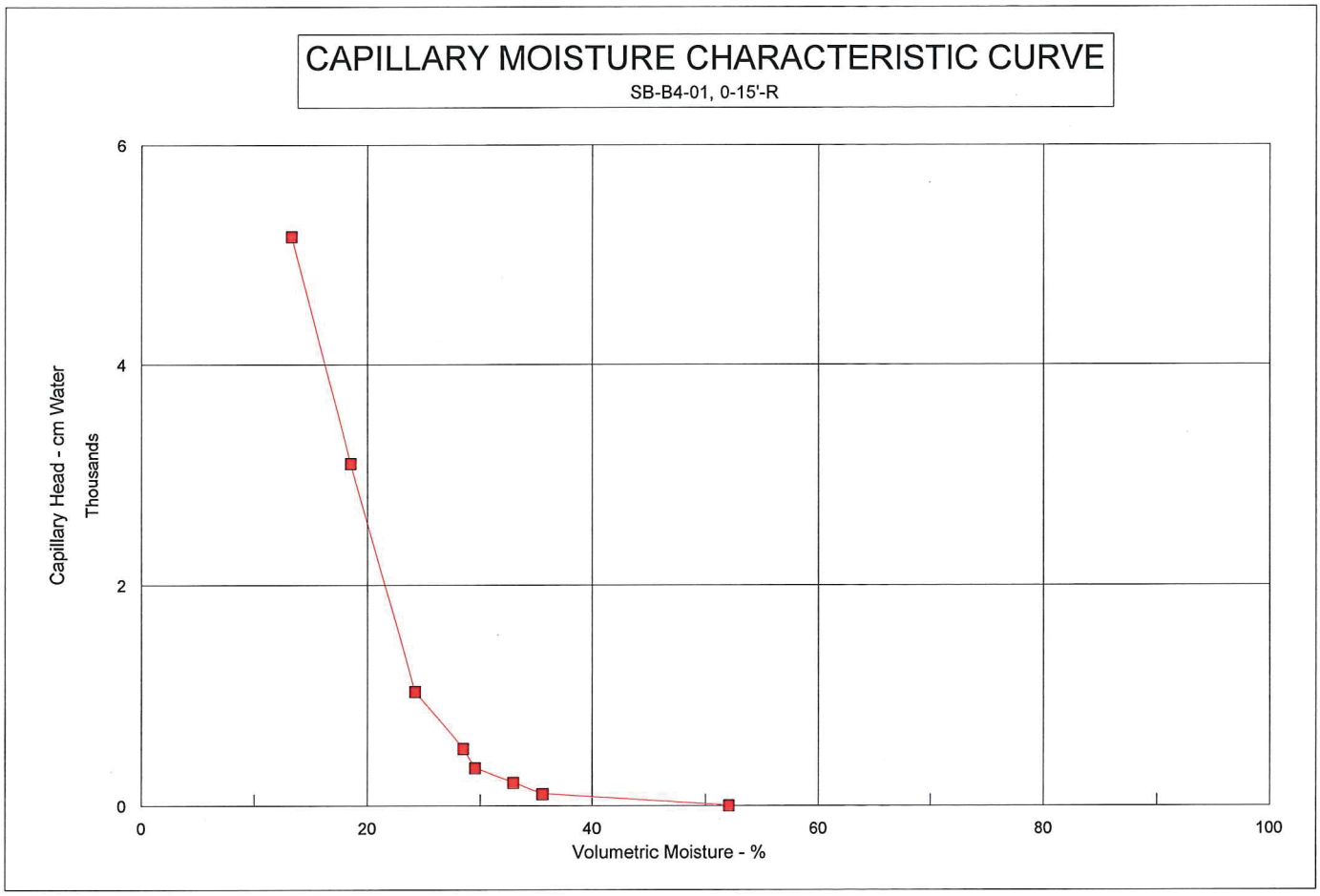
SB-B4-01, 0-15'
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Percent Saturation (%)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SB-B4-01, 0-15'-R
Capillary Head - cm Water
Thousands
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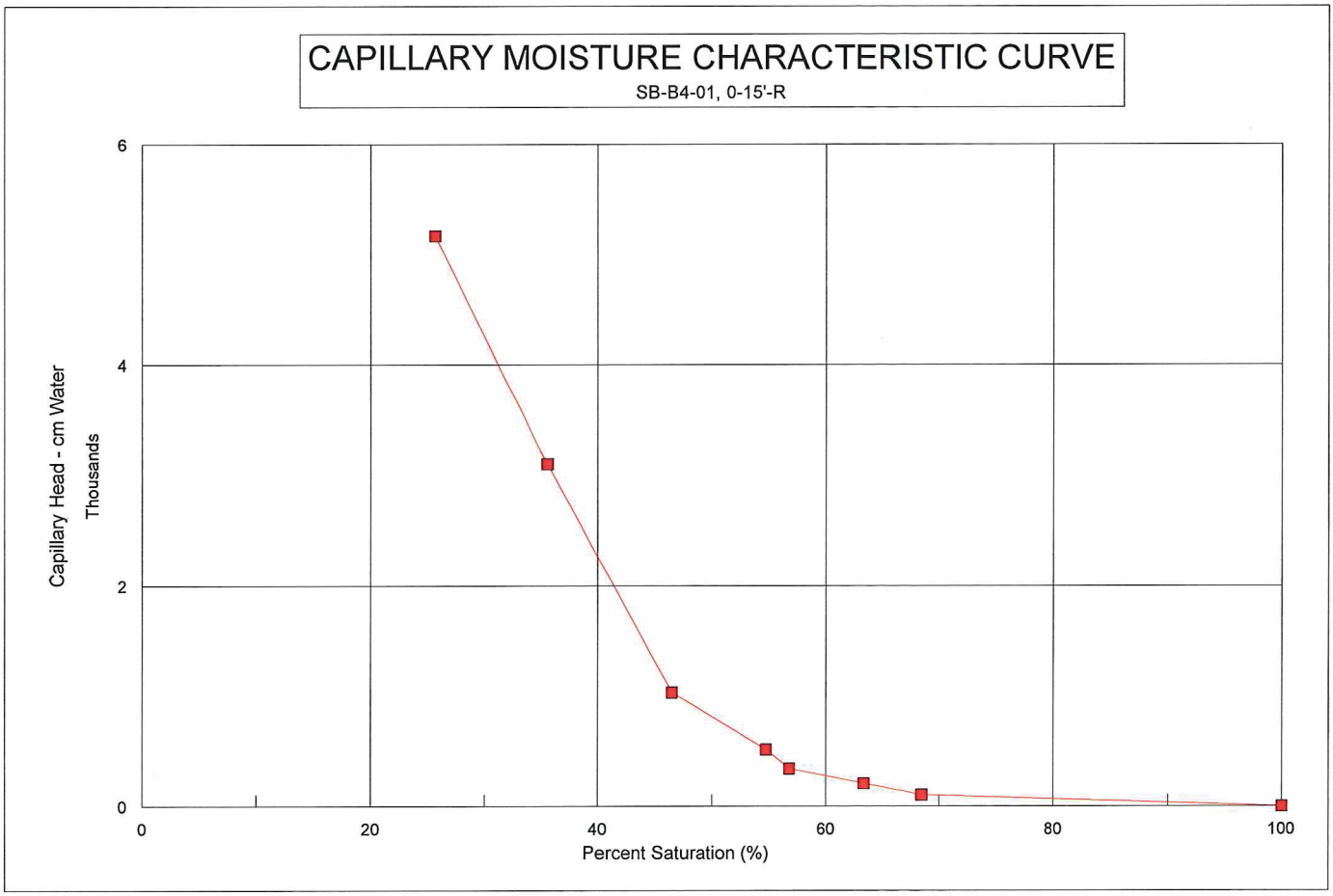
2
4
6
0
20
40
60
80
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
SB-B4-01, 0-15'-R
Capillary Head - cm Water
Thousands
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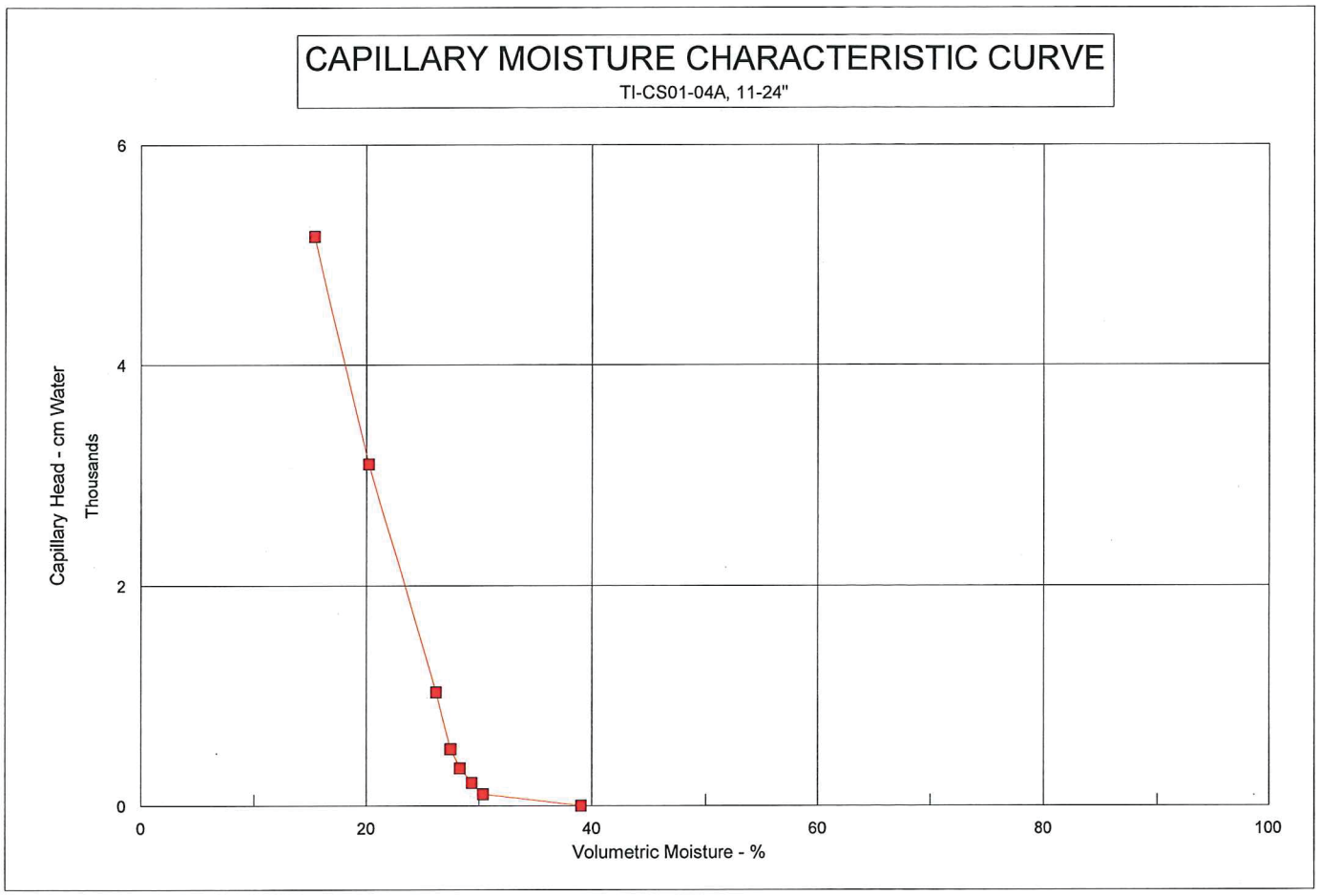
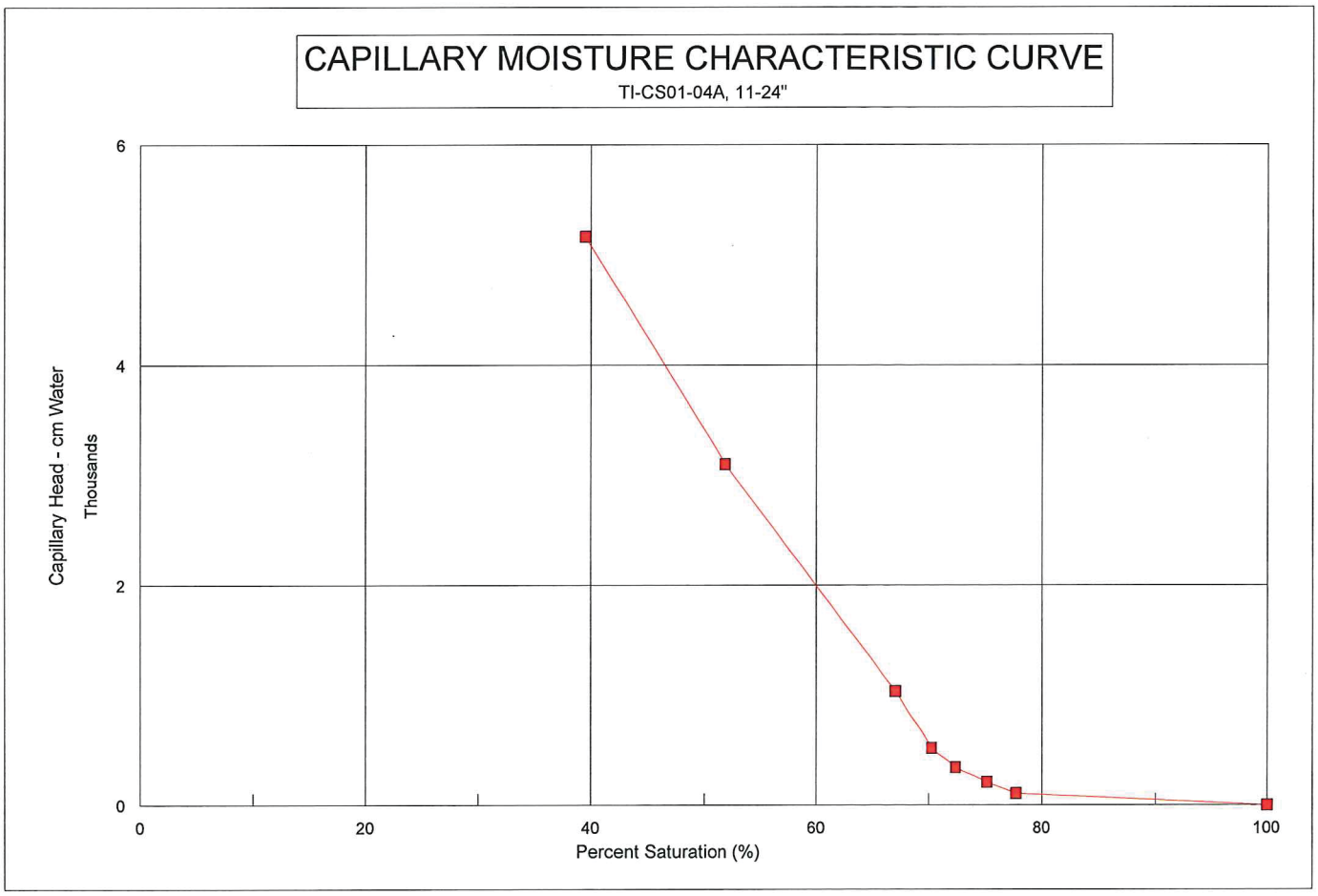
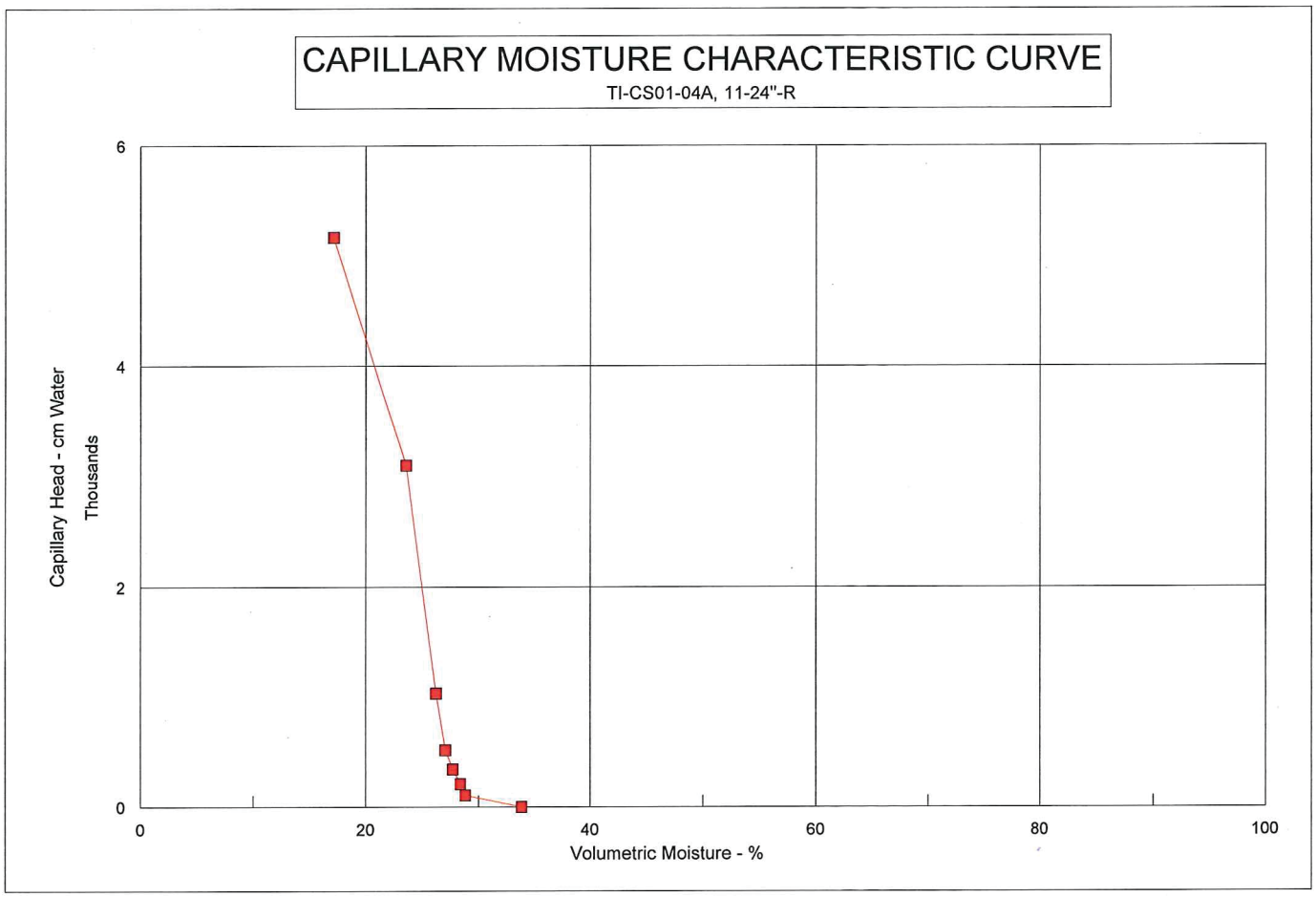
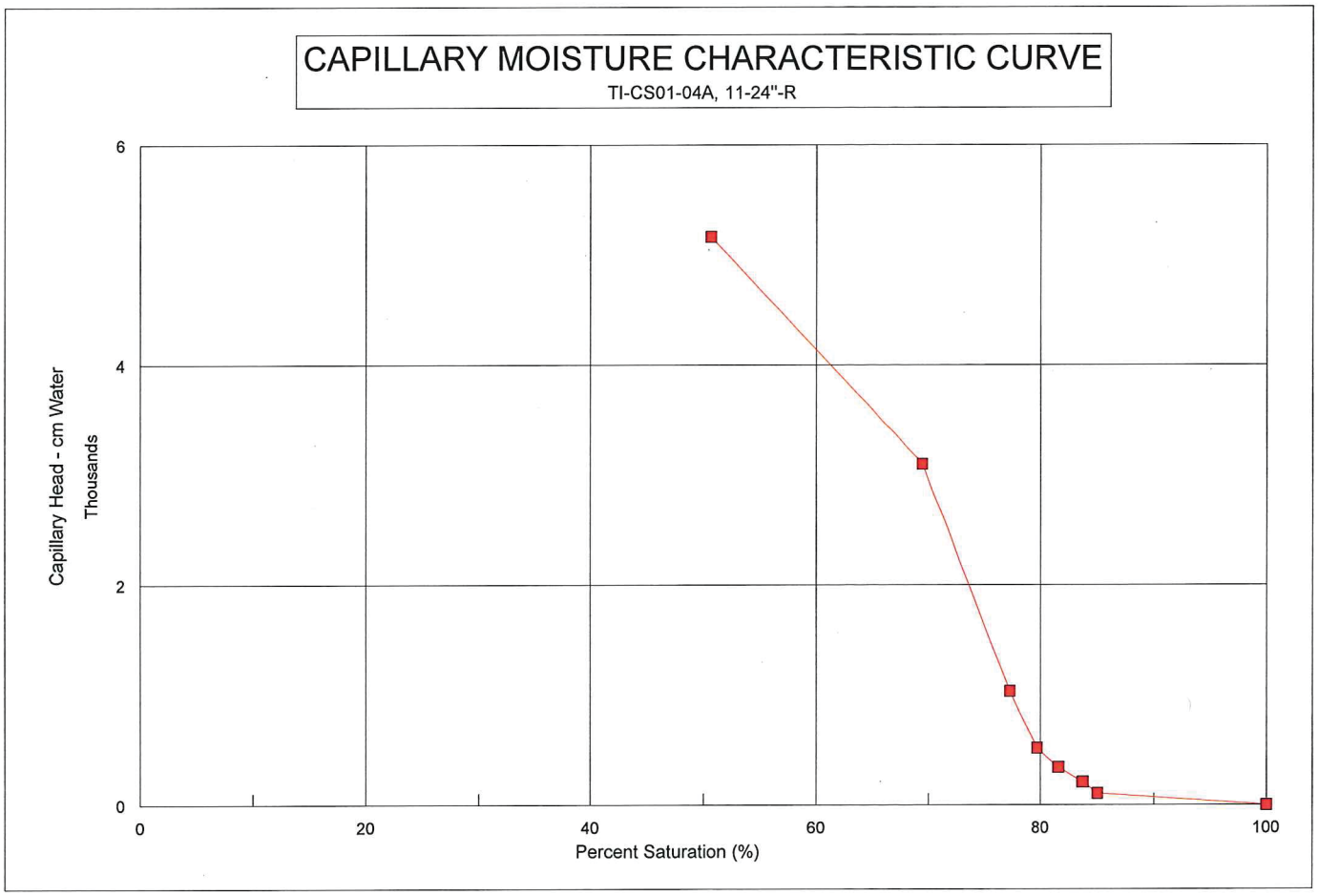
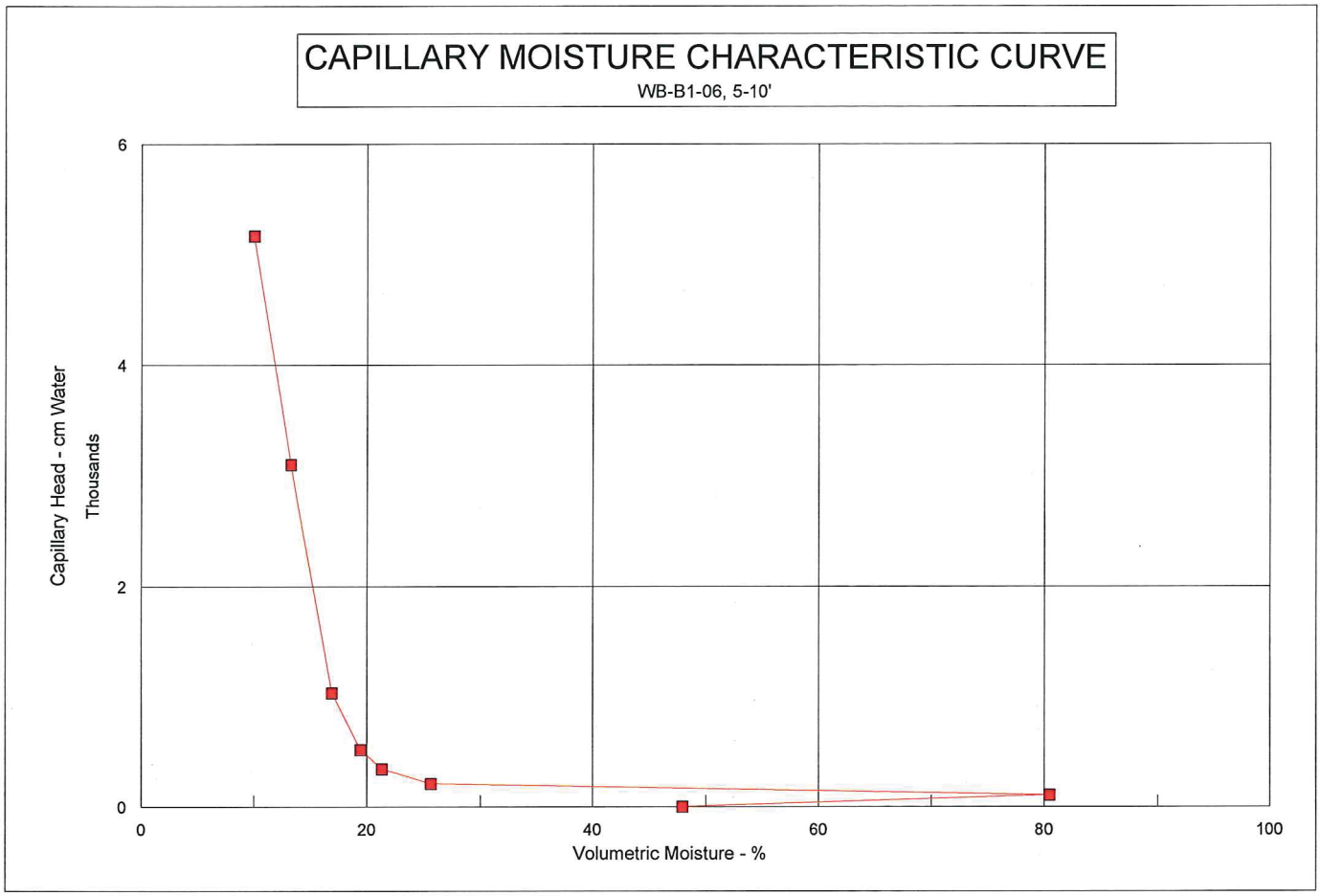
2
4
6
0
20
40
60
80
100
Percent Saturation (%)

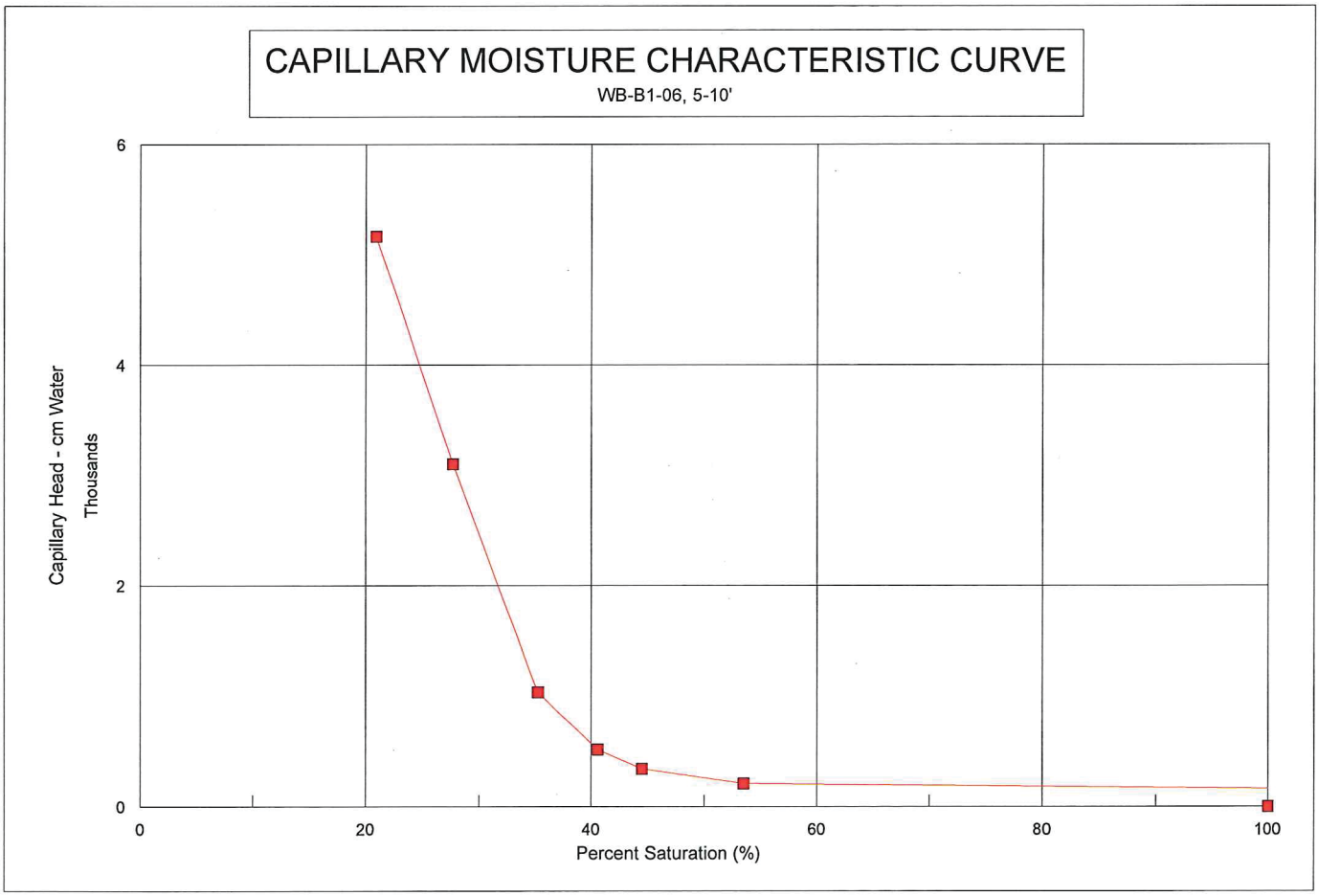

CAPILLARY MOISTURE CHARACTERISTIC CURVE
TI-CS01-04A, 11-24"
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Volumetric Moisture - %

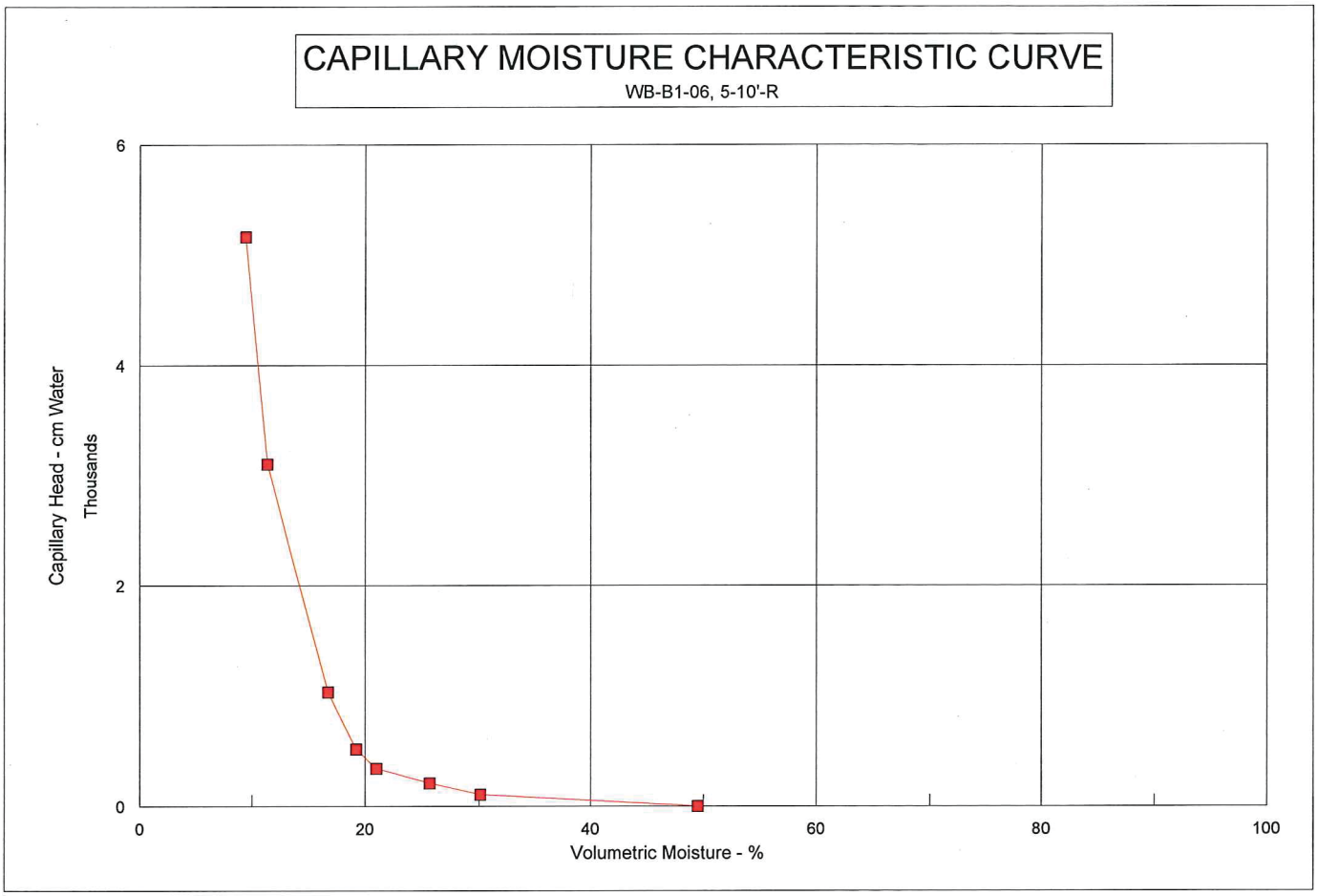

CAPILLARY MOISTURE CHARACTERISTIC CURVE
TI-CS01-04A, 11-24"
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Percent Saturation (%)

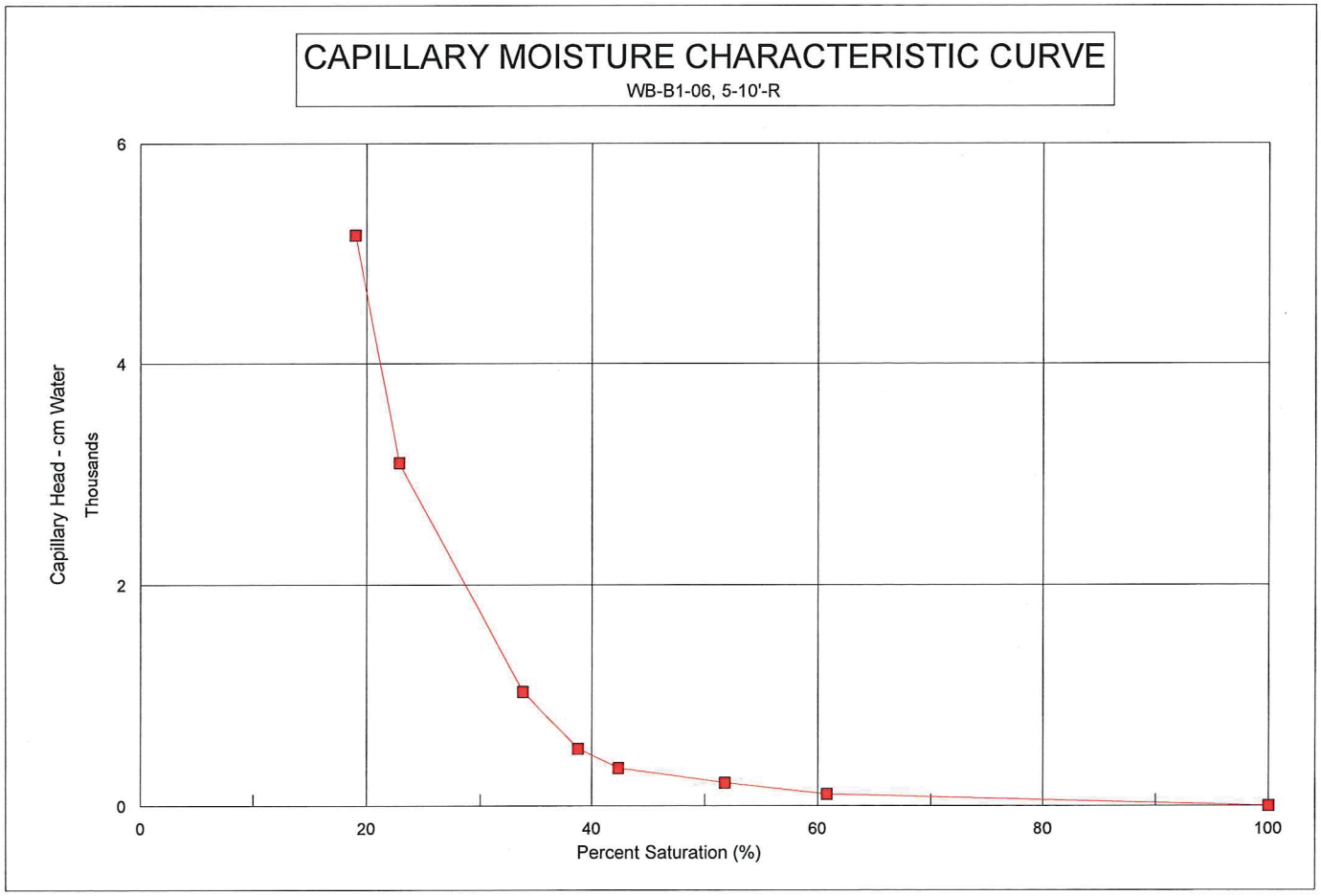

CAPILLARY MOISTURE CHARACTERISTIC CURVE
TI-CS01-04A, 11-24"-R
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Volumetric Moisture - %

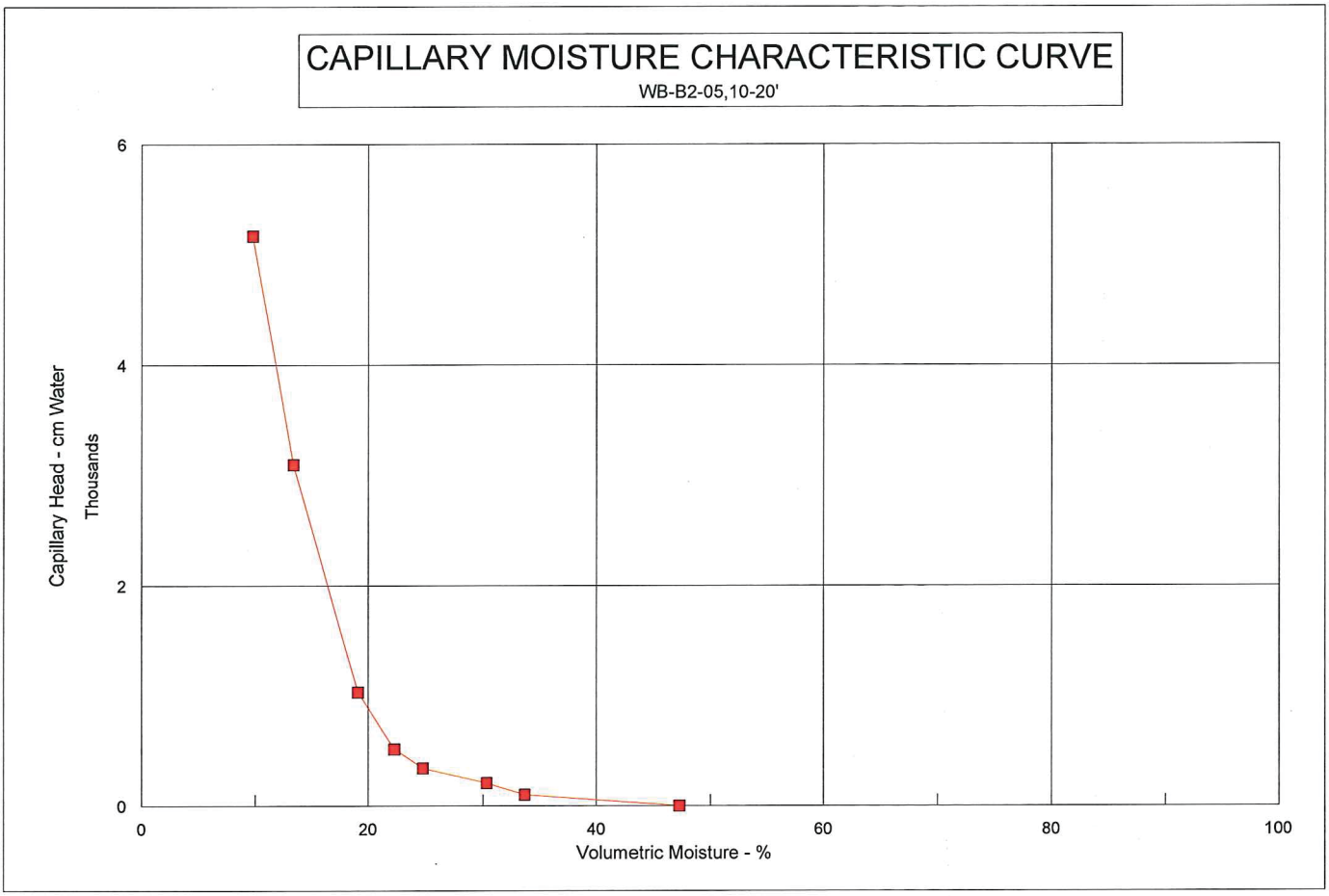

CAPILLARY MOISTURE CHARACTERISTIC CURVE
TI-CS01-04A, 11-24"-R
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Percent Saturation (%)

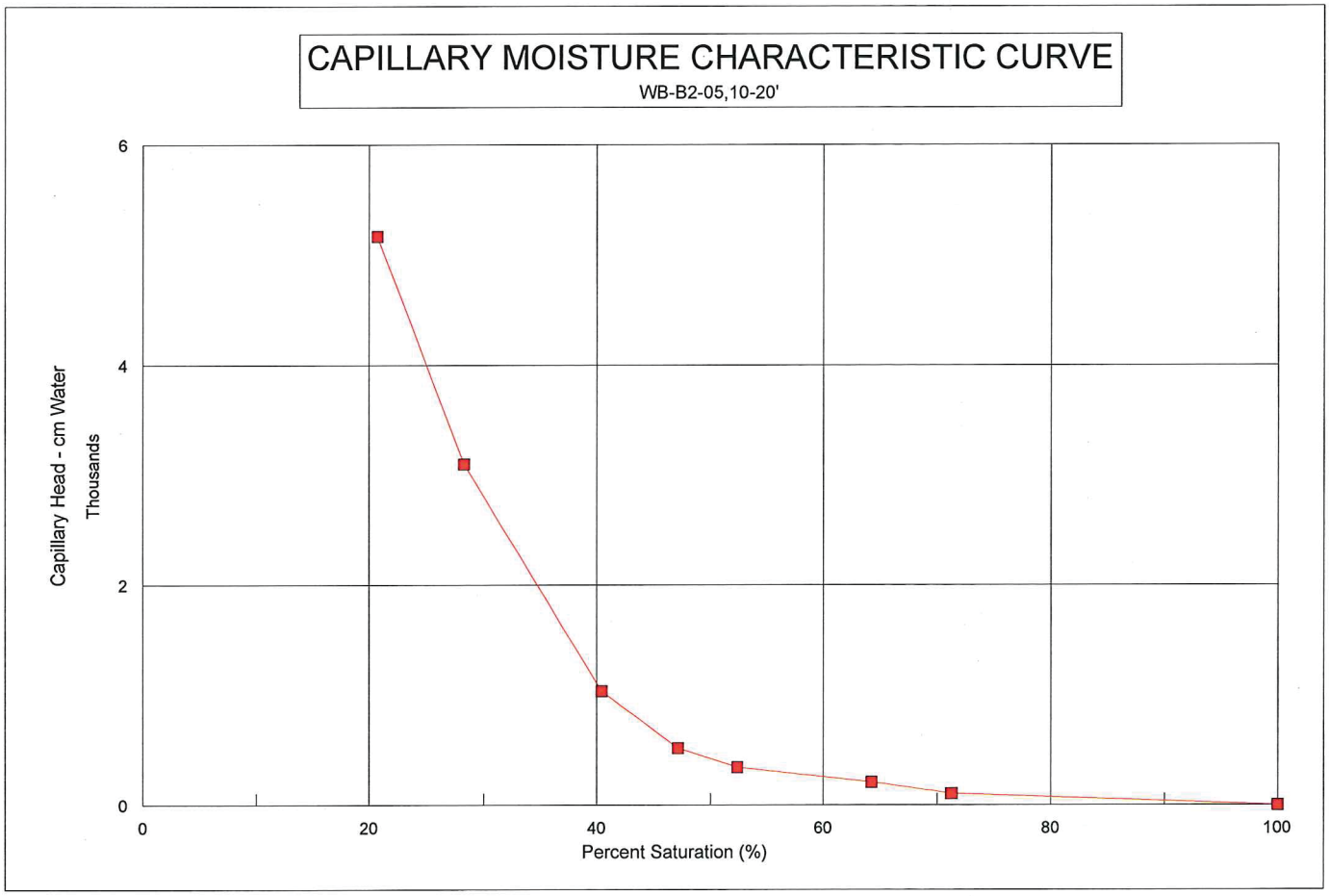

CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B1-06, 5-10'
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Volumetric Moisture - %

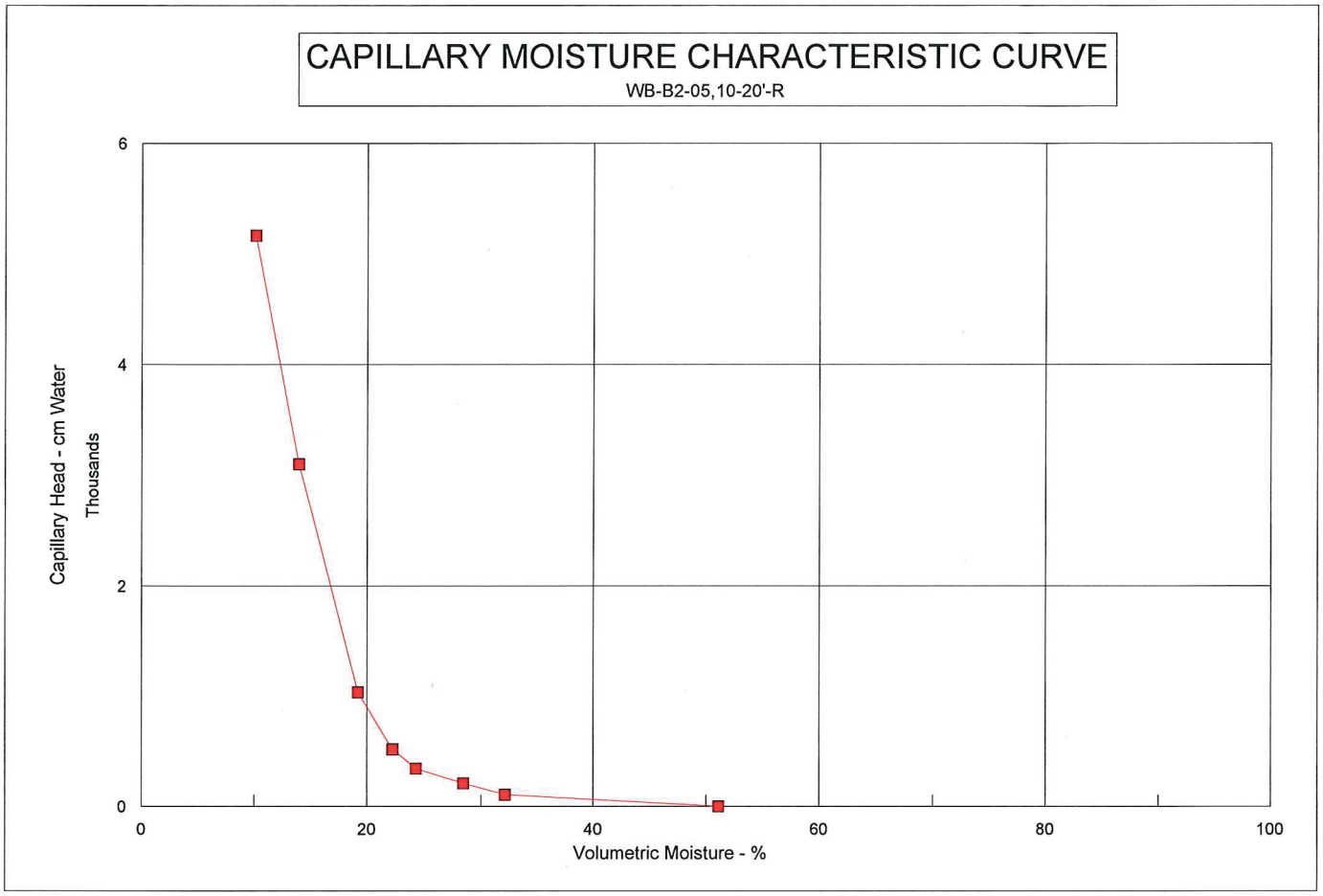

CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B1-06, 5-10'
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B1-06, 5-10'-R
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B1-06, 5-10'-R
Capillary Head - cm Water
Thousands
0
2
4
6
0
20
40
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B2-05,10-20'
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B2-05,10-20'
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Percent Saturation (%)


CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B2-05,10-20'-R
Capillary Head - cm Water
Thousands
6
4
2
0
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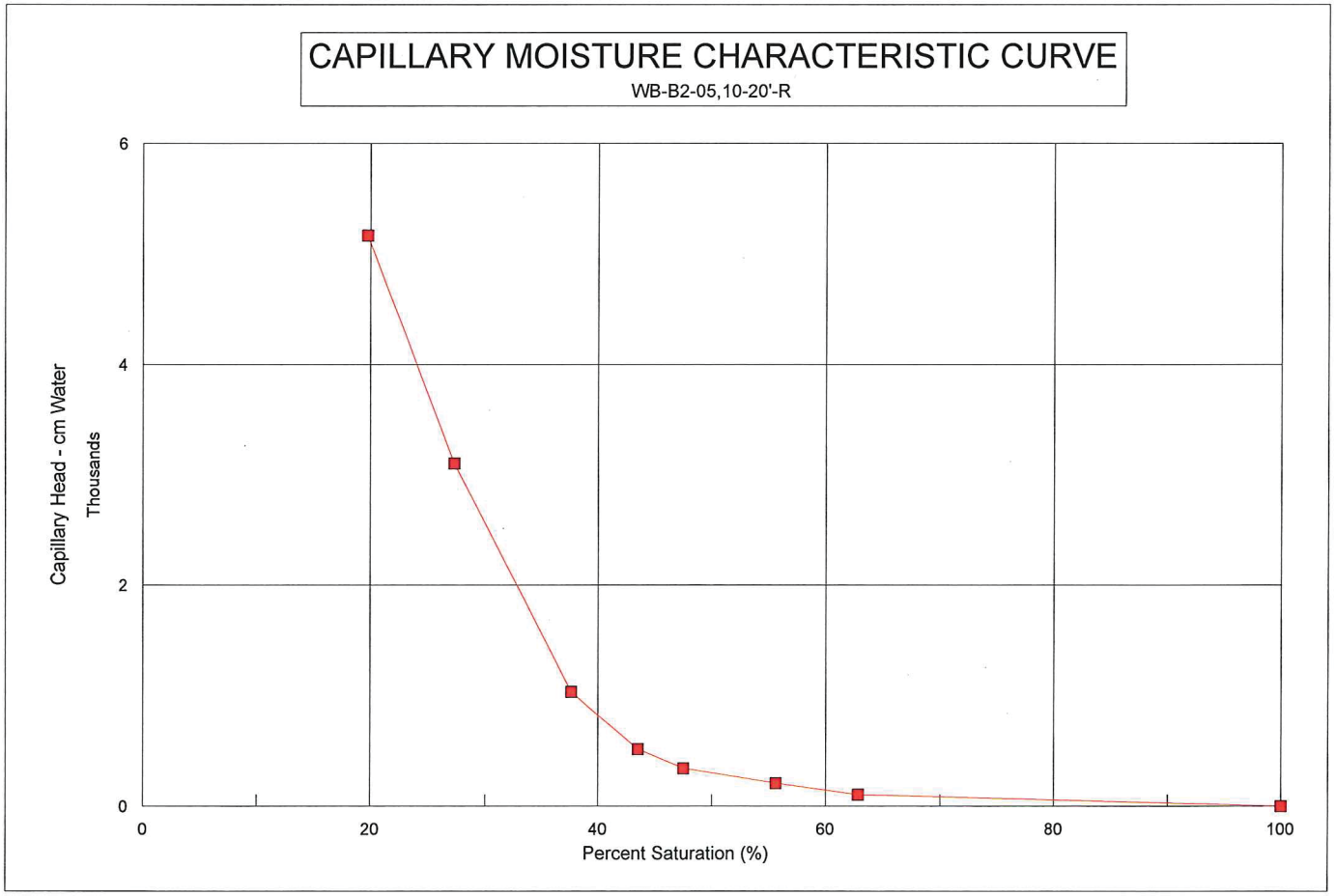
20
40
60
80
100
Volumetric Moisture - %


CAPILLARY MOISTURE CHARACTERISTIC CURVE
WB-B2-05,10-20'-R
Capillary Head - cm Water
Thousands
6
4
2
0
0
20
40
60
80
100
Percent Saturation (%)