

APPENDIX D

**Pore Size Distribution Detected by Mercury Intrusion Porosimetry
(MIP)**

C1-7
(w/c=0.40, t=7 days)

PORESIZER 9320 V2.04

PAGE 1

SAMPLE DIRECTORY/NUMBER: EDATA / 1
OPERATOR: SOMSRI
SAMPLE ID: C1-7
SUBMITTER: TISTR

LP 12:51:33 11/30/00
HP 12:35:54 11/30/00
REP 13:35:55 11/30/00

PENETROMETER NUMBER: 7	ADVANCING CONTACT ANGLE: 130.0 deg
PENETROMETER CONSTANT: 10.79 $\mu\text{L}/\text{pF}$	REDUCING CONTACT ANGLE: 130.0 deg
PENETROMETER WEIGHT: 69.8500 g	MERCURY SURFACE TENSION: 485.0 dyn/cm
STEM VOLUME: 0.3920 mL	MERCURY DENSITY: 13.5335 g/mL
MAXIMUM HEAD PRESSURE: 4.4500 psi	SAMPLE WEIGHT: 4.7900 g
PENETROMETER VOLUME: 6.0500 mL	SAMPLE+PEN+Hg WEIGHT: 117.9300 g

LOW PRESSURE:

MERCURY FILLING PRESSURE: 1.3980 psia
LAST LOW PRESSURE POINT: 24.5896 psia

HIGH PRESSURE:

RUN TYPE: AUTOMATIC
RUN METHOD: EQUILIBRATED
EQUILIBRATION TIME: 10 seconds

INTRUSION DATA SUMMARY

TOTAL INTRUSION VOLUME	=	0.0783	mL/g
TOTAL PORE AREA	=	3.370	sq-m/g
MEDIAN PORE DIAMETER (VOLUME)	=	0.1007	μm
MEDIAN PORE DIAMETER (AREA)	=	0.0932	μm
AVERAGE PORE DIAMETER (4V/A)	=	0.0929	μm
BULK DENSITY	=	1.6800	g/mL
APPARENT (SKELETAL) DENSITY	=	1.9343	g/mL
POROSITY	=	13.15	%
STEM VOLUME USED	=	96	% ****

C1-7
(w/c=0.40, t=7 days)

PORESIZER 9320 V2.04

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SAMPLE DIRECTORY/NUMBER: EDATA / 1
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SAMPLE ID: C1-7
SUBMITTER: TISTR

LP 12:51:33 11/30/00
HP 12:35:54 11/30/00
REP 13:35:55 11/30/00

INCREMENTAL INTRUSION vs DIAMETER

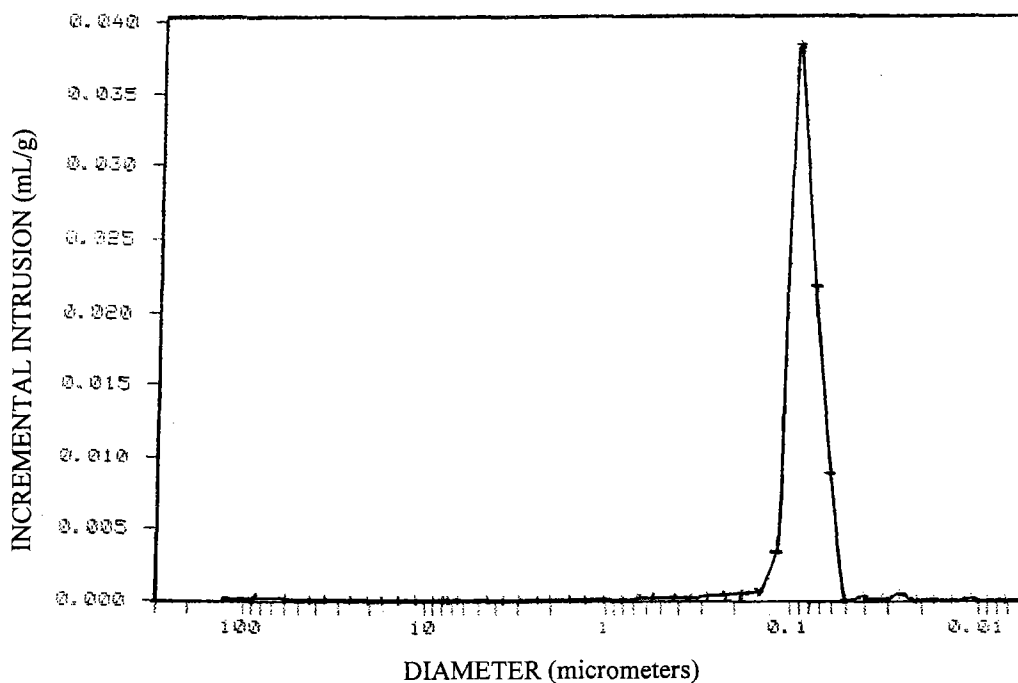


Fig.D.1 Pore size distribution of cement type 1 paste with water to cement ratio of 0.40 at 7 days

C1-28
(w/c=0.40, t=28 days)

PORESIZER 9320 V2.04

PAGE 1

SAMPLE DIRECTORY/NUMBER: EDATA / 4
OPERATOR: SOMSRI
SAMPLE ID: C1-28
SUBMITTER: TISTR

LP 16:31:49 12/21/00
HP 17:04:41 12/21/00
REP 17:04:42 12/21/00

PENETROMETER NUMBER: 7	ADVANCING CONTACT ANGLE: 130.0 deg
PENETROMETER CONSTANT: 10.79 $\mu\text{L}/\text{pF}$	REDUCING CONTACT ANGLE: 130.0 deg
PENETROMETER WEIGHT: 69.4500 g	MERCURY SURFACE TENSION: 485.0 dyn/cm
STEM VOLUME: 0.3920 mL	MERCURY DENSITY: 13.5335 g/mL
MAXIMUM HEAD PRESSURE: 4.4500 psi	SAMPLE WEIGHT: 1.0200 g
PENETROMETER VOLUME: 6.0500 mL	SAMPLE+PEN+Hg WEIGHT: 144.3300 g

LOW PRESSURE:

MERCURY FILLING PRESSURE: 1.6067 psia
LAST LOW PRESSURE POINT: 24.8270 psia

HIGH PRESSURE:

RUN TYPE: AUTOMATIC
RUN METHOD: EQUILIBRATED
EQUILIBRATION TIME: 10 seconds

INTRUSION DATA SUMMARY

TOTAL INTRUSION VOLUME	=	0.1248	mL/g
TOTAL PORE AREA	=	18.505	sq-m/g
MEDIAN PORE DIAMETER (VOLUME)	=	0.0446	μm
MEDIAN PORE DIAMETER (AREA)	=	0.0167	μm
AVERAGE PORE DIAMETER (4V/A)	=	0.0270	μm
BULK DENSITY	=	1.7217	g/mL
APPARENT (SKELETAL) DENSITY	=	2.1931	g/mL
POROSITY	=	21.50	%
STEM VOLUME USED	=	32	%

C1-28
(w/c=0.40, t=28 days)

PORESIZER 9320 V2.04

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SAMPLE DIRECTORY/NUMBER: EDATA / 4
OPERATOR: SOMSRI
SAMPLE ID: C1-28
SUBMITTER: TISTR

LP 16:31:49 12/21/00
HP 17:04:41 12/21/00
REP 17:04:42 12/21/00

INCREMENTAL INTRUSION vs DIAMETER

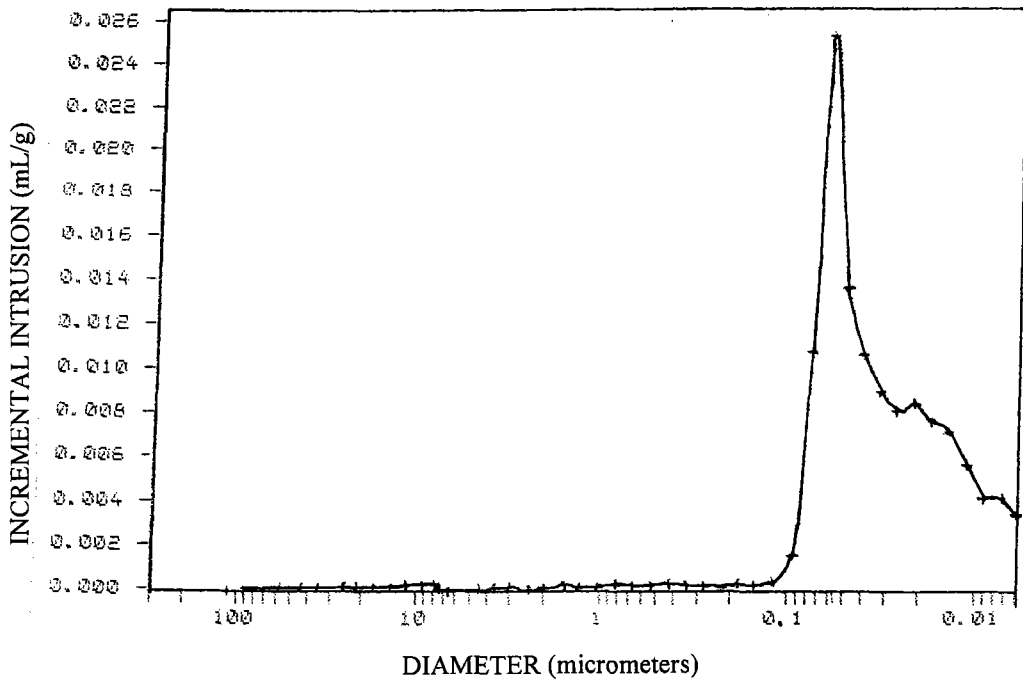


Fig.D.2 Pore size distribution of cement type 1 paste with water to cement ratio of 0.40 at 28 days

C2-7
(w/c=0.30, t=7 days)

PORESIZER 9320 V2.04

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SAMPLE DIRECTORY/NUMBER: EDATA / 20
OPERATOR: SOMSRI
SAMPLE ID: C2-7
SUBMITTER: TISTR

LP 10:02:49 01/15/01
HP 10:39:59 01/15/01
REP 10:40:00 01/15/01

PENETROMETER NUMBER: 7	ADVANCING CONTACT ANGLE: 130.0 deg
PENETROMETER CONSTANT: 10.79 $\mu\text{L}/\text{pF}$	REDUCING CONTACT ANGLE: 130.0 deg
PENETROMETER WEIGHT: 69.4500 g	MERCURY SURFACE TENSION: 485.0 dyn/cm
STEM VOLUME: 0.3920 mL	MERCURY DENSITY: 13.5335 g/mL
MAXIMUM HEAD PRESSURE: 4.4500 psi	SAMPLE WEIGHT: 0.8000 g
PENETROMETER VOLUME: 6.0500 mL	SAMPLE+PEN+Hg WEIGHT: 146.4300 g

LOW PRESSURE:

MERCURY FILLING PRESSURE: 1.5753 psia
LAST LOW PRESSURE POINT: 24.6955 psia

HIGH PRESSURE:

RUN TYPE: AUTOMATIC
RUN METHOD: EQUILIBRATED
EQUILIBRATION TIME: 10 seconds

INTRUSION DATA SUMMARY

TOTAL INTRUSION VOLUME	=	0.1022	mL/g
TOTAL PORE AREA	=	13.828	sq-m/g
MEDIAN PORE DIAMETER (VOLUME)	=	0.0478	μm
MEDIAN PORE DIAMETER (AREA)	=	0.0191	μm
AVERAGE PORE DIAMETER (4V/A)	=	0.0295	μm
BULK DENSITY	=	1.9002	g/mL
APPARENT (SKELETAL) DENSITY	=	2.3579	g/mL
POROSITY	=	19.41	%
STEM VOLUME USED	=	21	% ****

C2-7
(w/c=0.30, t=7 days)

PORESIZER 9320 V2.04

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SAMPLE DIRECTORY/NUMBER: EDATA / 20
OPERATOR: SOMSRI
SAMPLE ID: C2-7
SUBMITTER: TISTR

LP 10:02:49 01/15/01
HP 10:39:59 01/15/01
REP 10:40:00 01/15/01

INCREMENTAL INTRUSION vs DIAMETER

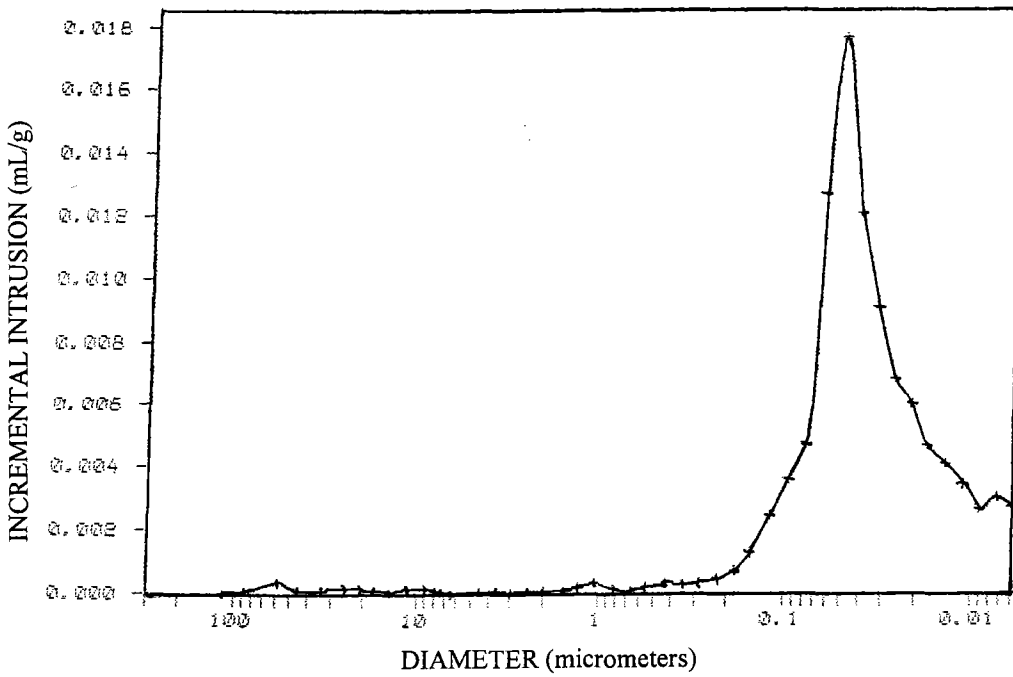


Fig.D.3 Pore size distribution of cement type 1 paste with water to cement ratio of 0.30 at 7 days

C2-28
(w/c=0.30, t=28 days)

PORESIZER 9320 V2.04

PAGE 1

SAMPLE DIRECTORY/NUMBER: EDATA / 5
OPERATOR: SOMSRI
SAMPLE ID: C2-28
SUBMITTER: TISTR

LP 09:16:53 12/26/00
HP 09:52:32 12/26/00
REP 14:31:24 12/26/00

PENETROMETER NUMBER: 7	ADVANCING CONTACT ANGLE: 130.0 deg
PENETROMETER CONSTANT: 10.79 $\mu\text{L}/\text{pF}$	REDUCING CONTACT ANGLE: 130.0 deg
PENETROMETER WEIGHT: 69.4500 g	MERCURY SURFACE TENSION: 485.0 dyn/cm
STEM VOLUME: 0.3920 mL	MERCURY DENSITY: 13.5335 g/mL
MAXIMUM HEAD PRESSURE: 4.4500 psi	SAMPLE WEIGHT: 0.8400 g
PENETROMETER VOLUME: 6.0500 mL	SAMPLE+PEN+Hg WEIGHT: 146.3300 g

LOW PRESSURE:

MERCURY FILLING PRESSURE: 1.4972 psia
LAST LOW PRESSURE POINT: 24.5434 psia

HIGH PRESSURE:

RUN TYPE: AUTOMATIC
RUN METHOD: EQUILIBRATED
EQUILIBRATION TIME: 10 seconds

INTRUSION DATA SUMMARY

TOTAL INTRUSION VOLUME	=	0.0773	mL/g
TOTAL PORE AREA	=	9.837	sq-m/g
MEDIAN PORE DIAMETER (VOLUME)	=	0.0457	μm
MEDIAN PORE DIAMETER (AREA)	=	0.0218	μm
AVERAGE PORE DIAMETER (4V/A)	=	0.0314	μm
BULK DENSITY	=	1.9474	g/mL
APPARENT (SKELETAL) DENSITY	=	2.2925	g/mL
POROSITY	=	15.05	%
STEM VOLUME USED	=	17	% ****

C2-28
(w/c=0.30, t=28 days)

PORESIZER 9320 V2.04

PAGE 5

SAMPLE DIRECTORY/NUMBER: EDATA / 5
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SAMPLE ID: C2-28
SUBMITTER: TISTR

LP 09:16:53 12/26/00
HP 09:52:32 12/26/00
REP 14:31:24 12/26/00

INCREMENTAL INTRUSION vs DIAMETER

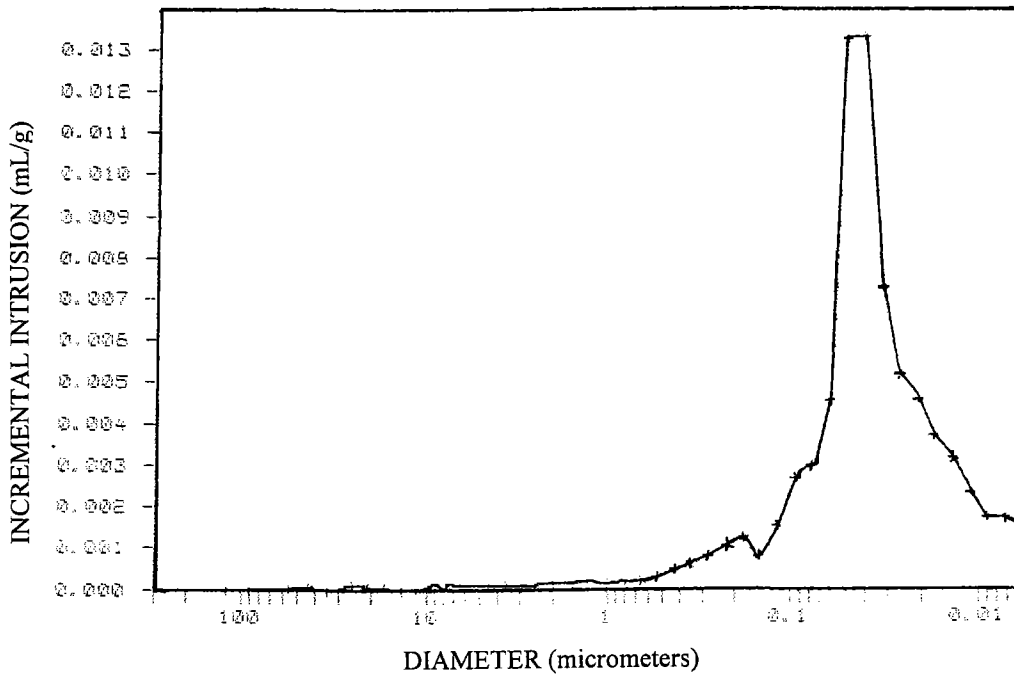


Fig.D.4 Pore size distribution of cement type 1 paste with water to cement ratio of 0.30 at 28 days