A/S NORSKE SHELL

SPECIAL CORE ANALYSIS

CATION EXCHANGE CAPACITY

WELL: 31/2-6

DATE: JANUARY 1983

GECO
GEOPHYSICAL COMPANY
OF NORWAY A·S

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COMMENTS

GENERAL: Special core analyses have been completed on 11 frozen samples from well 31/2-6. The samples were 1 1/2 inch plugs collected from the nearest suitable place to the requested depths. Prior to beginning all measurements, three samples with unlike permeabilities (i.e. one "low" perm. sample, one "middle", + one "high") were selected specifically for air permeability, helium porostiy confined pressure measurements. These plugs have been designated Set A.

The remaining eight samples, designated Set B, were used to measure air and water permeability, porosity, and formation resistivity factor also at the various requested confining pressures. Due to very low permeability characteristics, the sample from depth 1604.00 m was not measured at all as per your request.

PREPARATION: All samples were drilled and cut in frozen condition using liquid nitrogen as a coolant. Each frozen plug was mounted in a triaxial cell and allowed to thaw overnight with a hydrostatic pressure of approximately five bar. On the following day cold solvent cleaning was initiated using methanol and toluene followed by gentle overnight air blow drying. Air permeability, porosity and confined pressure measurements were then collected in that order.

MEASUREMENTS: AIR PERMEABILITY

Air permeability was measured using N_2-gas at three different pressures. These values were the basis for calculating the Klinkenberg corrected permeability. All data presented have been corrected to recent permeameter calibrations. Both tabular and graphic compilations have been enclosed in this report.

POROSITY

Set A. Three samples were measured by helium injection in a triaxial cell. A 15 bar pressure was applied in the cell to avoid gas leakage from the installed sample.

Set B. Eight samples were measured by formation water saturation. The procedure employed was first to evacuate the plug confined in the triaxial cell. A measured volume of water was then drawn into the plug. To ensure better sample saturation, a 15 bar pressure was then applied to the injected formation water. A net confined pressure on the plug was maintained at a constant level of 15 bar during the operation.

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CONFINED PRESSURE MEASUREMENTS (isostatic condition)

Net overburden pressure was set in the laboratory without any Geerstma-factor correction. Permeability, porosity, and in Set B formation resistivity factor, were measured simultaneously at increasing pressure levels in the triaxial cell. The "atmospheric" pressure was set to 15 bar to avoid leakage along the sleeve and the plug. The confined pressure levels were as follows: 15 bar, 50 bar, 100 bar, 150 bar and 200 bar.

a) Permeability

Set A. See "Measurements: Air Permeability".

Set B. Liquid permeability was measured by pumping degassed simulated formation water through the plugs at a constant rate of six ml/min. until a stable flow was achieved. Pressure transducers measured the pressure difference, ΔP.

b) Porosity

In these measurements it has been assumed that the sample porosities were preserved at 15 bar confining pressure ("atmospheric" condition). Pore saturation was kept constant at one atmosphere.

Set A. Porosity reduction was determined by measuring helium porosity at the various confining pressures after sample stability occured.

Set B. A graduated pipette (vol. 1.0 ml, grad. 0.01 ml) was used to measure pore volume reduction when increasing the sleeve presure and to note when stability in the sample occured.

c) Formation Resistivity Factor (FRF)

The formation resistivity factor was measured using a frequency of 1 kHz. A platinum screen was placed at each end of the plug to ensure good electrical contact over the end surface of the plug. The parameters "a" and "m" in Archies formula $FF = a \cdot \emptyset^{-m}$ were calculated both by least squares method forced through ($FF = 1.0$, $\emptyset = 1.0$) and least squares method (free fit). The forced fit curve is presented grafically.

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NOTES:

a) Plug from depth 1585.10 had an abnormal permeability reduction at 200 bar. Structural collapse appears evident at this pressure (note pore volume reduction).

b) Plug from depth 1597.05 also had an abnormal permeability reduction after 100 bar. Routine inspection of the plug under UV light after removal from the cell indicated slight oil contamination along the end facies. This intrusion may explain the severe permeability drop at higher confining pressures.

c) Plugs from depths 1516.05, 1527.15, 1530.72, 1571.25, and 1597.05 show a higher water permeability then the Klinkenberg corrected air permeability. One explanation may be that disturbance to the sample occured between the air and water permeability measurements i.e. during the water porosity injection process. Under laboaratory conditions lower water permeability than Klinkenberg permeability is normally observed.

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FORMATION WATER

The formation water was specified to have a resistivity of 0.07 ohm-m at 130°F.

This request was gained by a solution consisting of 63 g sodiumchloride per litre solution.

The used formation water has the following characteristics:

Electrolyte consentration:	Na^+:	23776 ppm
	Cl^-:	36724 ppm
	Total	60500 ppm

Resistivity	(130°F, 54.4°C)	: r_w	= 0.070 ohm-m
Resistivity	(20°C)	: r_w	= 0.121 ohm-m
Density	(20°C)	: ρ	= 1.043 g/cm^3
Viscosity	(20°C)	: η	= 1.106 cP

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PLUG SIZE AND POROSITY

DEPTH (m)	LENGTH (cm)	DIAMETER (cm)	BULK VOLUME (cm^3)	POROSITY (%)
1506.46	6.99	3.55	68.85	33.0
1516.05	7.13	3.54	70.18	29.6
1527.15	7.01	3.53	68.61	32.7
1530.72	7.05	3.55	69.78	34.7
1538.12	6.92	3.55	68.40	29.6
1544.30	7.02	3.54	69.09	33.0
1552.18	6.98	3.55	69.09	32.6
1571.25	6.98	3.53	68.31	33.5
1580.10	6.86	3.55	67.48	34.9
1585.10	6.50	3.55	64.34	31.1
1597.05	7.01	3.56	69.78	33.4

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KLINKENBERG CORRECTED AIR PERMEABILITY

DEPTH (m)	1/Mean Pressure (atm.abs.)$^{-1}$	Air Permeability ka (mD)	Klinkenberg corr. perm. k (mD)
1506.46	0.908	6560	6042
	0.669	6439	
	0.503	6324	
1516.05	0.909	10523	9786
	0.669	10300	
	0.503	10202	
1527.15	0.906	3426	3353
	0.667	3406	
	0.502	3394	
1530.72	0.906	2592	2452
	0.667	2561	
	0.502	2528	
1538.12	0.816	78.9	67.2
	0.617	76.1	
	0.473	74.0	
1544.30	0.909	14338	13327
	0.669	14018	
	0.503	13901	
1552.18	0.832	6562	5925
	0.668	6460	
	0.502	6306	
1571.25	0.833	6969	6456
	0.669	6901	
	0.503	6761	
1580.10	0.908	4369	4091
	0.668	4312	
	0.503	4241	
1585.10	0.811	881	824
	0.654	872	
	0.495	858	
1597.05	0.904	3040	2846
	0.666	2979	
	0.501	2957	
1604.31	nmp		

Klinkenberg corrected Air Permeability

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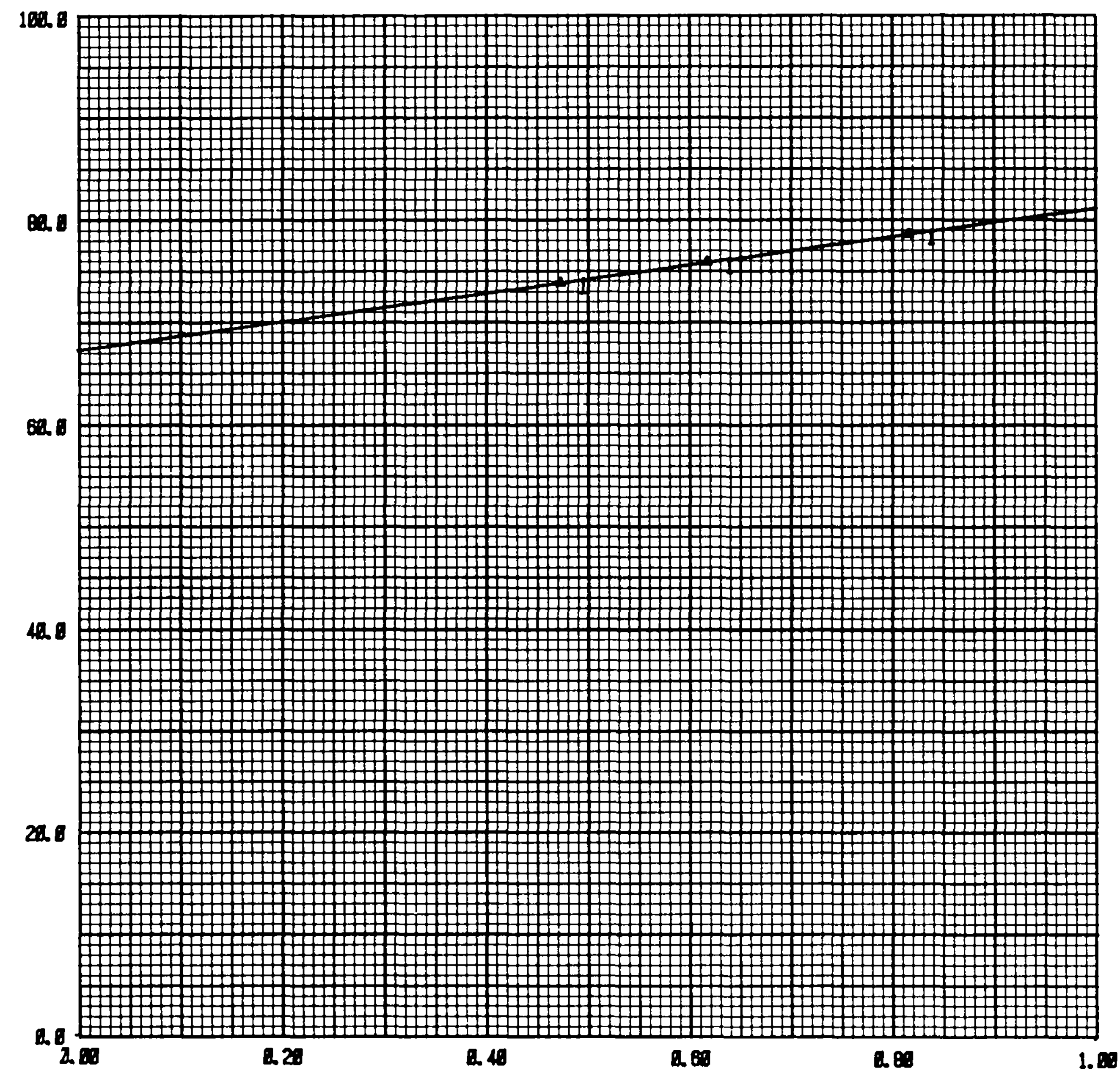
Curve "1" : Klinkenberg perm.: 67.2 mD
depth : 1538.12 m.



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Klinkenberg corrected Air Permeability

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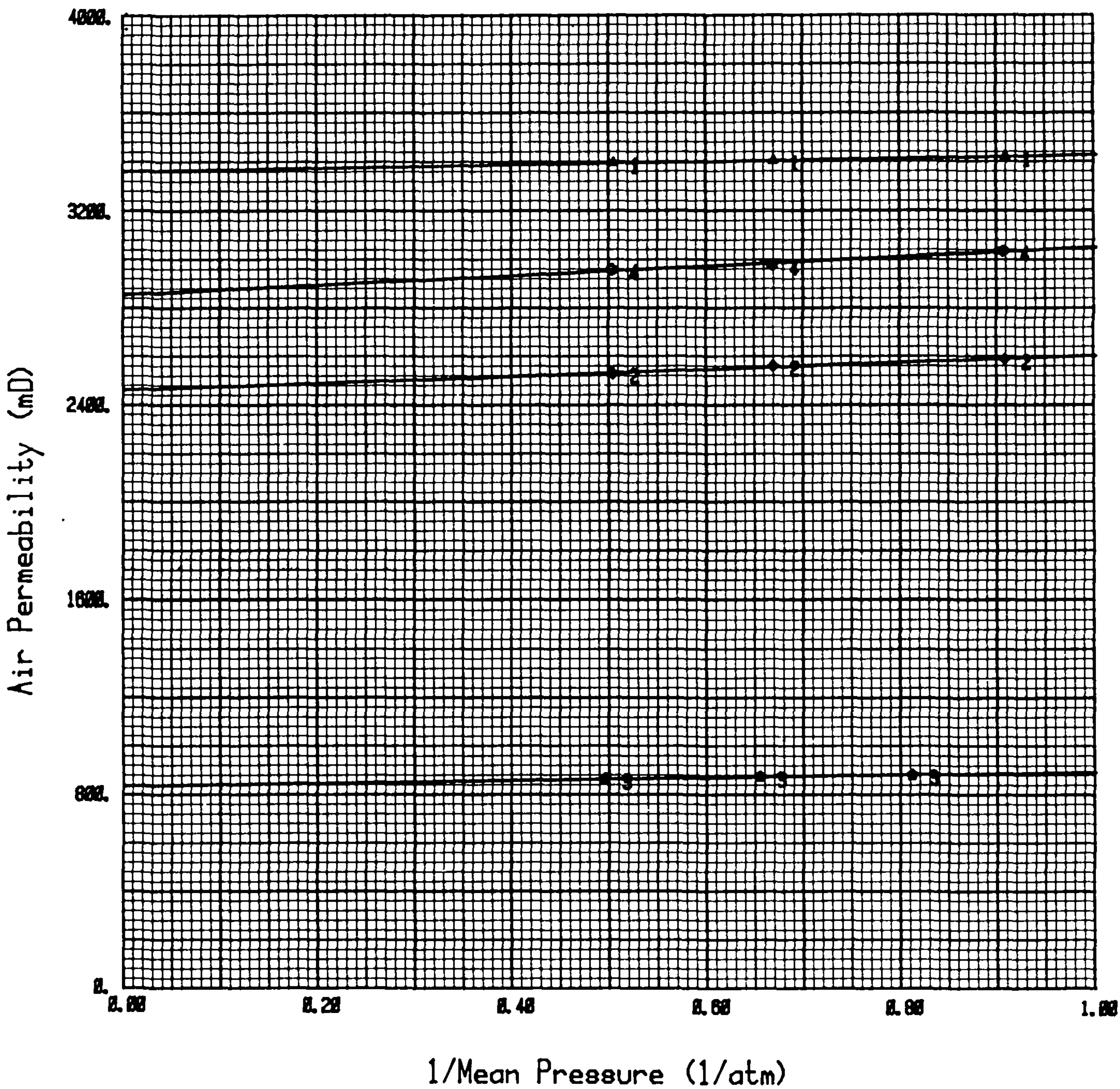
Curve "1" : Klinkenberg perm.: 3353 mD
depth : 1527.15 m.

Curve "2" : Klinkenberg perm.: 2452 mD
depth : 1530.72 m.

Curve "3" : Klinkenberg perm.: 824 mD
depth : 1585.10 m.

Curve "4" : Klinkenberg perm.: 2846 mD
depth : 1597.05 m,



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Klinkenberg corrected Air Permeability

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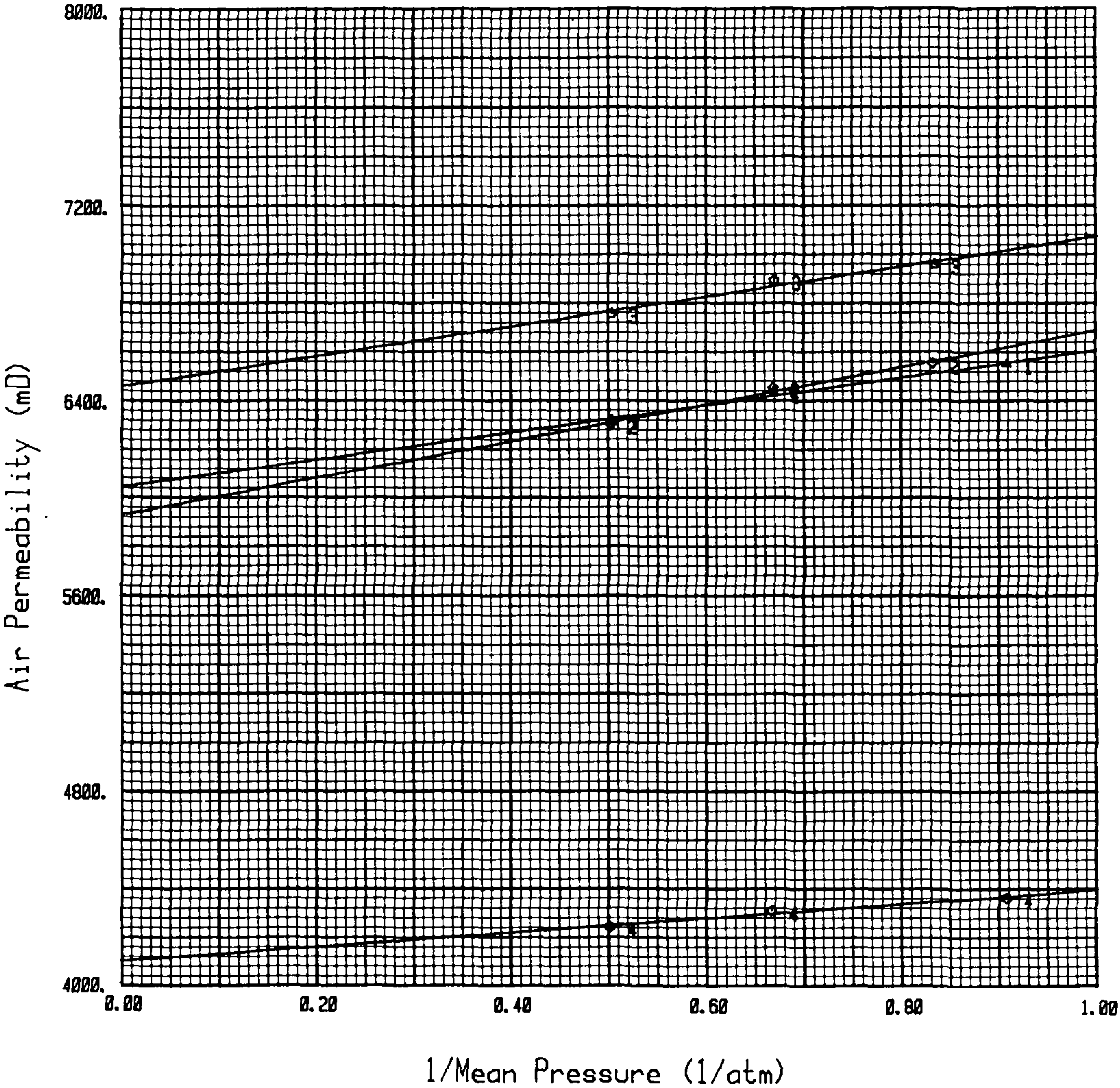
Curve "1" : Klinkenberg perm.: 6042 mD
depth : 1506.46 m.

Curve "2" : Klinkenberg perm.: 5925 mD
depth : 1552.18 m.

Curve "3" : Klinkenberg perm.: 6456 mD
depth : 1571.25 m.

Curve "4" : Klinkenberg perm.: 4091 mD
depth : 1580.10 m.



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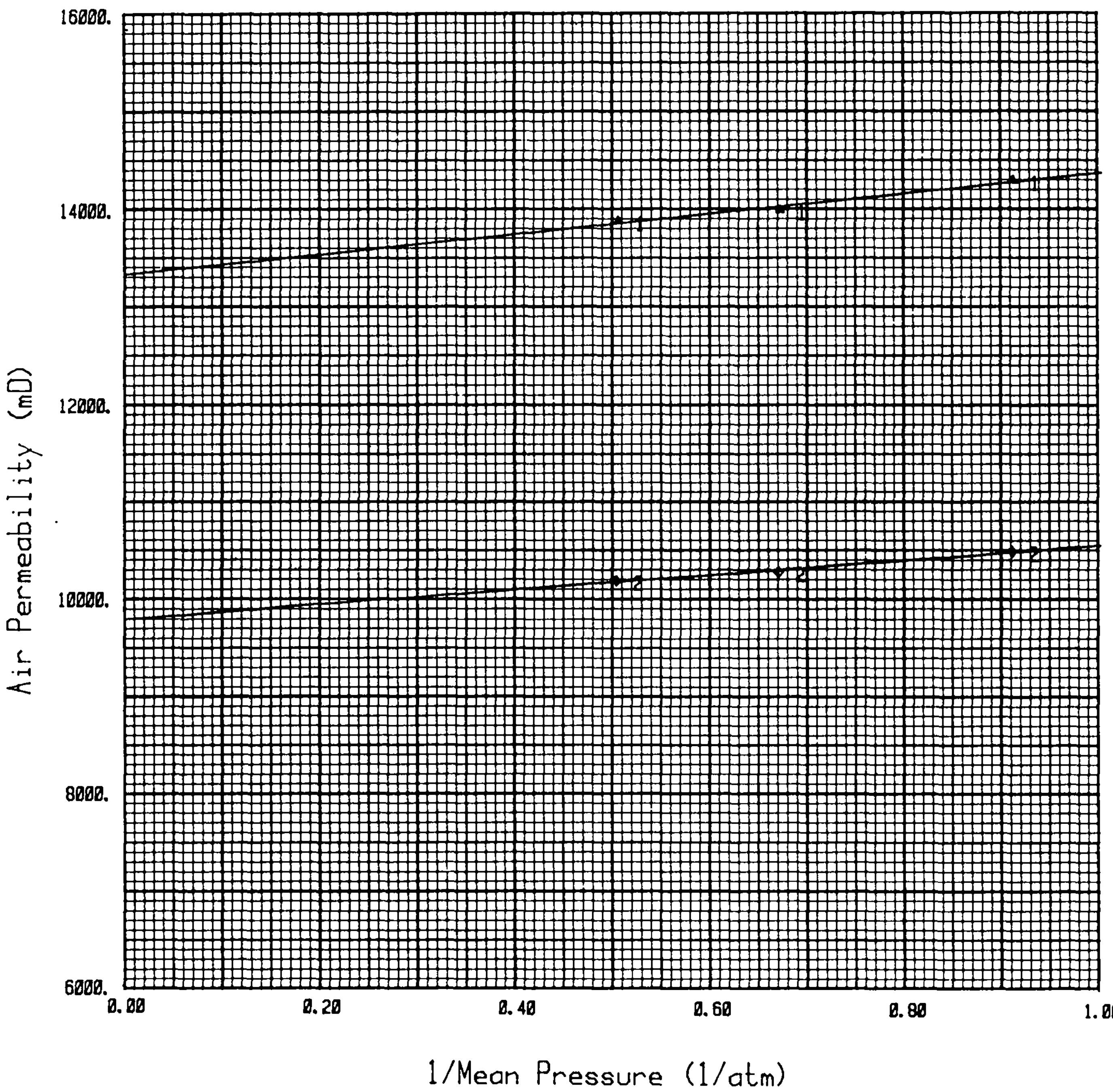
Klinkenberg corrected Air Permeability

Curve "1" : Klinkenberg perm.: 13327 mD
depth : 1544.30 m.

Curve "2" : Klinkenberg perm.: 9786 mD
depth : 1516.05 m.



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CONFINED PRESSURE MEASUREMENTS

DEPTH: 1506.46

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
AIR PERMEABILITY (mD)	6560	6201	5712	5230	4884
PERMEABILITY REDUCTION (fraction of original)	1.00	0.95	0.87	0.80	0.75
POROSITY (%)	33.0	32.3	31.7	31.3	31.0
POROSITY REDUCTION (fraction of original)	1.000	0.979	0.961	0.948	0.939
PORE VOLUME (cm^3)	22.72	22.22	21.84	21.52	21.33
PORE VOLUME REDUCTION (fraction of original) $\frac{\Delta PV}{orig.PV}$	0.000	0.022	0.039	0.053	0.061

CONFINED PRESSURE MEASUREMENTS

DEPTH: 1538.12

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
AIR PERMEABILITY (mD)	78.9	73.0	68.4	64.4	61.8
PERMEABILITY REDUCTION (fraction of original)	1.00	0.93	0.87	0.82	0.78
POROSITY (%)	29.6	28.7	28.1	27.7	27.5
POROSITY REDUCTION (fraction of original)	1.000	0.970	0.949	0.936	0.929
PORE VOLUME (cm^3)	20.22	19.64	19.25	18.96	18.82
PORE VOLUME REDUCTION (fraction of original) $\frac{\Delta PV}{orig.PV}$	0.000	0.029	0.048	0.062	0.069

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CONFINED PRESSURE MEASUREMENTS

DEPTH: 1580.10

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
AIR PERMEABILITY (mD)	4369	4071	3664	3371	3116
PERMEABILITY REDUCTION (fraction of original)	1.00	0.93	0.84	0.77	0.71
POROSITY (%)	34.9	34.3	33.7	33.4	33.1
POROSITY REDUCTION (fraction of original)	1.000	0.983	0.966	0.955	0.946
PORE VOLUME (cm^3)	23.57	23.17	22.77	22.52	22.30
PORE VOLUME REDUCTION (fraction of original) $\frac{\Delta PV}{orig.PV}$	0.000	0.017	0.034	0.045	0.054

Permeability & Porosity vs. hydrostatic sleeve pressure

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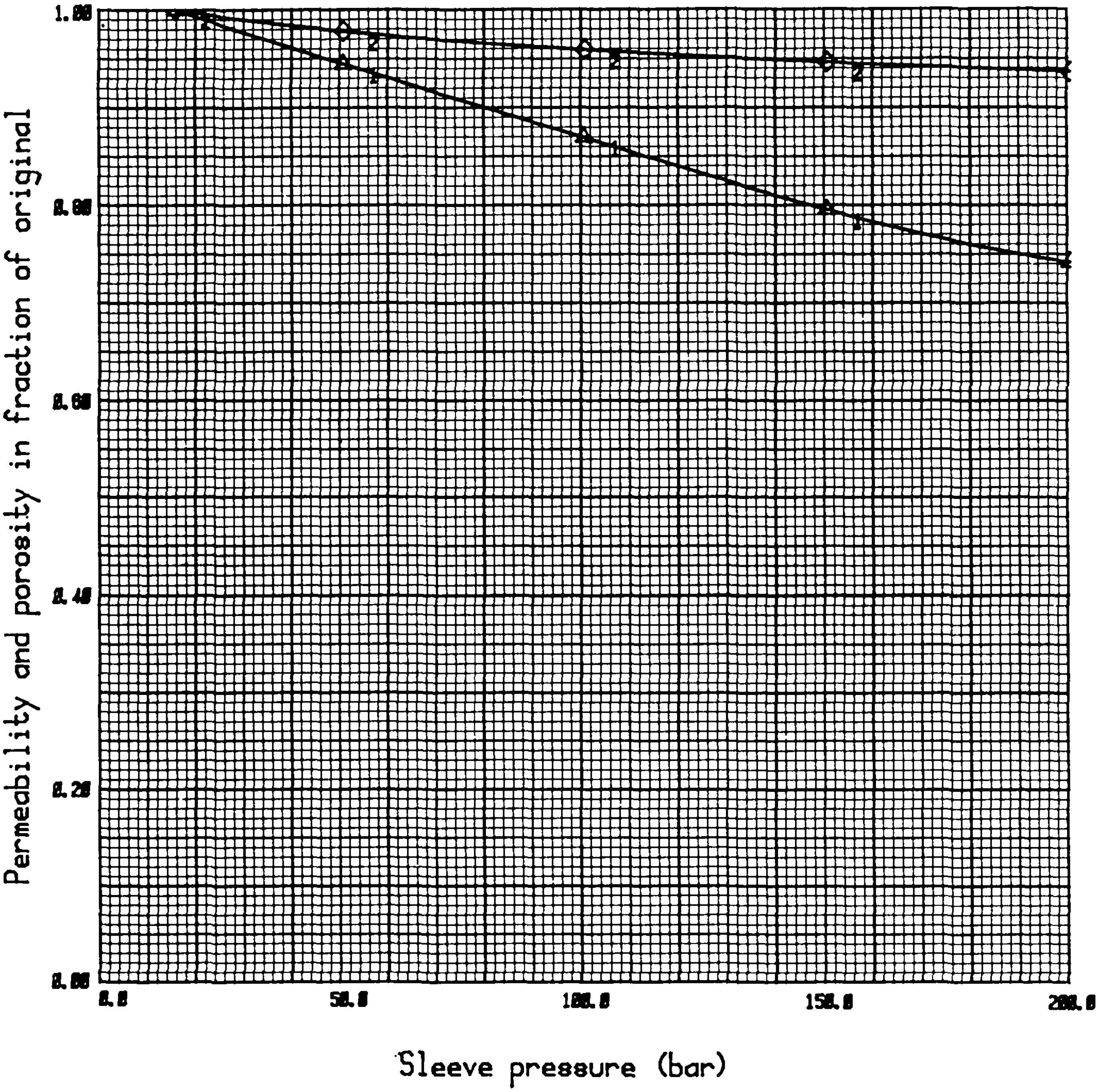
Depth : 1506.46 m

Original permeability (curve "1"): 6560 mD
Original porosity (curve "2"): 33.0 %



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Permeability & Porosity vs. hydrostatic sleeve pressure

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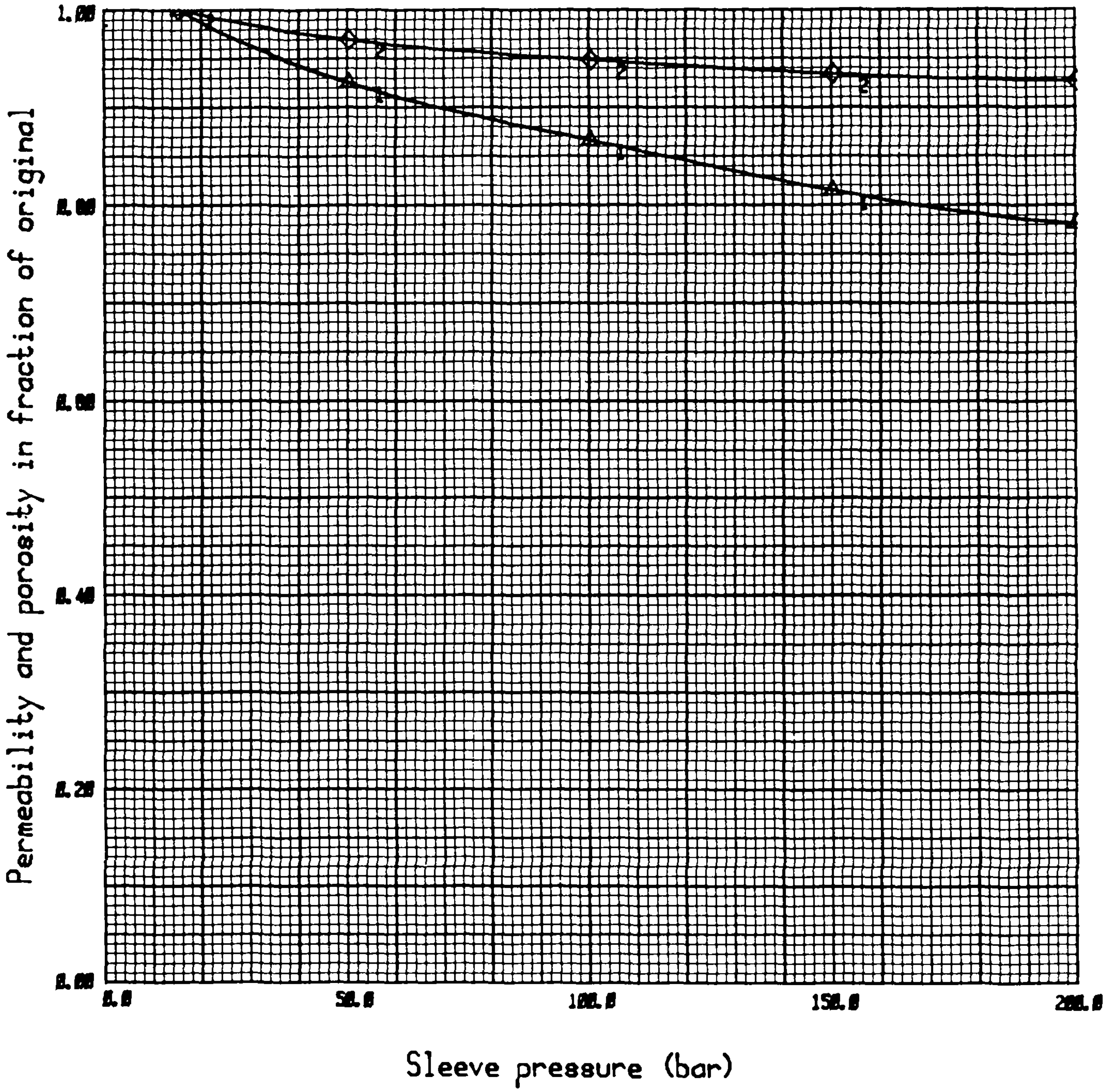
Depth : 1538.12 m

Original permeability (curve "1"): 78.9 mD
Original porosity (curve "2"): 29.6 %



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Permeability & Porosity vs. hydrostatic sleeve pressure

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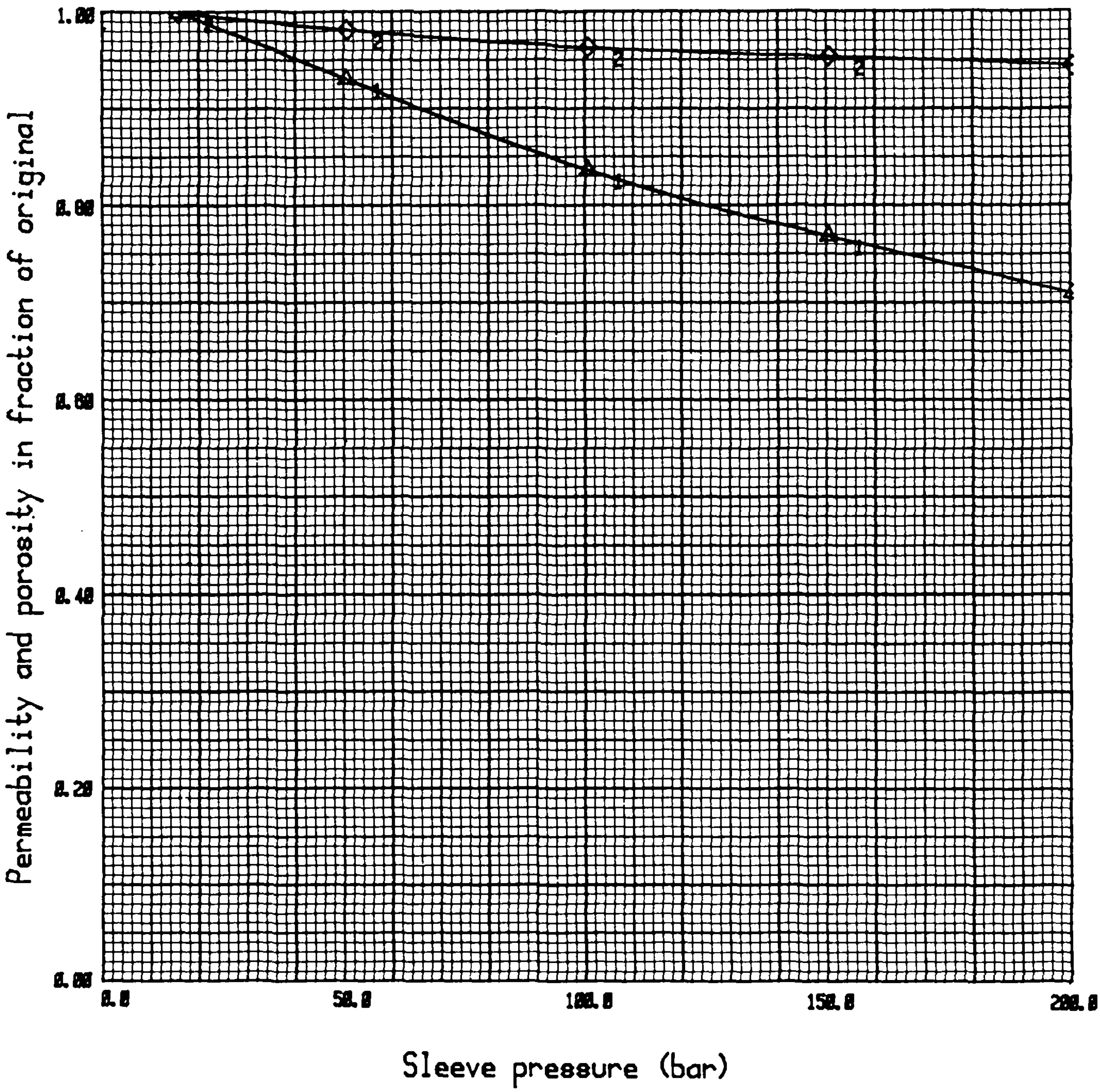
Depth : 1580.10 m

Original permeability (curve "1"): 4369 mD
Original porosity (curve "2"): 34.9 %



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CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1516.05

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	11771	11050	10304	9730	9255
PERMEABILITY REDUCTION (fraction of original)	1.00	0.94	0.88	0.83	0.79
POROSITY (%)	29.6	29.1	28.7	28.5	28.4
POROSITY REDUCTION (fraction of original)	1.000	0.980	0.969	0.962	0.957
PORE VOLUME (cm^3)	20.80	20.22	19.89	19.70	19.54
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig.\ PV}$	0.000	0.028	0.044	0.053	0.060
FORMATION RESISTIVITY FACTOR (1 kHz)	7.17	7.43	7.54	7.60	7.65
FRF - INCREMENT: (frac. of original)	1.00	1.04	1.05	1.06	1.07

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CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1527.15

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	4260	3772	3280	2976	2815
PERMEABILITY REDUCTION (fraction of original)	1.00	0.89	0.77	0.70	0.66
POROSITY (%)	32.7	32.3	31.9	31.7	31.5
POROSITY REDUCTION (fraction of original)	1.000	0.986	0.976	0.969	0.963
PORE VOLUME (cm^3)	22.46	22.01	21.66	21.44	21.26
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig.\ PV}$	0.000	0.020	0.036	0.045	0.053
FORMATION RESISTIVITY FACTOR (1 kHz)	6.28	6.47	6.64	6.69	6.79
FRF - INCREMENT: (frac. of original)	1.00	1.03	1.06	1.07	1.08

CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1530.72

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	2560	2190	1831	1520	1352
PERMEABILITY REDUCTION (fraction of original)	1.00	0.86	0.72	0.59	0.53
POROSITY (%)	34.7	34.1	33.8	33.5	33.3
POROSITY REDUCTION (fraction of original)	1.000	0.983	0.972	0.966	0.961
PORE VOLUME (cm^3)	24.22	23.59	23.21	22.98	22.80
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig. PV}$	0.000	0.026	0.042	0.051	0.059
FORMATION RESISTIVITY FACTOR (1 kHz)	5.56	5.81	5.96	6.06	6.11
FRF - INCREMENT: (frac. of original)	1.00	1.05	1.07	1.09	1.10

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CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1544.30

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	12832	11041	9785	8983	8406
PERMEABILITY REDUCTION (fraction of original)	1.00	0.86	0.76	0.70	0.66
POROSITY (%)	33.0	32.6	32.3	32.1	31.9
POROSITY REDUCTION (fraction of original)	1.000	0.988	0.979	0.972	0.967
PORE VOLUME (cm^3)	22.80	22.40	22.08	21.87	21.69
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig. PV}$	0.000	0.018	0.032	0.041	0.049
FORMATION RESISTIVITY FACTOR (1 kHz)	6.23	6.36	6.45	6.50	6.62
FRF - INCREMENT: (frac. of original)	1.00	1.02	1.04	1.04	1.06

CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1552.18

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	5848	4882	4223	3803	3610
PERMEABILITY REDUCTION (fraction of original)	1.00	0.84	0.72	0.65	0.62
POROSITY (%)	32.6	31.8	31.4	31.1	30.9
POROSITY REDUCTION (fraction of original)	1.000	0.978	0.964	0.956	0.949
PORE VOLUME (cm^3)	22.49	21.75	21.30	21.04	20.84
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig. PV}$	0.000	0.033	0.053	0.064	0.073
FORMATION RESISTIVITY FACTOR (1 kHz)	6.16	6.49	6.70	6.79	6.90
FRF - INCREMENT: (frac. of original)	1.00	1.05	1.09	1.11	1.12

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CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1571.25

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	7649	5666	4330	3604	3273
PERMEABILITY REDUCTION (fraction of original)	1.00	0.74	0.57	0.47	0.43
POROSITY (%)	33.5	32.7	32.1	31.8	31.6
POROSITY REDUCTION (fraction of original)	1.000	0.975	0.960	0.950	0.943
PORE VOLUME (cm^3)	22.88	22.04	21.52	21.21	20.98
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig. PV}$	0.000	0.037	0.060	0.073	0.083
FORMATION RESISTIVITY FACTOR (1 kHz)	5.47	5.78	5.98	6.10	6.13
FRF - INCREMENT: (frac. of original)	1.00	1.06	1.09	1.12	1.12

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CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1585.10

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	524	465	400	361	309
PERMEABILITY REDUCTION (fraction of original)	1.00	0.89	0.76	0.69	0.59
POROSITY (%)	31.1	30.7	30.3	30.0	29.7
POROSITY REDUCTION (fraction of original)	1.000	0.987	0.974	0.964	0.954
PORE VOLUME (cm^3)	20.02	19.63	19.27	18.99	18.70
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig. PV}$	0.000	0.019	0.038	0.051	0.066
FORMATION RESISTIVITY FACTOR (1 kHz)	7.63	7.90	8.10	8.21	8.35
FRF - INCREMENT: (frac. of original)	1.00	1.04	1.06	1.08	1.09

CONFINED PRESSURE MEASUREMENTS (isostatic condition)

DEPTH: 1597.05

MEASUREMENTS	"ATMOSPHERIC" PRESSURE 15 bar	50 bar	100 bar	150 bar	200 bar
WATER PERMEABILITY (mD)	3098	2880	2710	2367	1979
PERMEABILITY REDUCTION (fraction of original)	1.00	0.93	0.88	0.76	0.64
POROSITY (%)	33.4	33.0	32.8	32.6	32.4
POROSITY REDUCTION (fraction of original)	1.000	0.990	0.982	0.976	0.971
PORE VOLUME (cm^3)	23.29	22.94	22.67	22.46	22.30
PORE VOLUME REDUCTION (frac. of original) $\frac{\Delta PV}{orig. PV}$	0.000	0.015	0.027	0.036	0.043
FORMATION RESISTIVITY FACTOR (1 kHz)	6.18	6.34	6.46	6.50	6.53
FRF - INCREMENT: (frac. of original)	1.00	1.03	1.05	1.05	1.06

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Permeability & Porosity vs. hydrostatic sleeve pressure

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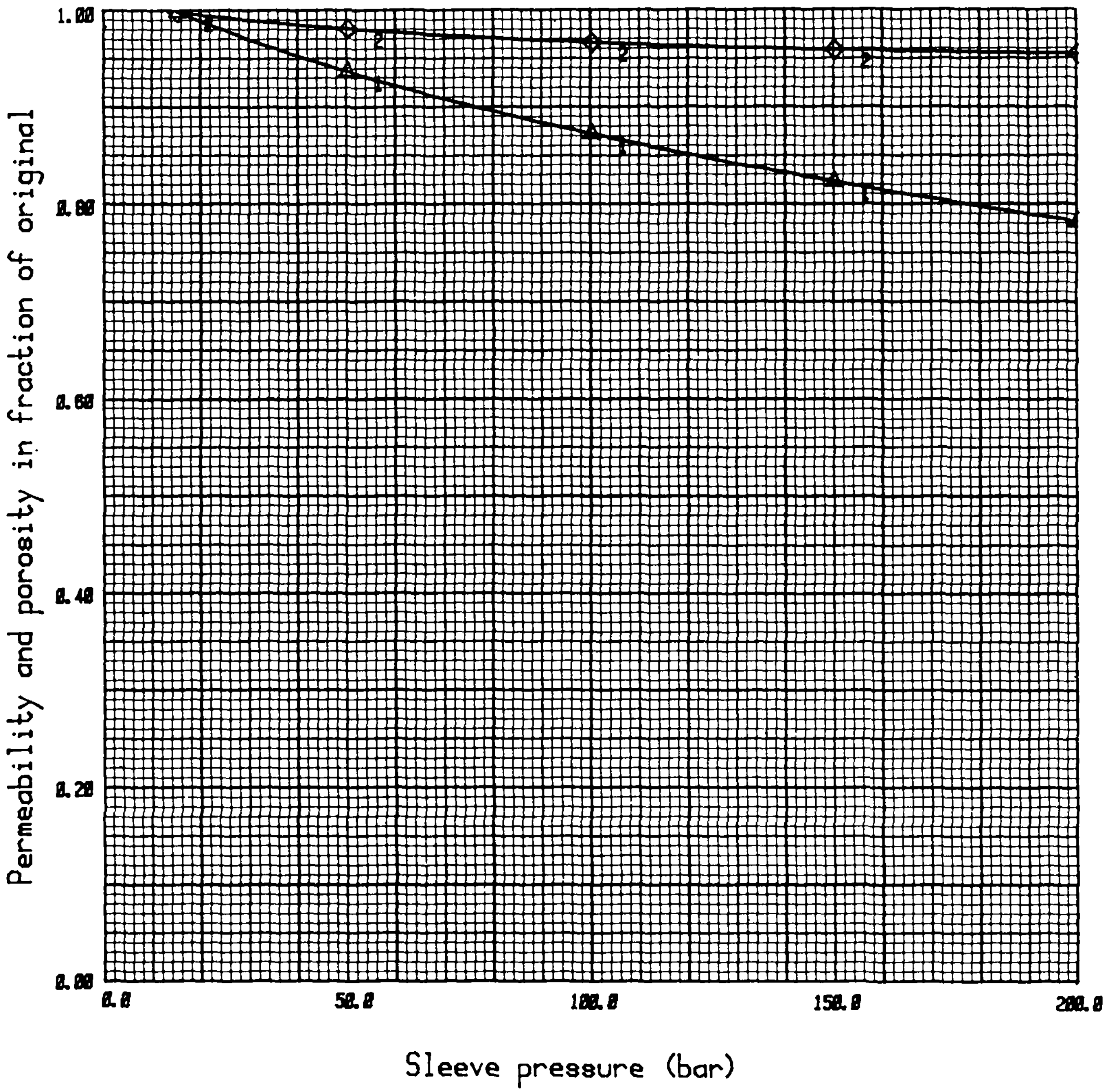
Depth : 1516.05 m

Original permeability (curve "1"): 11771 mD
Original porosity (curve "2"): 29.6 %



Permeability & Porosity vs. hydrostatic sleeve pressure

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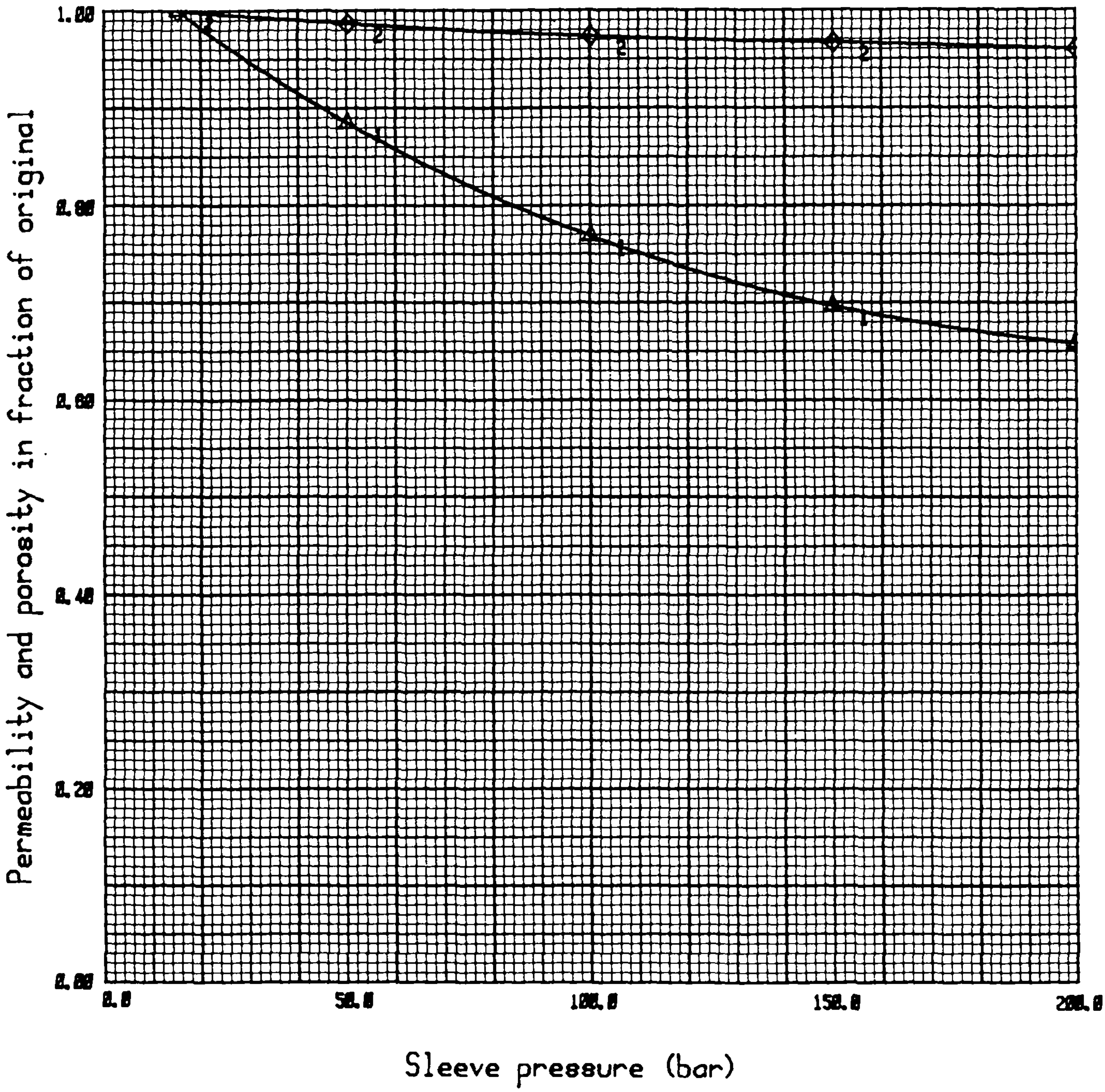
Depth : 1527.15 m

Original permeability (curve "1"): 4260 mD
Original porosity (curve "2"): 32.7 %



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Permeability & Porosity vs. hydrostatic sleeve pressure

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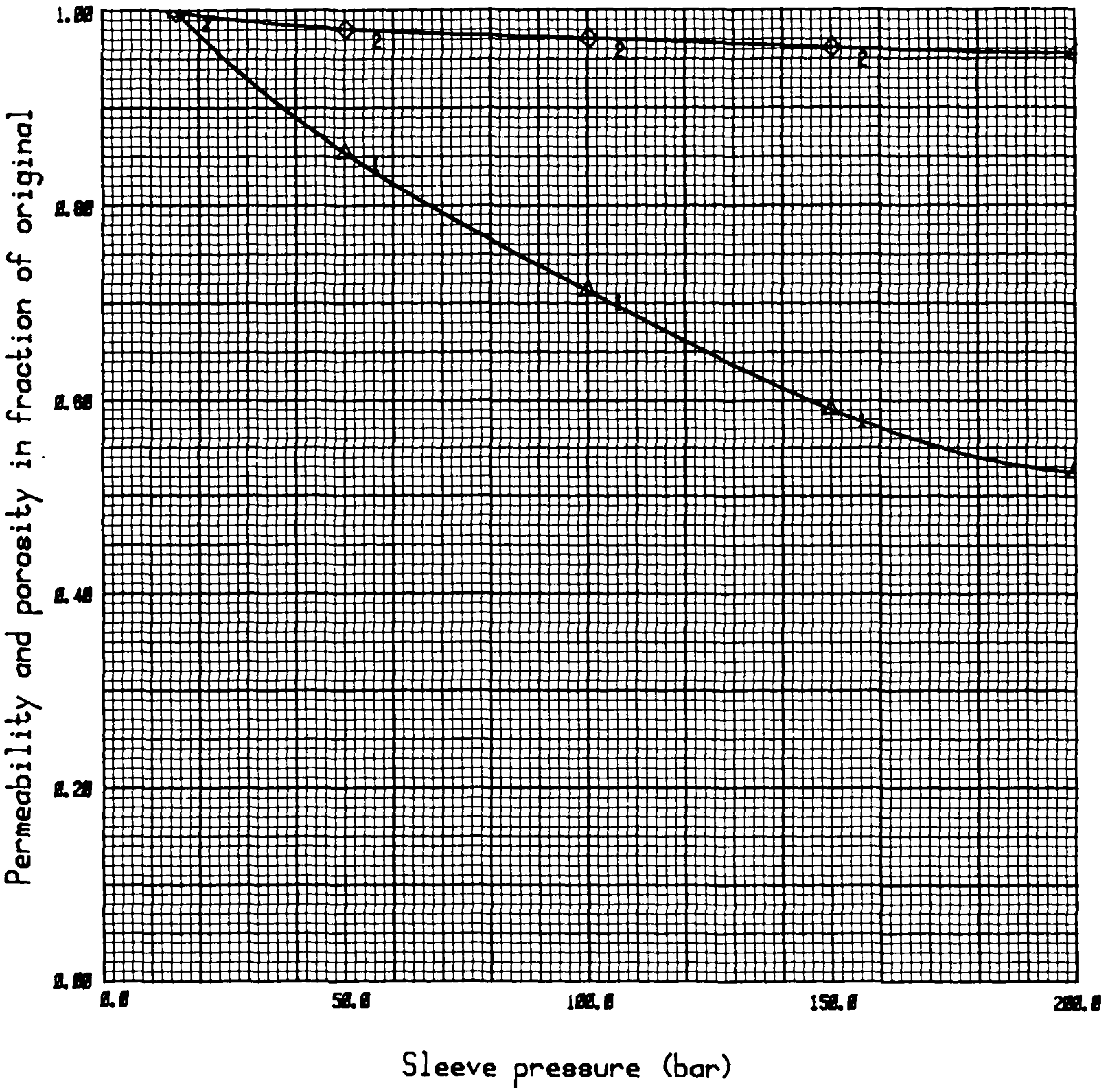
Depth : 1530.72 m

Original permeability (curve "1"): 2560 mD
Original porosity (curve "2"): 34.7 %



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Permeability & Porosity vs. hydrostatic sleeve pressure

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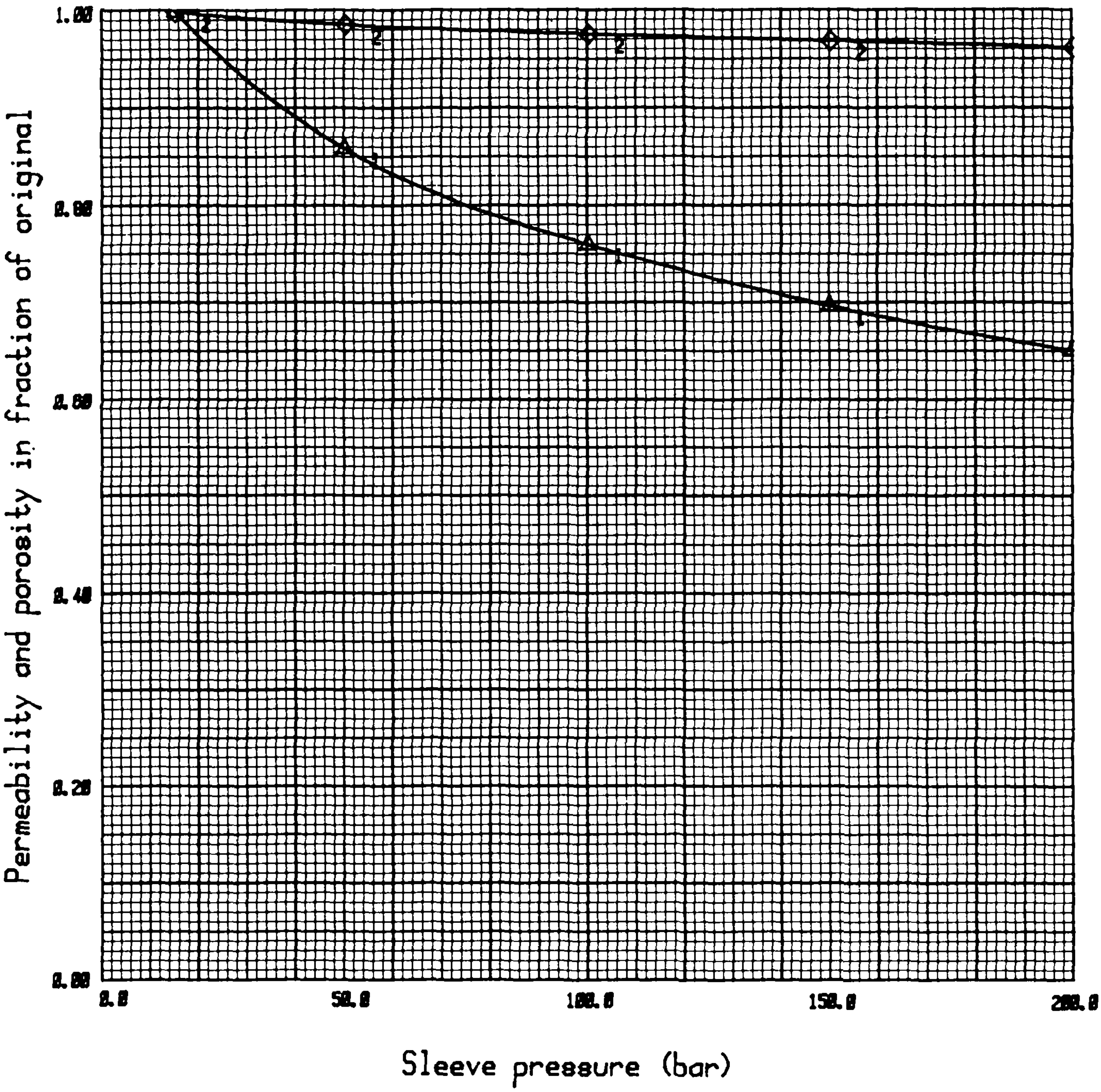
Depth : 1544.30 m

Original permeability (curve "1"): 12832 mD
Original porosity (curve "2"): 33.0 %



Permeability & Porosity vs. hydrostatic sleeve pressure

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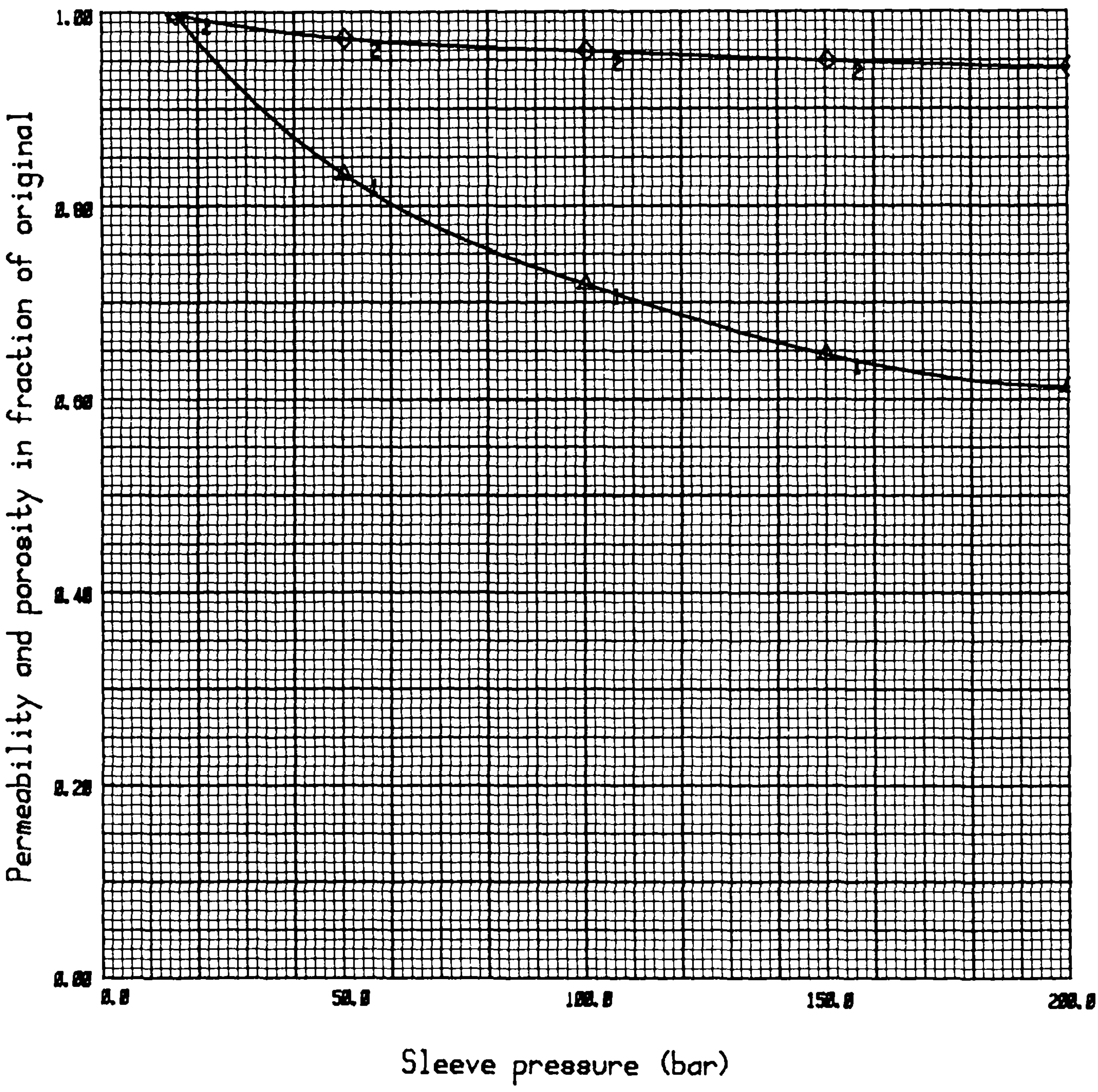
Depth : 1552.18 m

Original permeability (curve "1"): 5848 mD
Original porosity (curve "2"): 32.6 %



Permeability & Porosity vs. hydrostatic sleeve pressure

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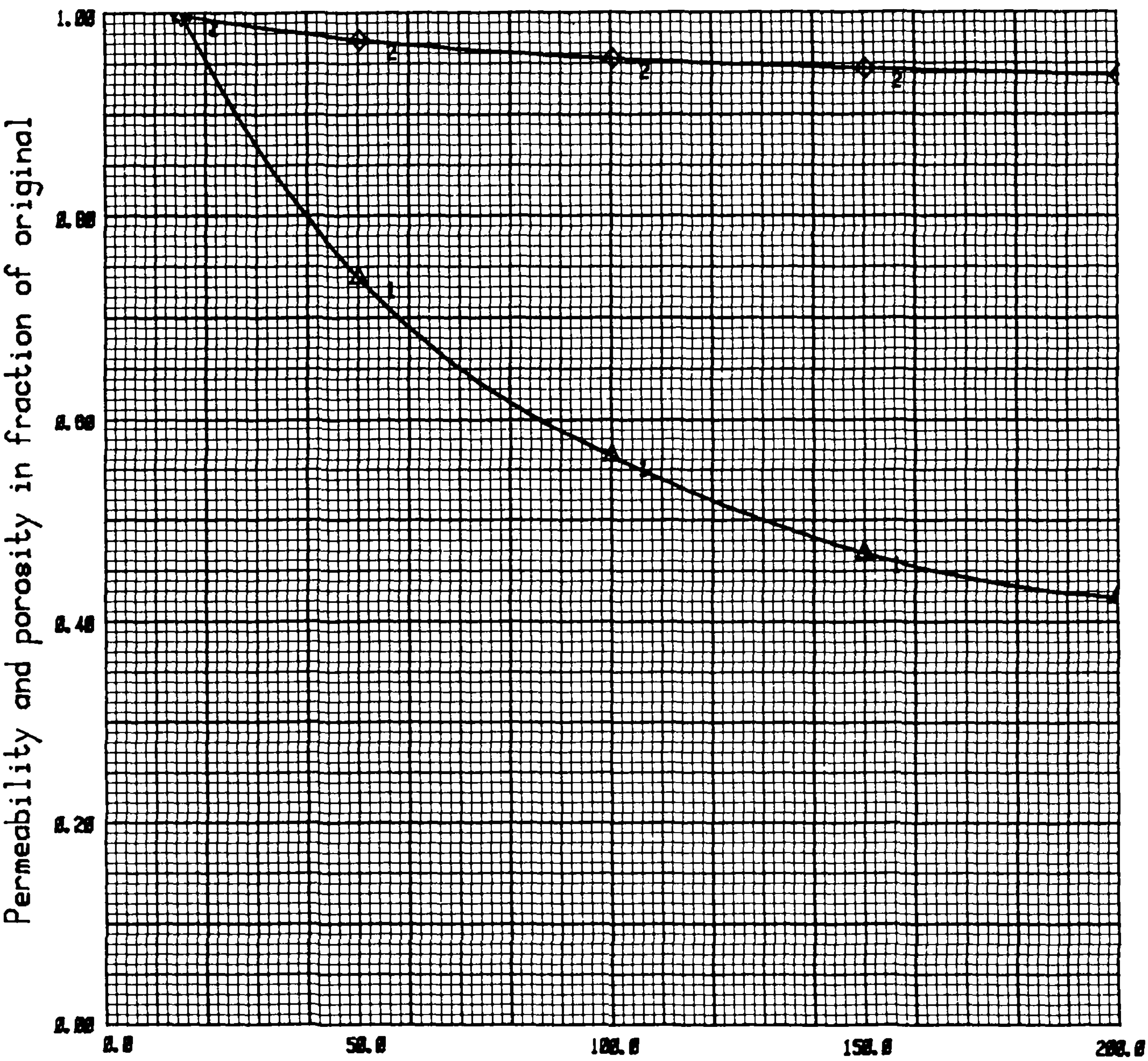
Depth : 1571.25 m

Original permeability (curve "1"): 7649 mD
Original porosity (curve "2"): 33.5 %



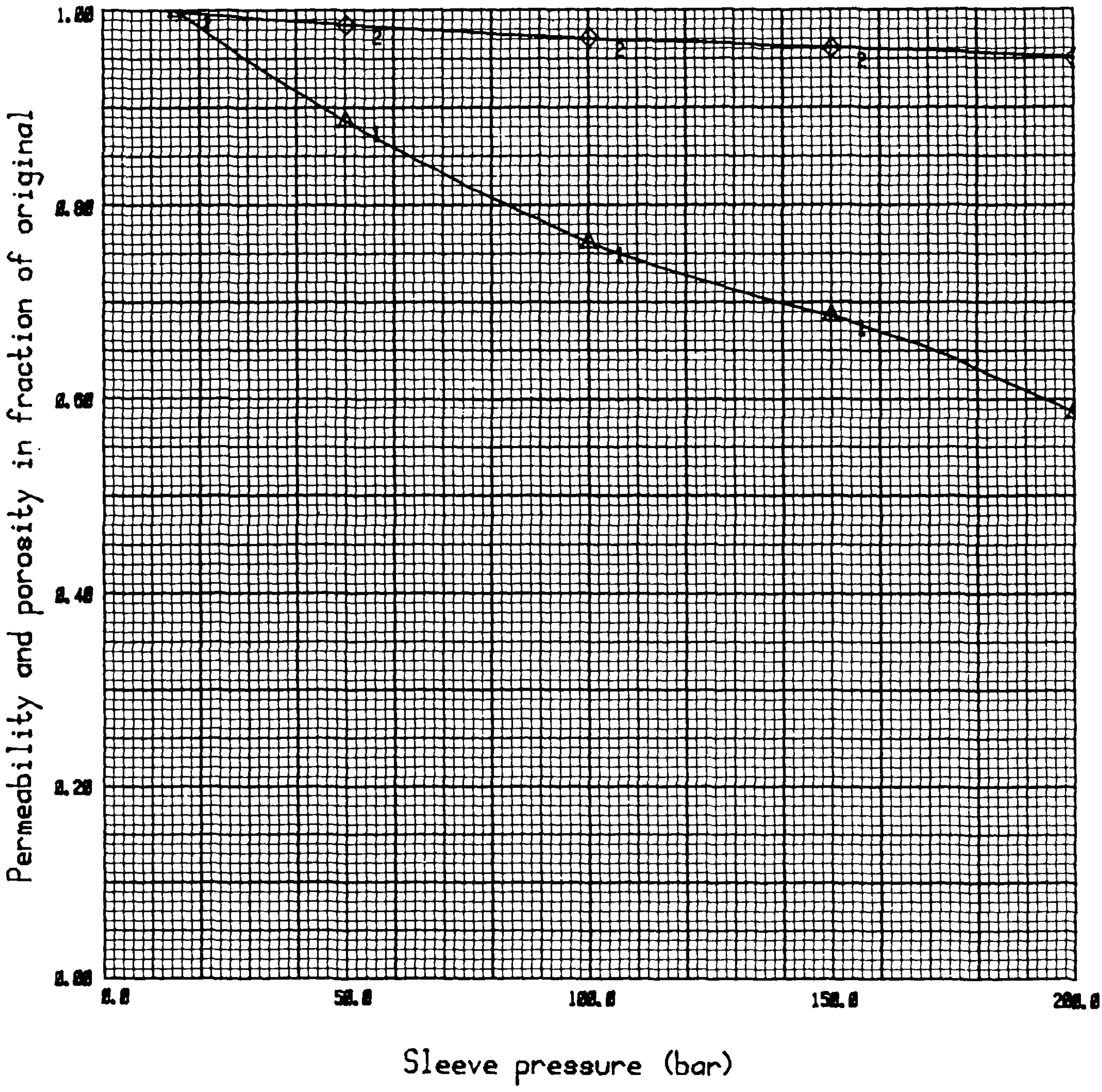
Sleeve pressure (bar)

Permeability & Porosity vs. hydrostatic sleeve pressure

GECO
GEOPHYSICAL COMPANY OF NORWAY A.S
Petroleum laboratory

Depth : 1585.10 m

Original permeability (curve "1"): 524 mD
Original porosity (curve "2"): 31.1 %

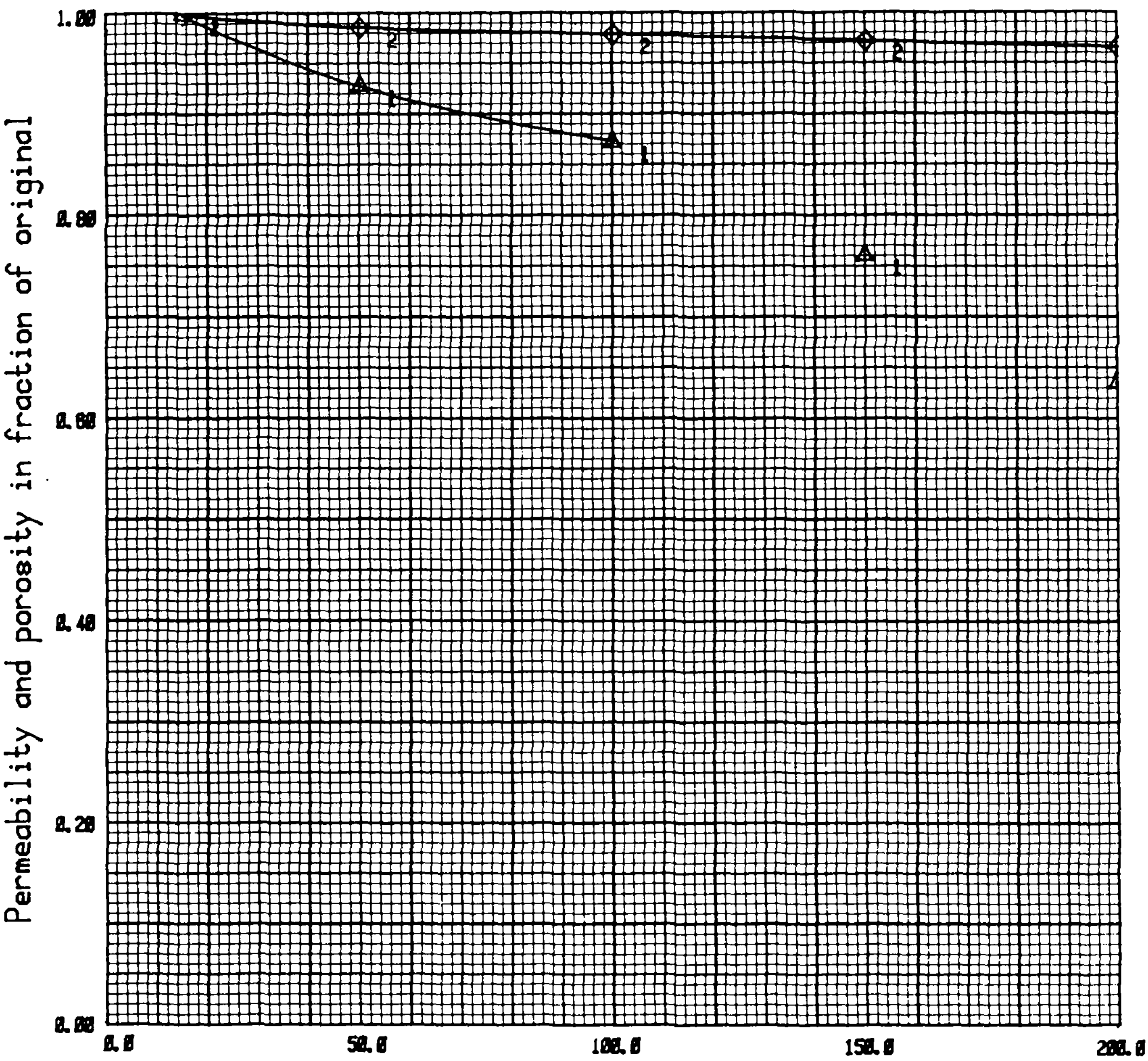


Permeability & Porosity vs. hydrostatic sleeve pressure

GECO
GEOPHYSICAL COMPANY OF NORWAY A.S
Petroleum laboratory

Depth : 1597.05 m

Original permeability (curve "1"): 3098 mD
Original porosity (curve "2"): 33.4 %



31-JAN-83

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FORMATION RESISTIVITY FACTOR VERSUS POROSITY

Determination of the parameters "a" and "m".

$$FF = \frac{r_o}{r_w} = a \cdot \emptyset^{-m}$$

r_o = resistivity of sample (100% saturated).

r_w = resistivity of saturating brine.

a = FRF value at fractional porosity of 1.0.

$\emptyset$ = Fractional porosity.

m = Cementation factor.

The data sets and the calculated values are presented both tabularly and graphically.

CONFINED PRESSURE: FORMATION FACTOR/POROSITY

	"ATMOSPHERIC"		50 BAR		100 BAR		150 BAR		200 BAR	
DEPTH (m)	FRF	POR.FRAC.	FRF	POR.FRAC.	FRF	POR.FRAC.	FRF	POR.FRAC.	FRF	POR.FRAC.
1516.05	7.17	0.296	7.43	0.291	7.54	0.287	7.60	0.285	7.65	0.284
1527.15	6.28	0.327	6.47	0.323	6.64	0.319	6.69	0.317	6.79	0.315
1530.72	5.56	0.347	5.81	0.341	5.96	0.338	6.06	0.335	6.11	0.333
1544.30	6.23	0.330	6.36	0.326	6.45	0.323	6.50	0.321	6.62	0.319
1552.18	6.16	0.326	6.49	0.318	6.70	0.314	6.79	0.311	6.90	0.309
1571.25	5.47	0.335	5.78	0.327	5.98	0.321	6.10	0.318	6.13	0.316
1585.10	7.63	0.311	7.90	0.307	8.10	0.303	8.21	0.300	8.35	0.297
1597.05	6.18	0.334	6.34	0.330	6.46	0.328	6.50	0.326	6.53	0.324

	"ATMOSPHERIC"	50 BAR	100 BAR	150 BAR	200 BAR
FORCED FIT:	$FF = \phi^{-1.64}$	$FF = \phi^{-1.65}$	$FF = \phi^{-1.65}$	$FF = \phi^{-1.65}$	$FF = \phi^{-1.65}$
FREE FIT :	$FF = 0.67 \cdot \phi^{-2.00}$	$FF = 0.75 \cdot \phi^{-1.90}$	$FF = 0.89 \cdot \phi^{-1.76}$	$FF = 0.91 \cdot \phi^{-1.74}$	$FF = 0.86 \cdot \phi^{-1.78}$

GECO

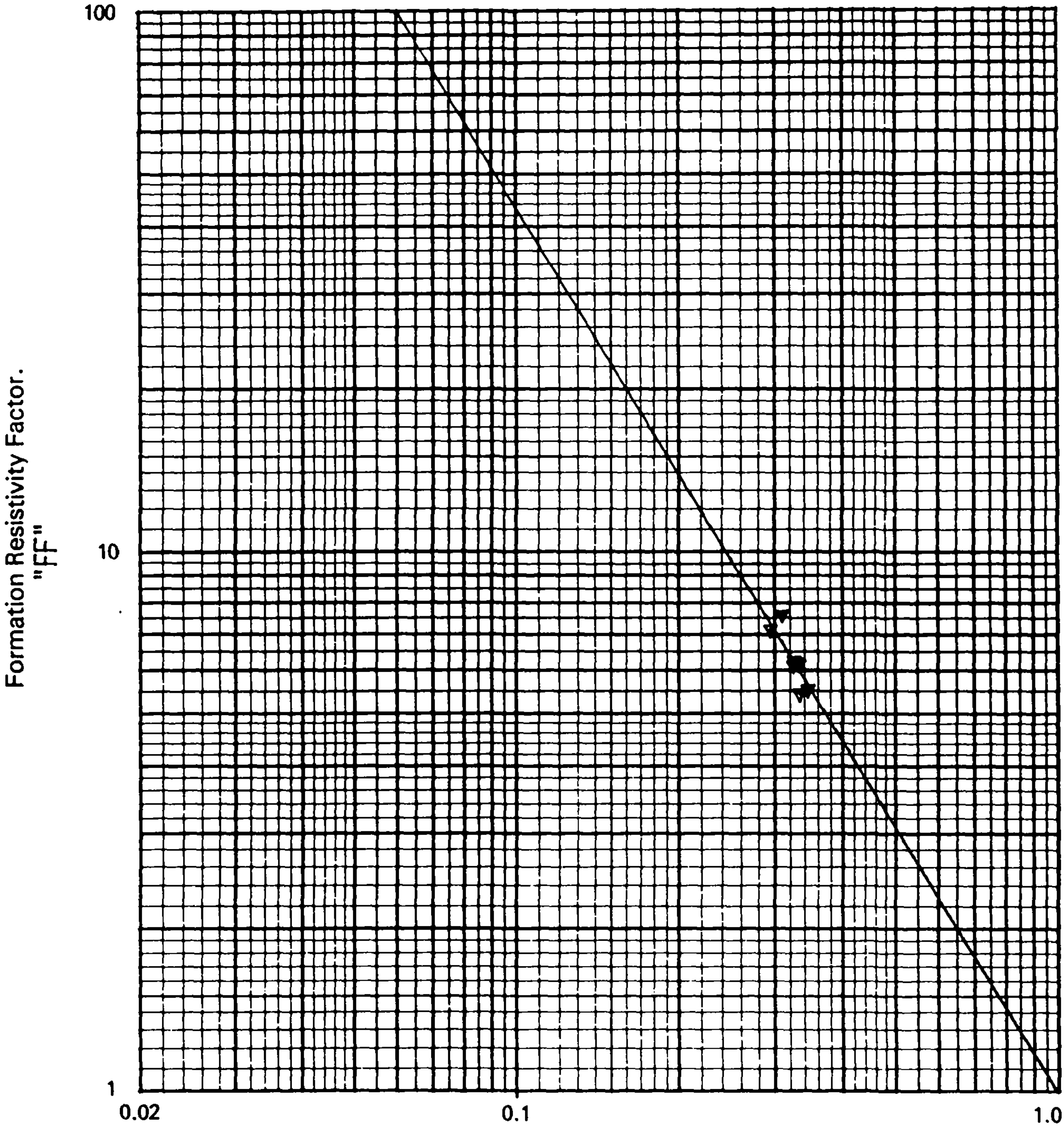
Formation Factor versus Porosity

Company ..A/S.NORSKE.SHELL..................................

Well ..31/2-6...

Confining pressure : Atmospheric pressure (15 bar)

$FF = 1.00 * Ø^{-1.64}$



31-JAN-83
Geco nr. 082 – Rogaland Industritrykk A.s

Formation Factor versus Porosity

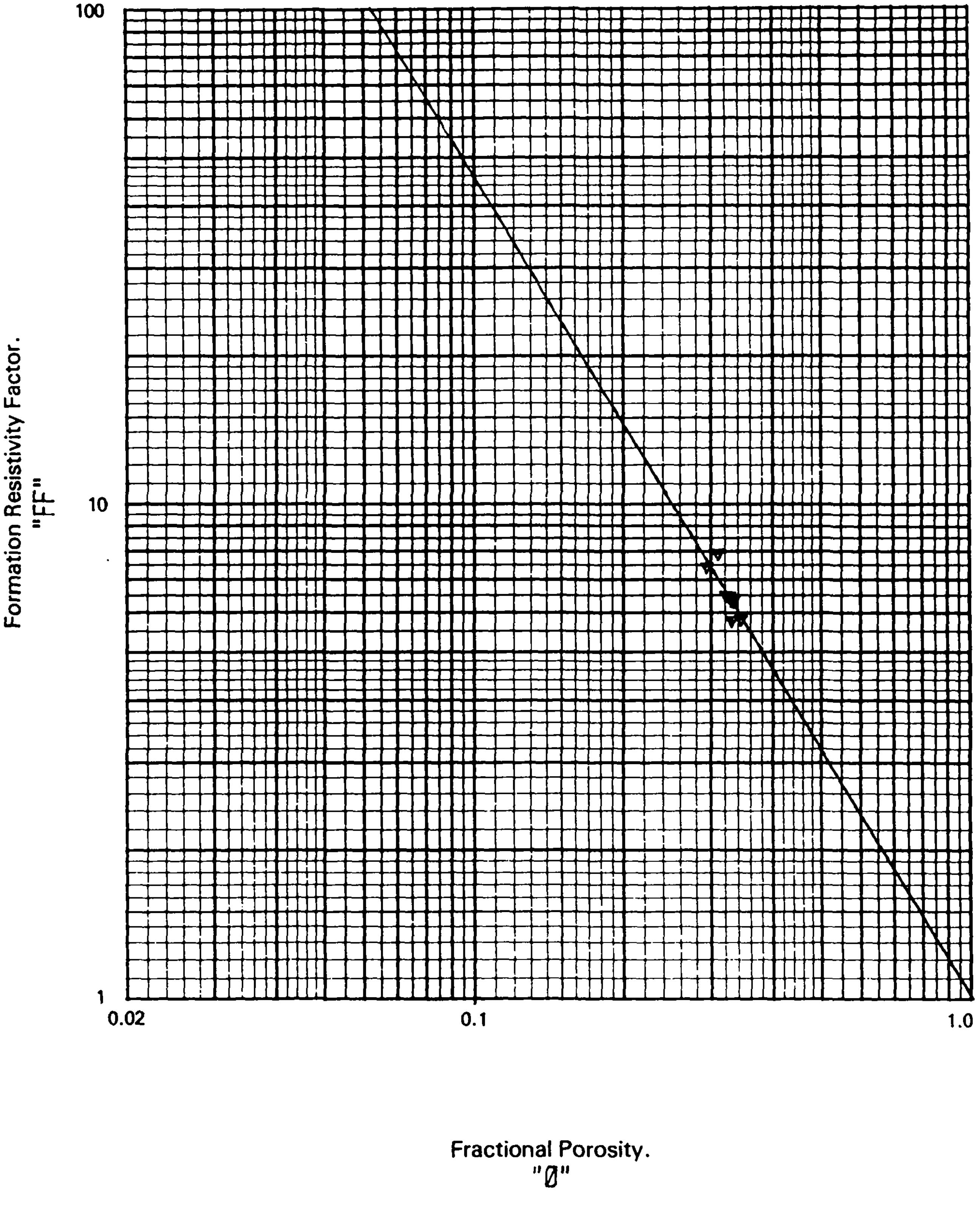
GECO
GEOPHYSICAL COMPANY OF NORWAY A/S

Company A/S NORSKE SHELL

Well 31/2-6

Confining pressure : 50 bar

$FF = 1.00 * \emptyset^{-1.85}$



31-JAN-83

Geco nr. 062 – Rogaland Industritrykk A.s

Formation Factor versus Porosity

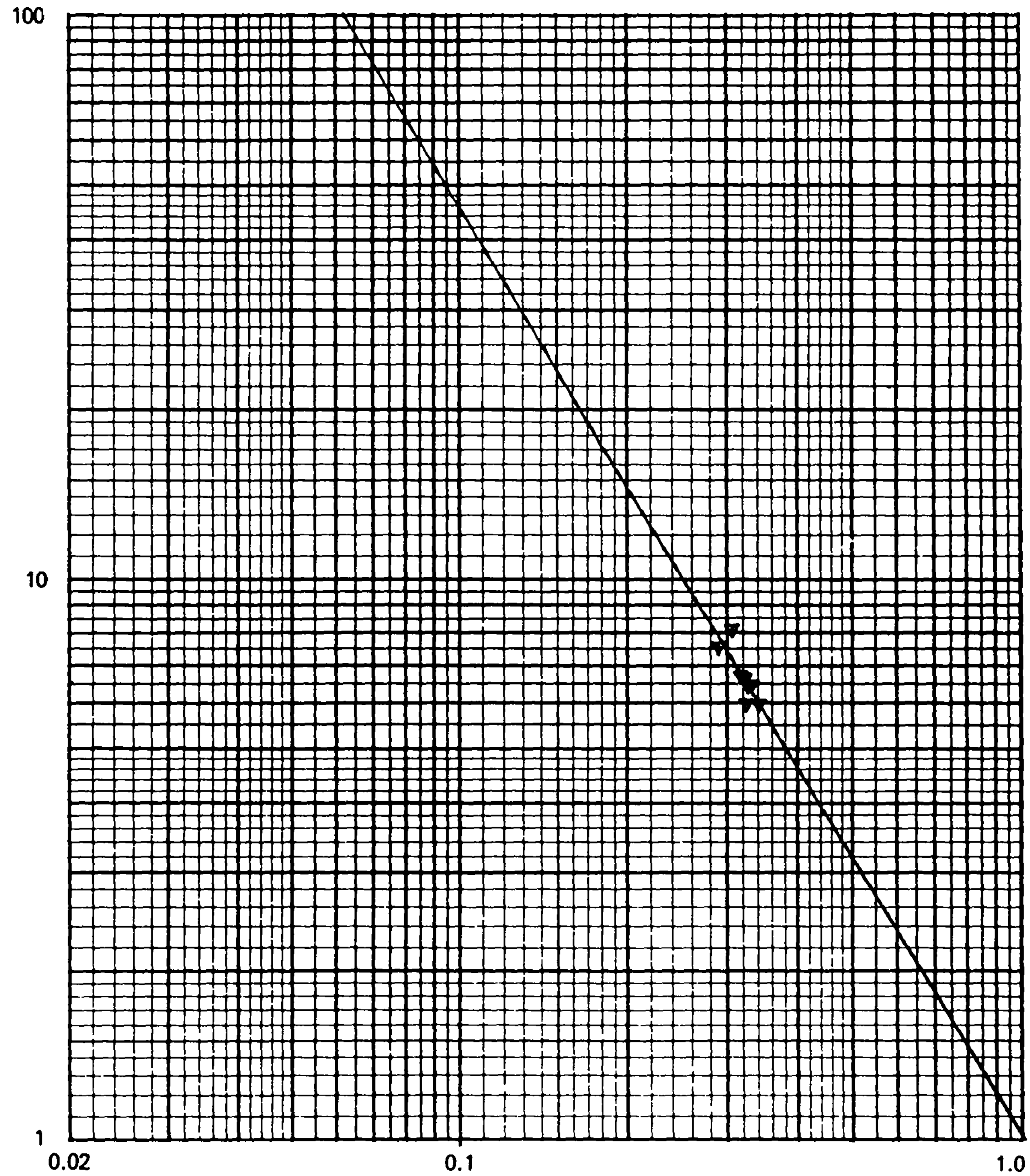
GECO
GEOPHYSICAL COMPANY OF NORWAY A/S

Company A/S NORSKE SHELL

Well 31/2-6

Confining pressure : 100 bar

FF = 1.00 * Ø^-1.85



31-JAN-83

Geco nr. 082 – Rogaland Industritrykk A.s

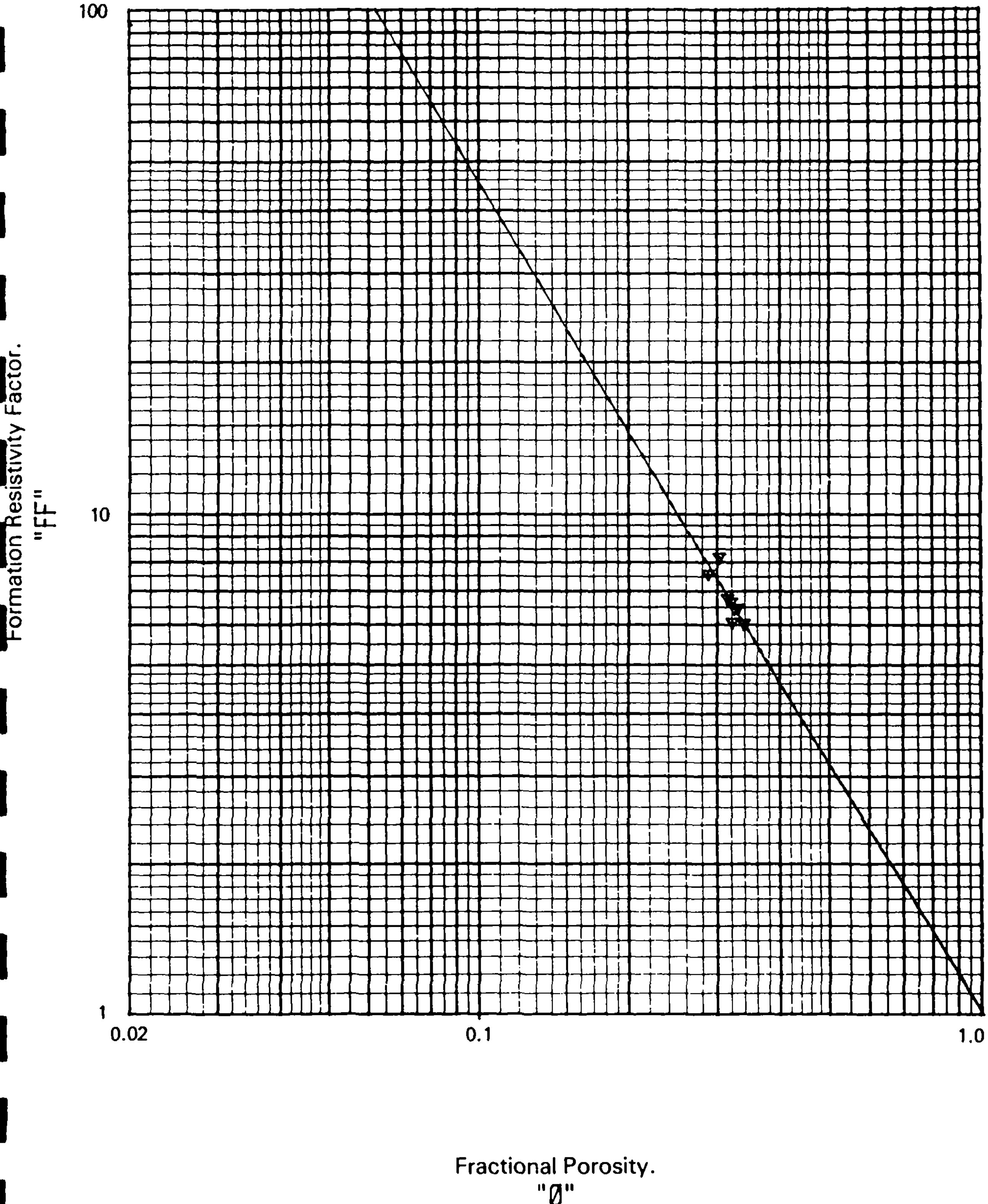
Formation Factor versus Porosity

Company ..A/S NORSKE SHELL......................................

Well ..31/2-6...

Confining pressure : 150 bar

$FF = 1.00 * Ø^{-1.85}$



31-JAN-83

Geco nr. 062 – Rogaland Industritrykk A.s

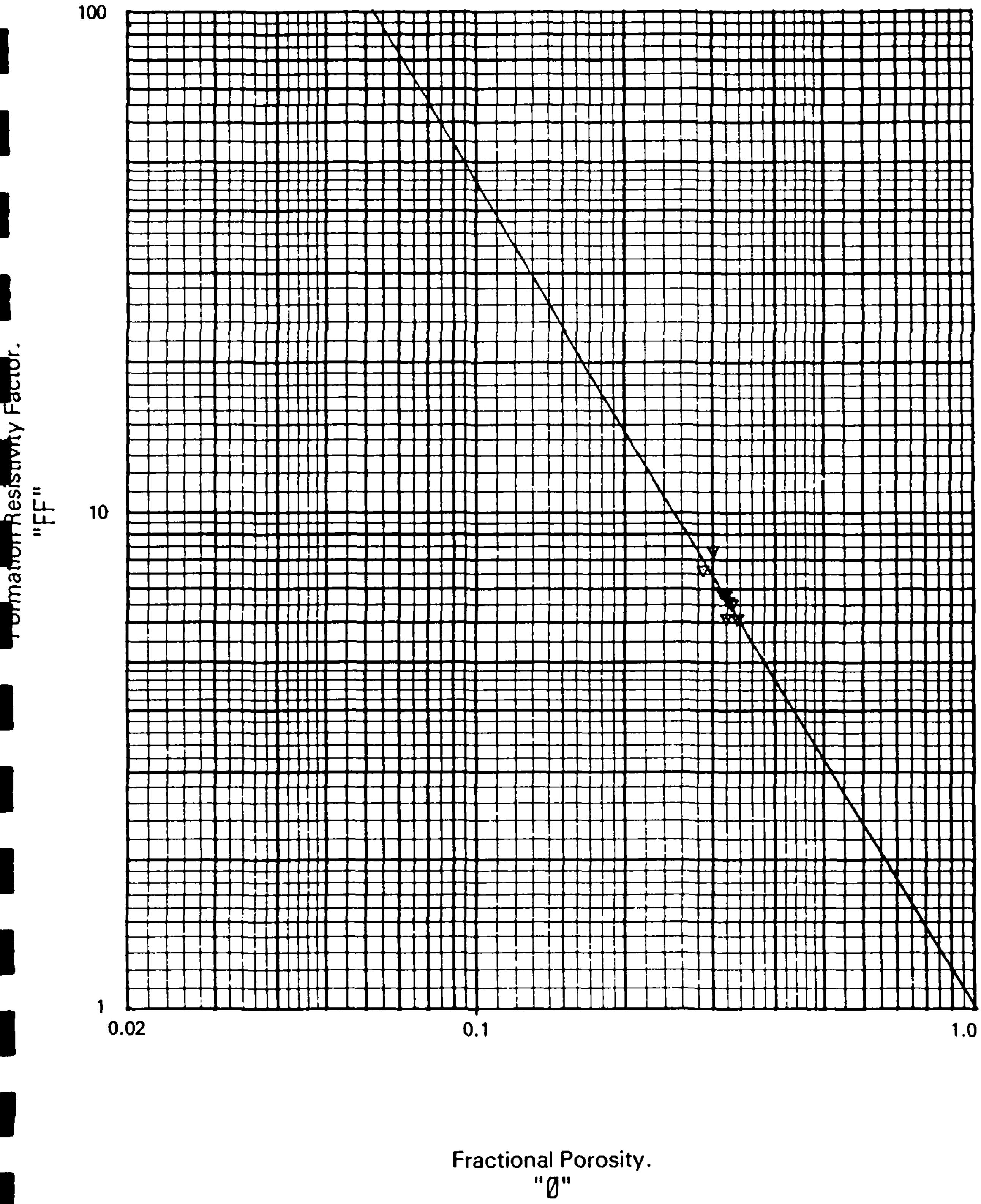
Formation Factor versus Porosity

Company ..A/S NORSKE SHELL...

Well ..31/2-6..

Confining pressure : 200 bar

$FF = 1.00 * Ø^{-1.65}$



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DETERMINATION OF CATION EXCHANGE CAPACITY

Cation Exchange Capacity

The cation exchange capacity was measured by the wet chemistry method. The matrix was carefully broken down in an ultra sonic bath using methanol and toluene as solvents.

The cation exchange capacity was determined as the capacity of spending cobalt in a hexammin cobalt (III) chlorid solution.

The cation exchange capacity is reported with porosity, grain density and air permeability from the adjoining plug depth.

GECO

DH, PHICEC, CEC

-1,0,0

CATION EXCHANGE CAPACITY

Depth (m)	K.e.l. (mD)	Ø (%)	meq/100 gr
1506.46	6042	33.0	0.87
1516.05	9786	29.6	1.00
1527.15	3353	32.7	0.84
1530.72	2452	34.7	1.25
1538.12	67.2	29.6	2.52
1544.30	13327	33.0	0.64
1552.18	5925	32.6	1.03
1571.25	6456	33.5	0.48
1580.10	4091	34.9	1.08
1585.10	824	31.1	2.39
1597.05	2846	33.4	0.54
1604.31	nmp	nmp	3.54