

IV RESULTS

DETERMINATION OF FAST MIXING SPEED

Raw water characteristics:

Sample 1, Surface water

Turbidity, 89% transmission

pH, 7.4

Alkalinity, 63 mg/l. as CaCO_3

TURBIDITY, % TRANSMISSION

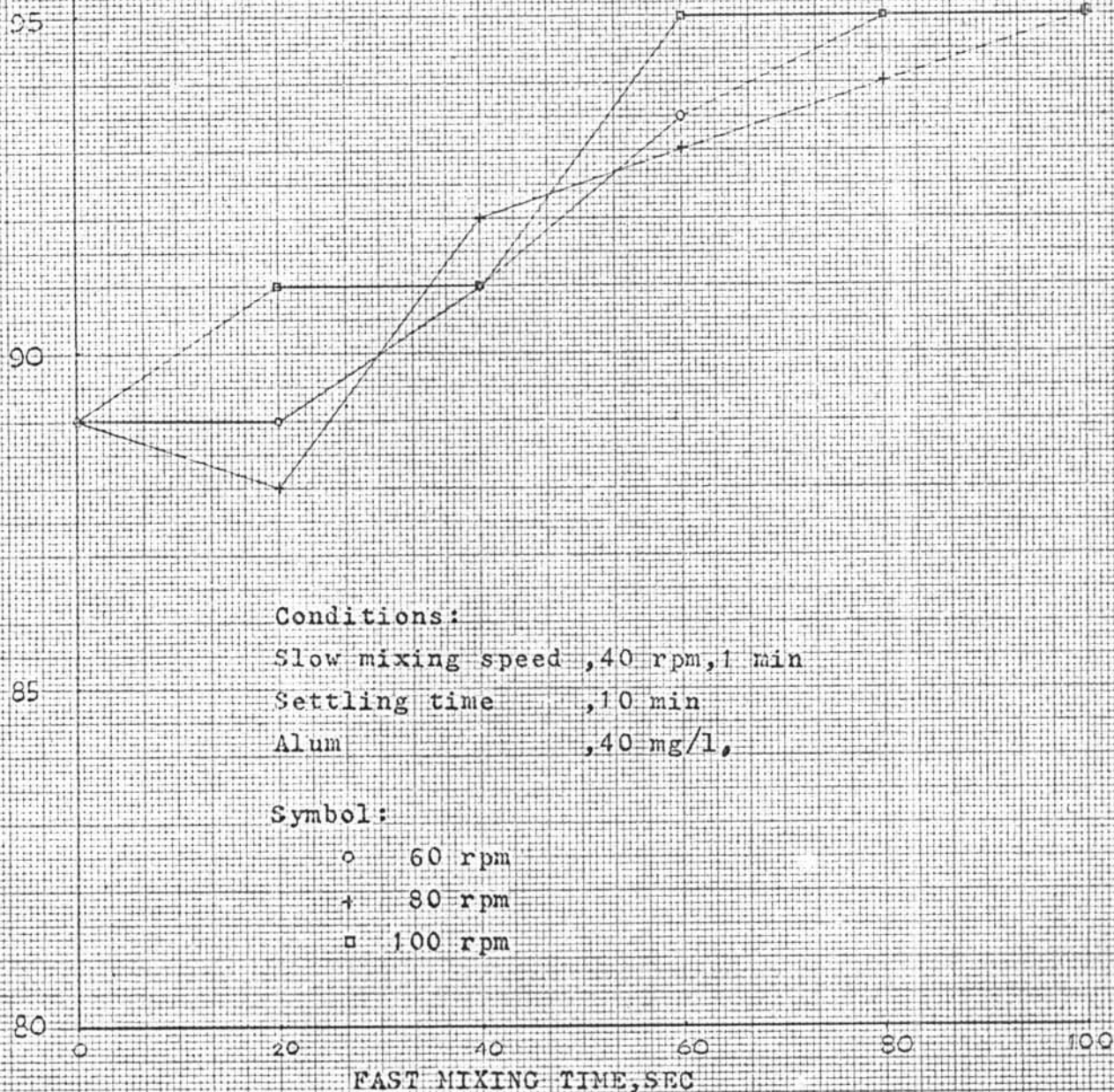


Fig.13-Effect of Fast Mixing Speed on Alum Coagulation

DETERMINATION OF SLOW MIXING SPEED

Raw water characteristics:

Sample 1 , Surface water
 Turbidity , 89% transmission
 pH , 7.4
 Alkalinity , 63 mg/l. as CaCO_3

Conditions:

Fast mixing speed , 100 rpm, 1 min
 Settling time , 10 min
 Alum , 40 mg/l.

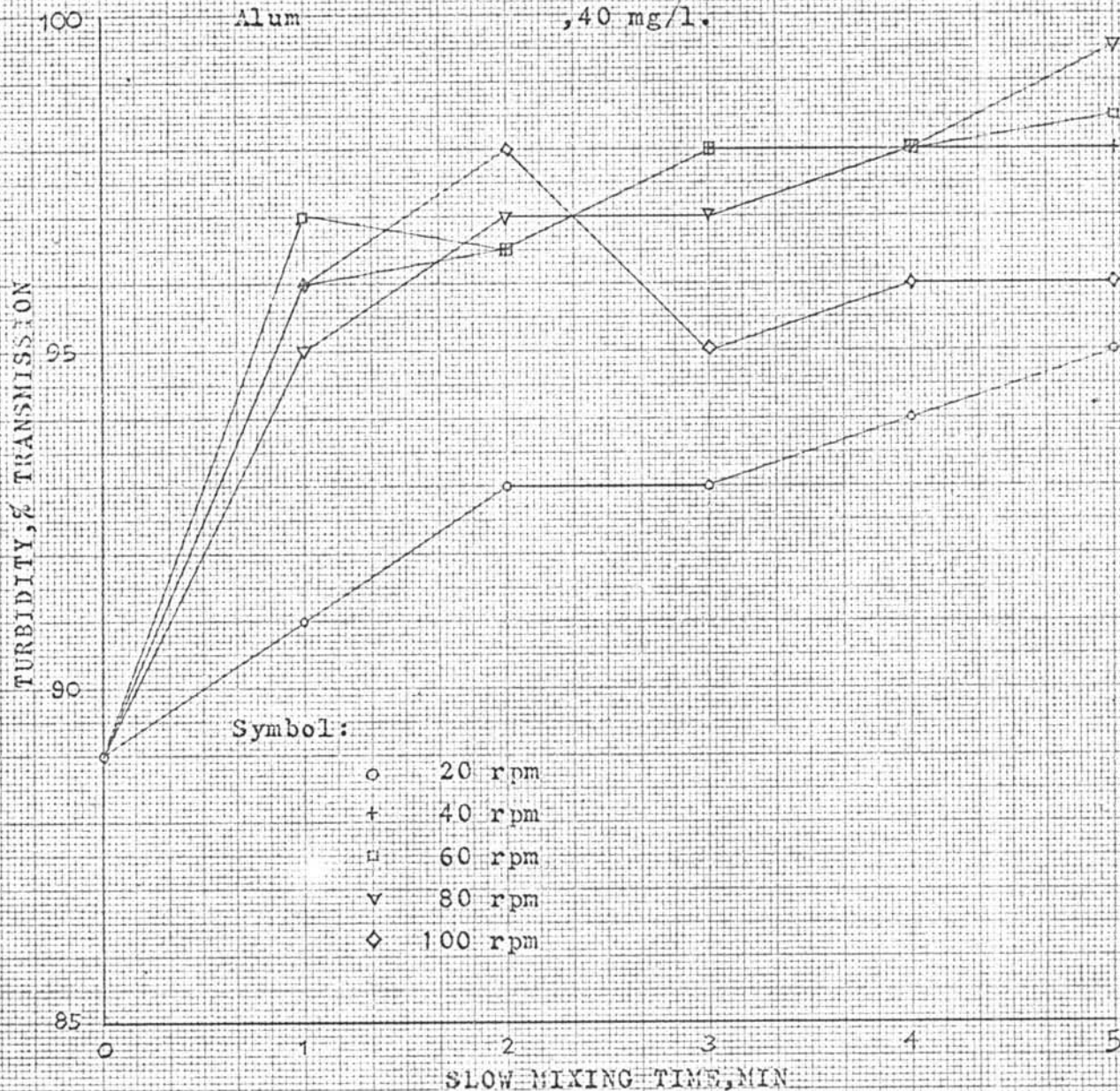


Fig. 14—Effect of Slow Mixing Speed on Alum Coagulation

DETERMINATION OF TOTAL SETTLING TIME

Raw water characteristics:		<u>Sample 1</u>	<u>Sample 4</u>
Turbidity, % transmission,		89	85
pH	,	7.4	7.4
Alkalinity	,	63	68
Conditions:			
Fast mixing speed	,	100 rpm, 1 min	
Slow mixing speed	,	40 rpm, 3 min	
Alum	,	40 mg/l.	

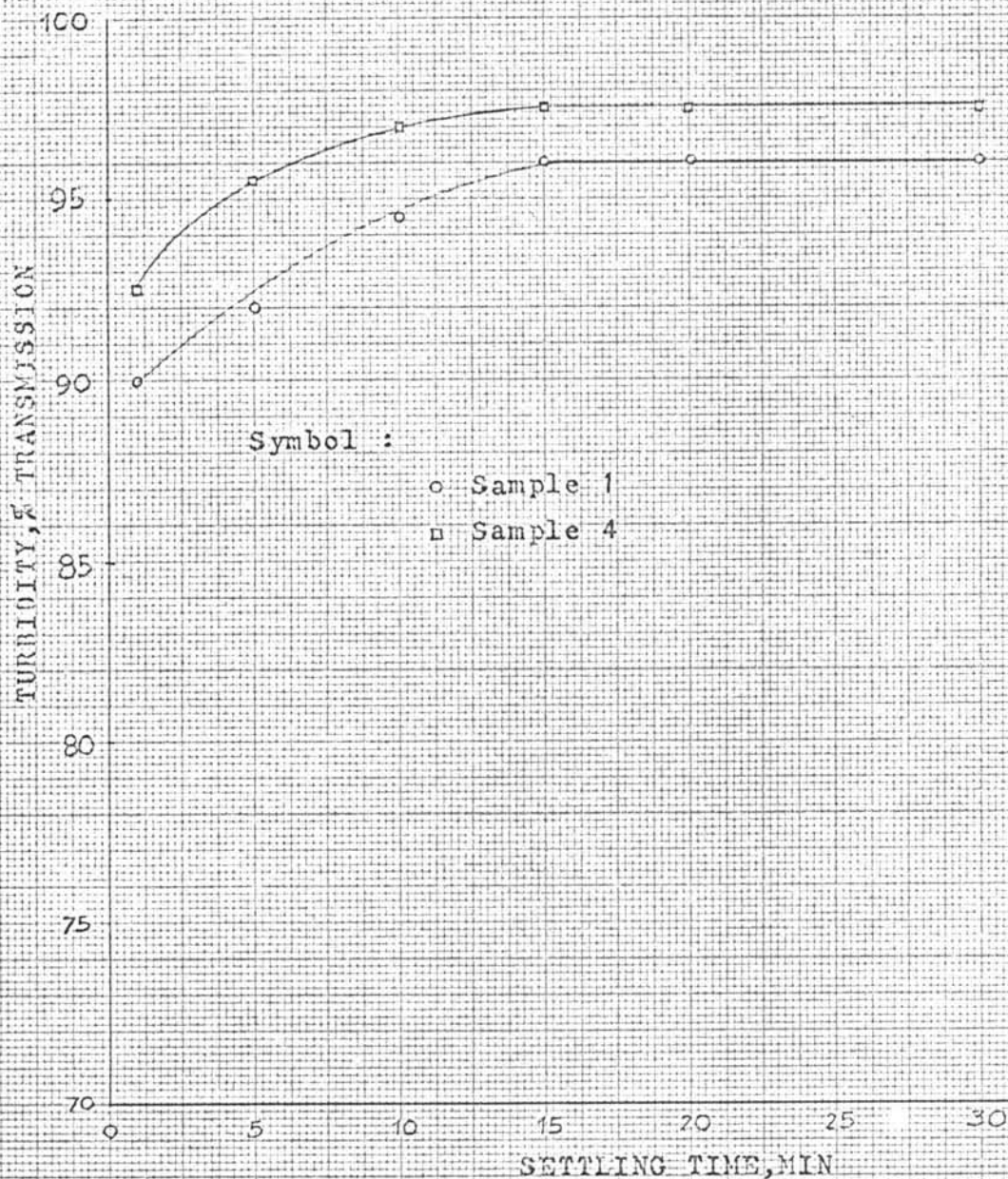


Fig.15-Settling Curve on Alum Coagulation

DETERMINATION OF ALUM UTILIZED

Raw water characteristics:	Sample 1	Sample 4
Turbidity, % transmission,	89	85
pH	7.4	7.4
Alkalinity, mg/l. as CaCO_3	65	68

Conditions:

Fast mixing speed , 100 rpm , 1 min

Slow mixing speed , 40 rpm , 3 min

Settling time , 15 min

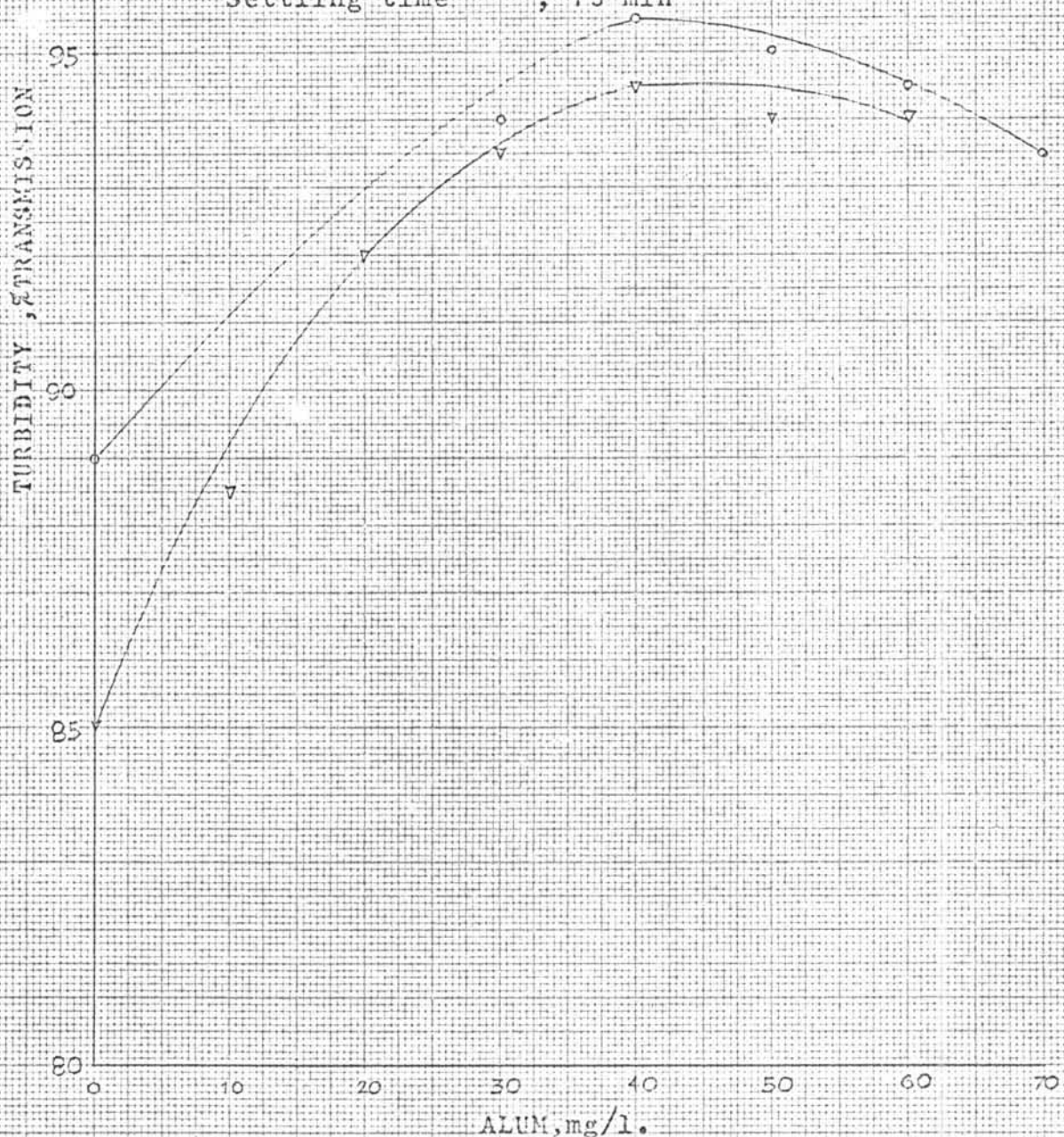


Fig.16-Effect of Alum Dosage on Turbidity Removal

Raw water characteristics:

	Sample 1	Sample 4
Turbidity, strans.	89	85
pH	7.4	7.4
Alkalinity	63	68

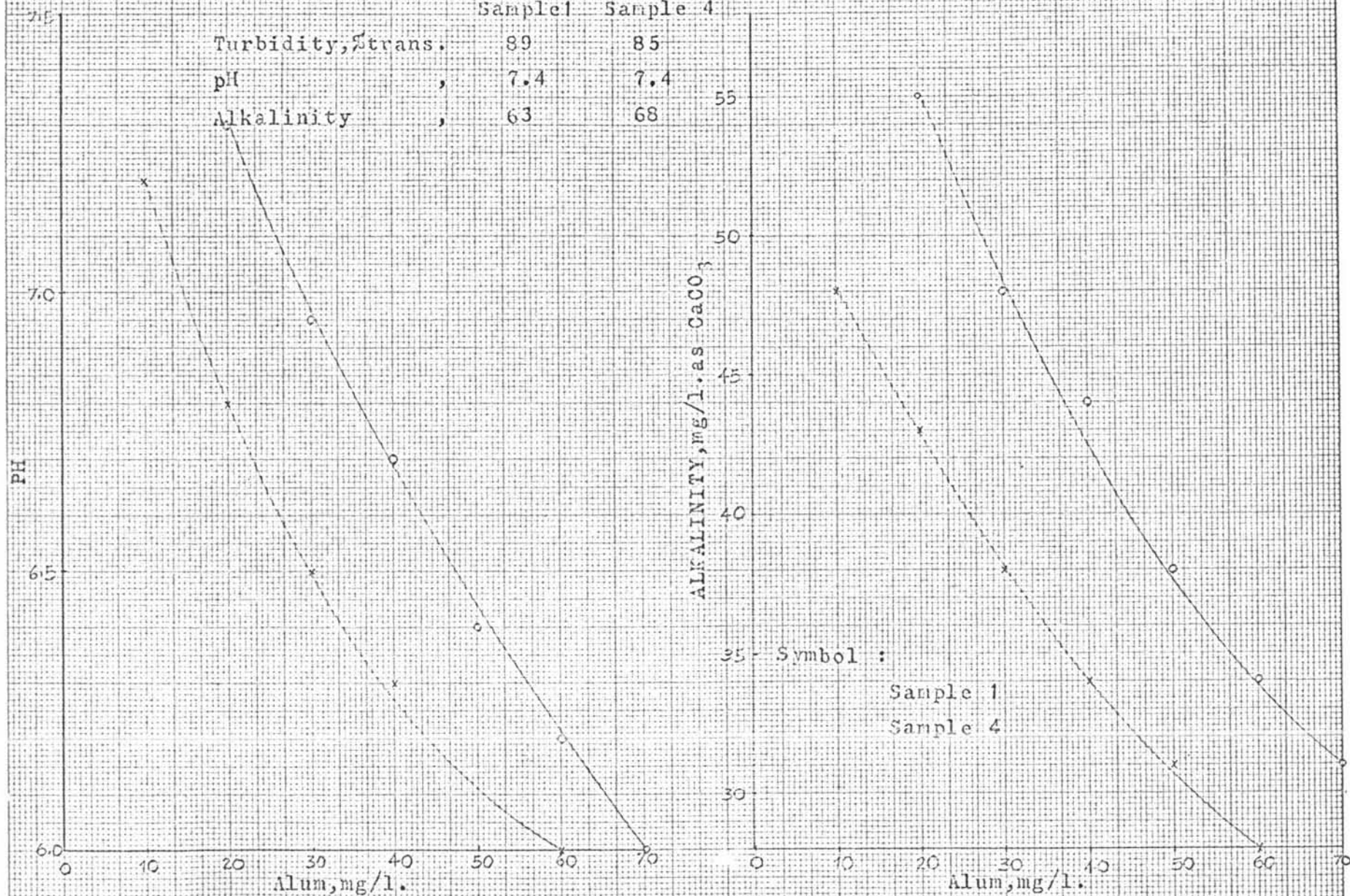
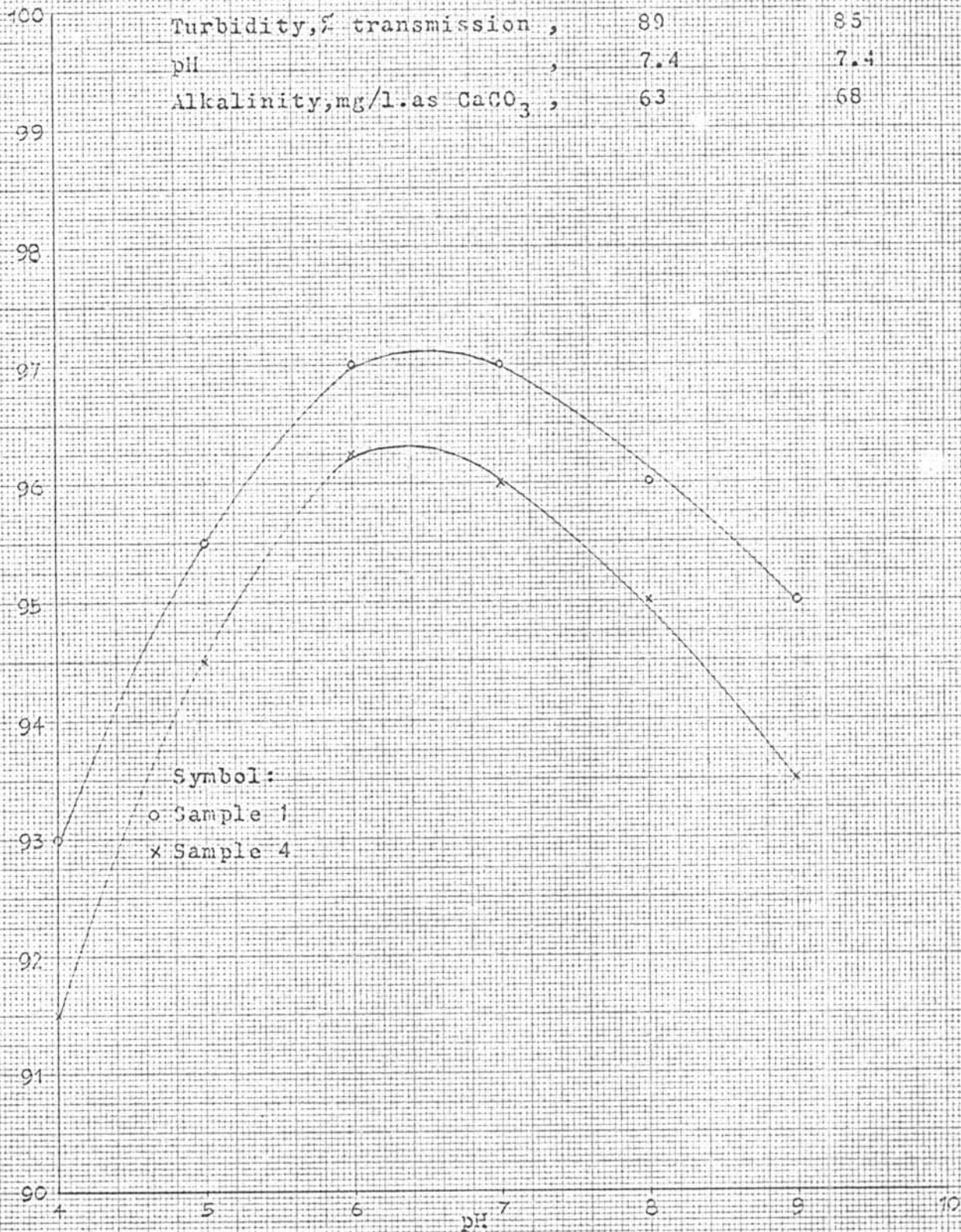


Fig.17-Effect of Alum on pH and Alkalinity Removal

DETERMINATION OF OPTIMUM pH RANGE FOR ALUM COAGULATION

Raw water characteristics :	Sample1	Sample4
Turbidity, % transmission ,	89	85
pH ,	7.4	7.4
Alkalinity, mg/l. as CaCO ₃ ,	63	68

TURBIDITY, % TRANSMISSION



Symbol:
 o Sample 1
 x Sample 4

Fig.18-Effect of pH on Alum Coagulation

Test No 10 A-B

Flow rate , 0.6 l./min

Power , 211 W

Inlet Temp , 29°C

Outlet Temp , 43°C

Sample 1 , Surface water

Turbidity , 89 %transmission

pH , 7.4

Alkalinity , 63 mg/l. as CaCO₃

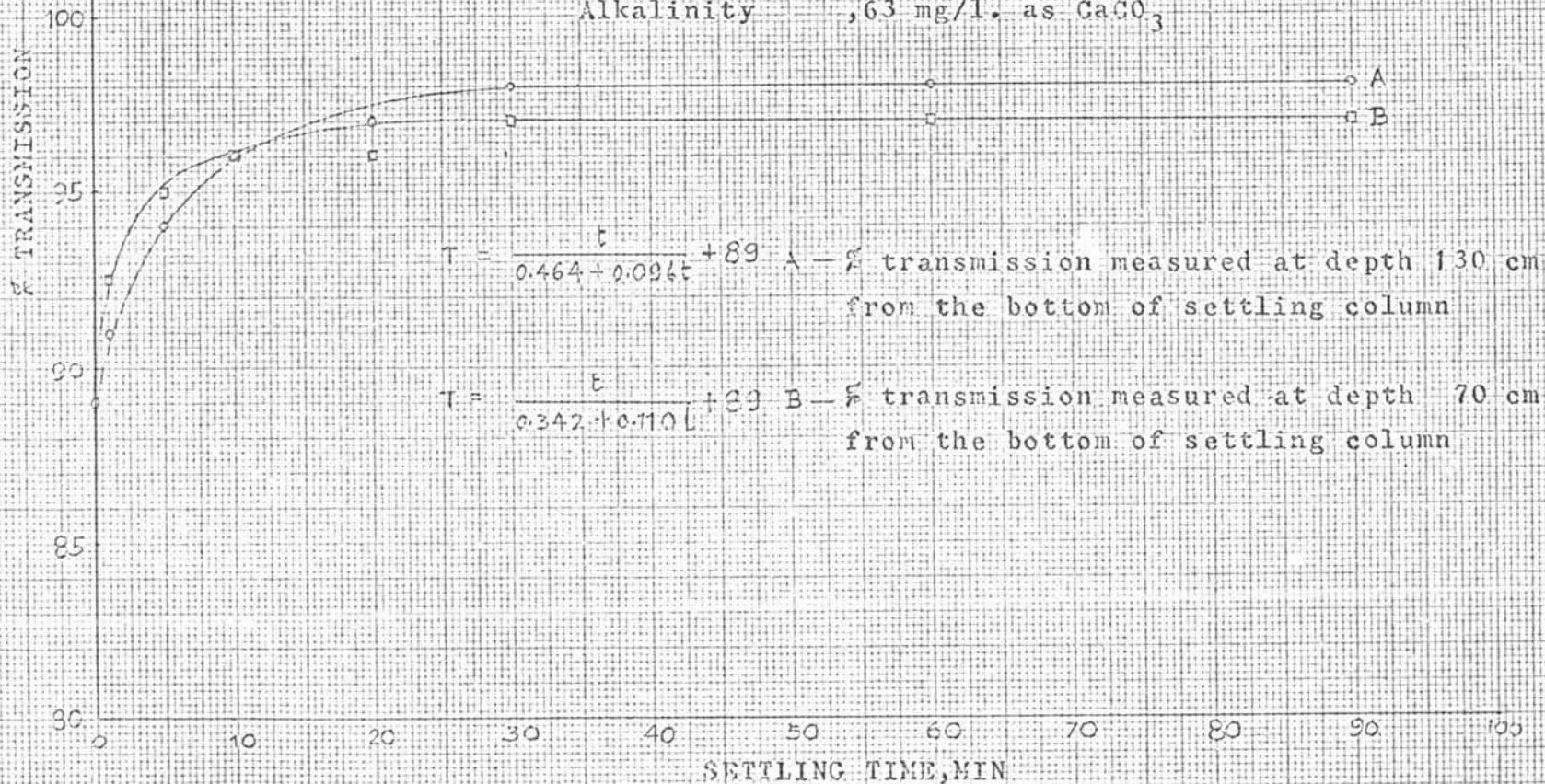


Fig.19-Settling Curve on Electrical Coagulation

Test No 11 A-B
 Sample 1 , Surface water
 Turbidity , 89% transmission
 pH , 7.4
 Flow rate , 0.8 l./min
 Power , 108 W
 Inlet temp , 29°C
 Outlet temp , 39°C

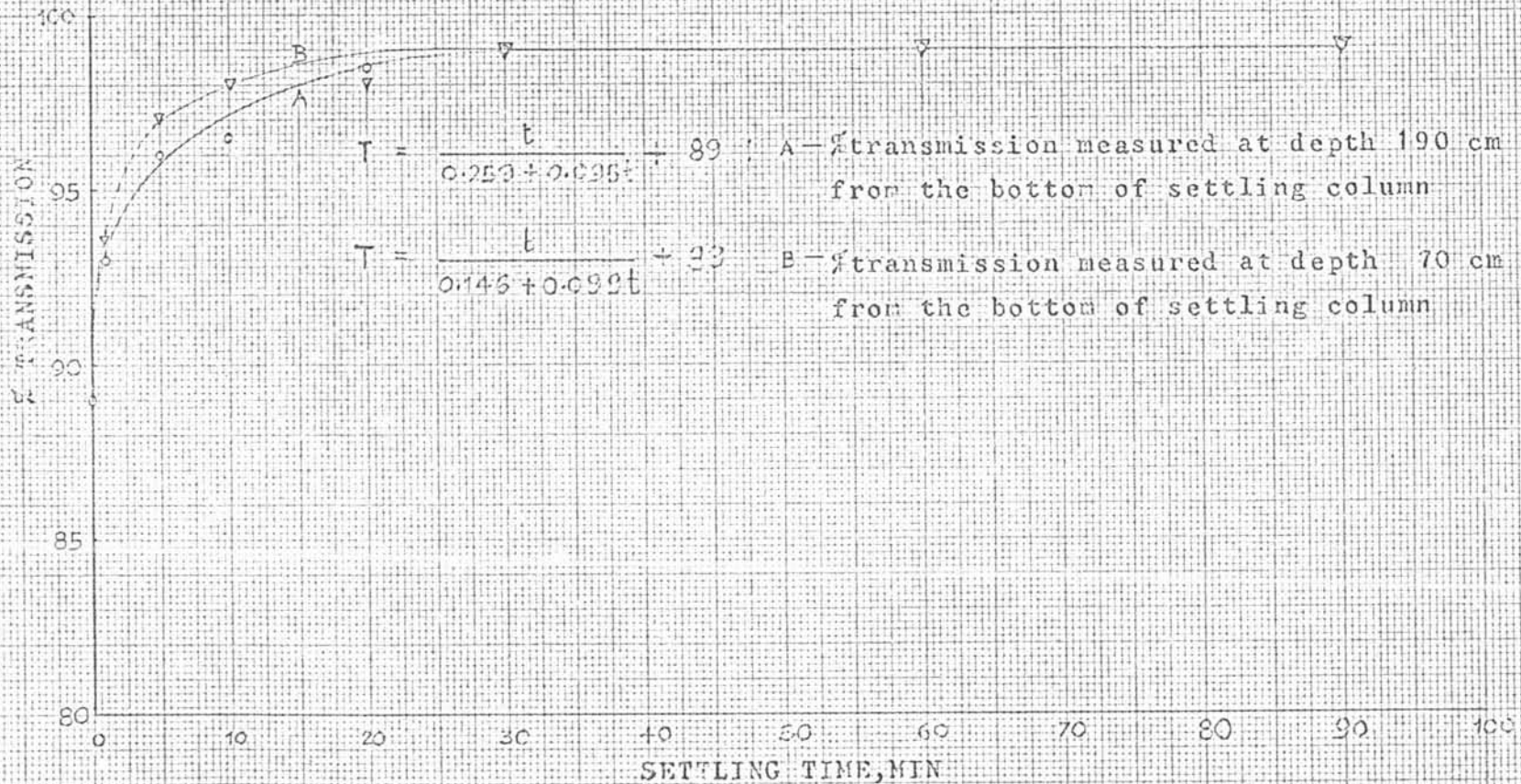


Fig.20-Settling Curve on Electrical Coagulation

Test No 12
 Sample 1 , Surface water
 Turbidity , 89 % transmission
 pH , 7.4
 Alkalinity , 63 mg/l. as CaCO₃
 Flow rate , 1.87 l./min
 Power , 108 W
 Inlet temp , 27°C
 Outlet temp , 31°C

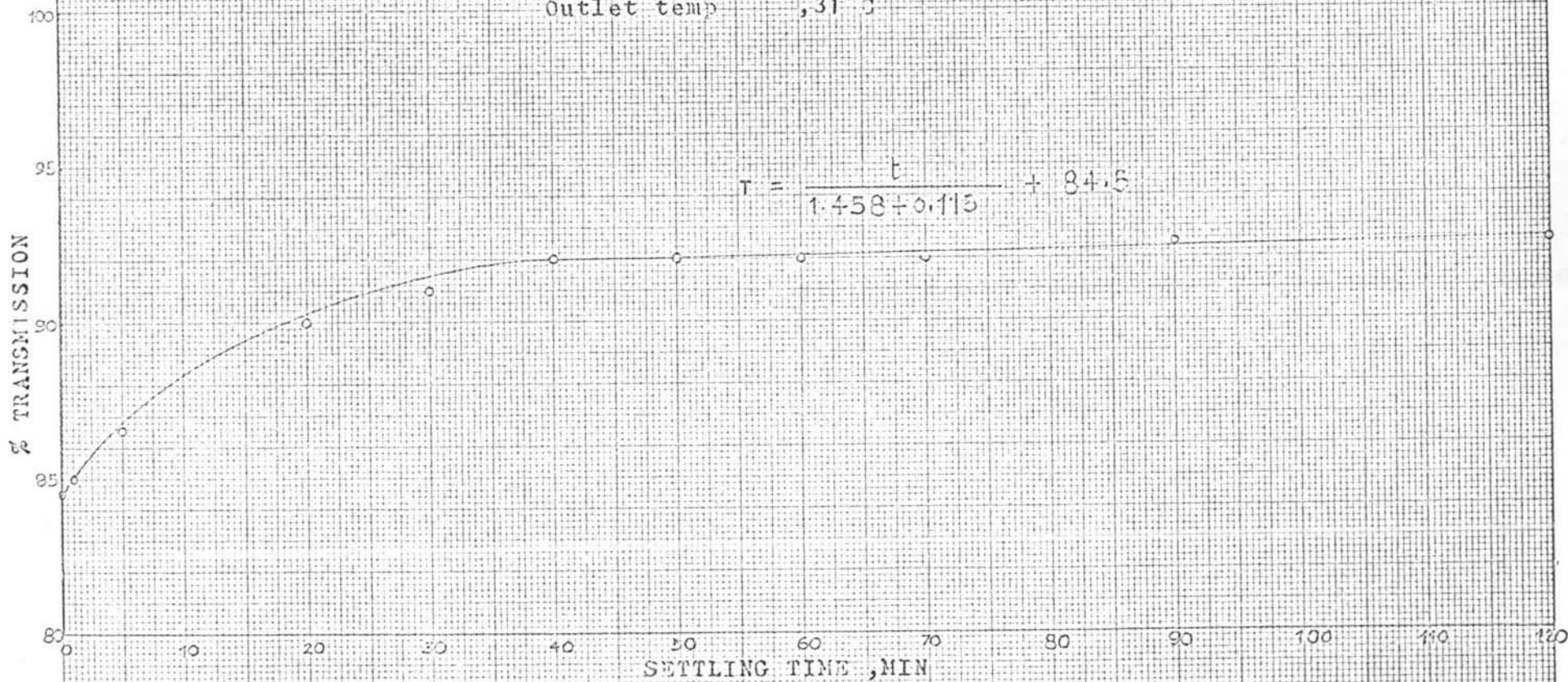


Fig. 21-Settling Curve on Electrical Coagulation

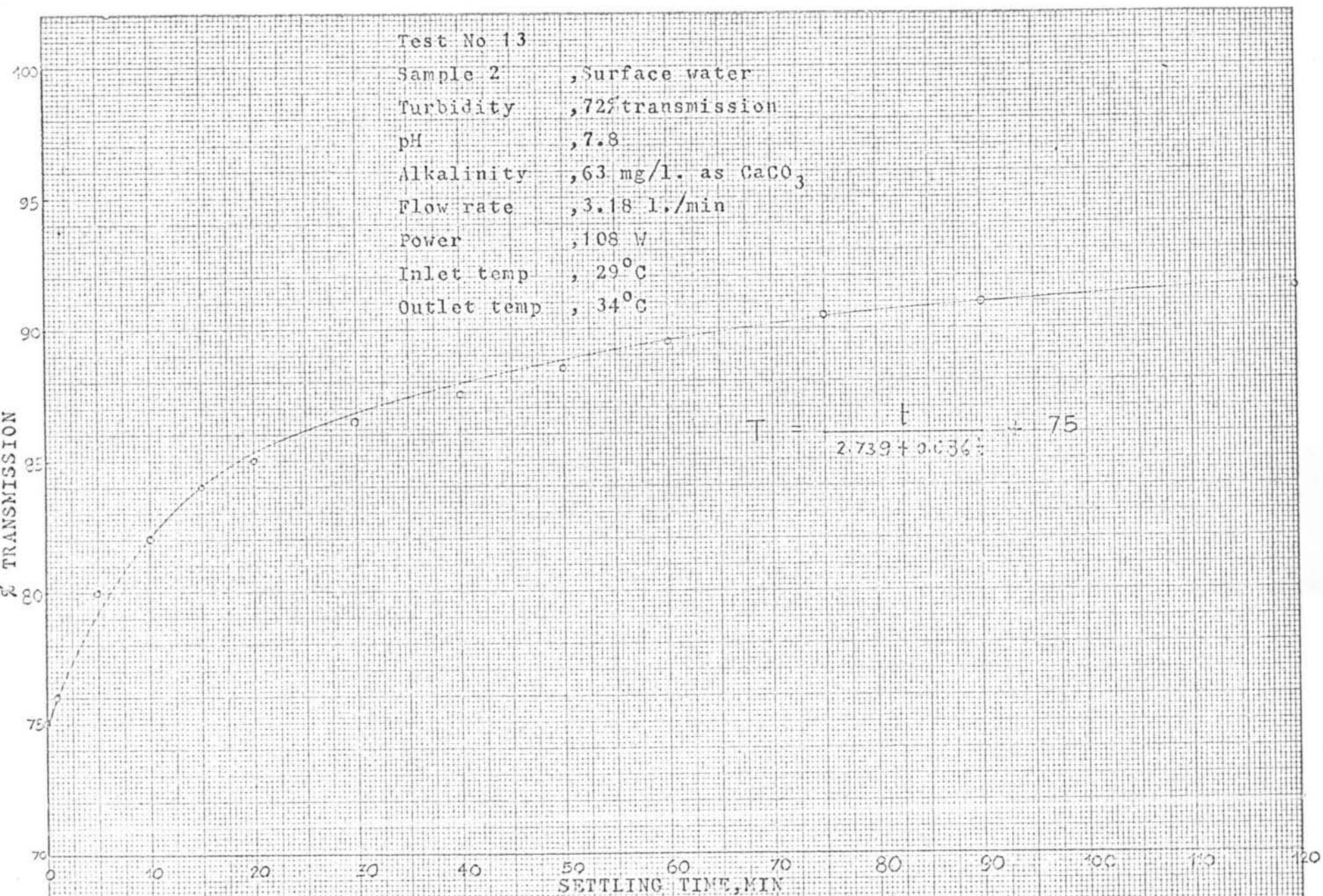


Fig.22-Settling Curve on Electrical Coagulation

Test No 14
 Sample 1 , Surface water
 Turbidity , 89% transmission
 pH , 7.4
 Alkalinity , 63 mg3l. as CaCO₃

100
95
90
85
80
75

% TRANSMISSION

Flow rate , 1.25 l./min
 Power , 108 W
 Inlet temp , 28°C
 Outlet temp , 35°C

$$T = \frac{t}{3.260 + 0.073t} + 85$$

0 10 20 30 40 50 60 70 80 90 100 110 120

SETTLING TIME, MIN

Fig.23-Settling Curve on Electrical Coagulation

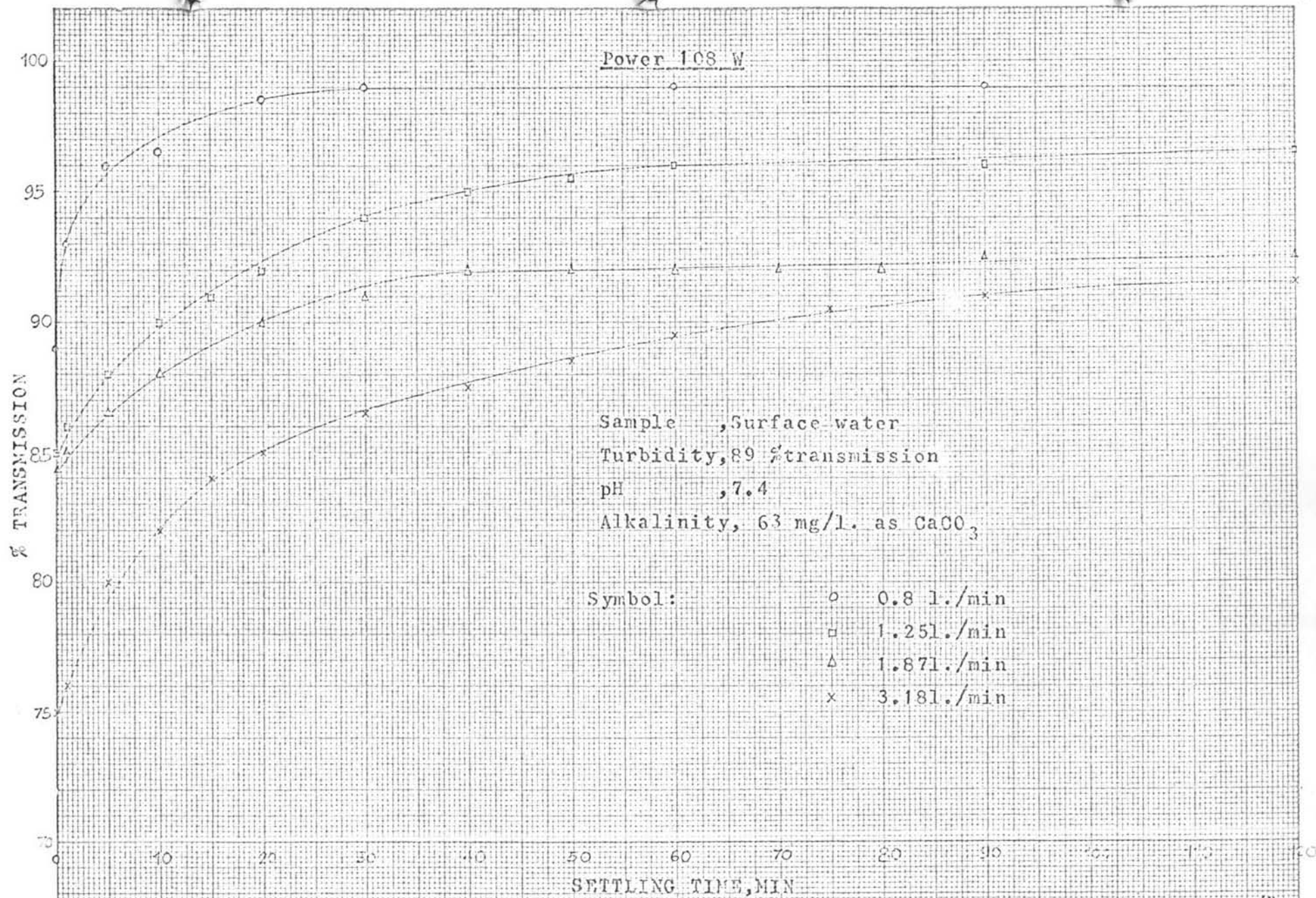


Fig. 24-Settling Curve on Electrical Coagulation

Test No 16

Sample , Surface water
Turbidity , 80 % transmission
pH , 7.2
Alkalinity , 64 mg/l.as CaCO₃

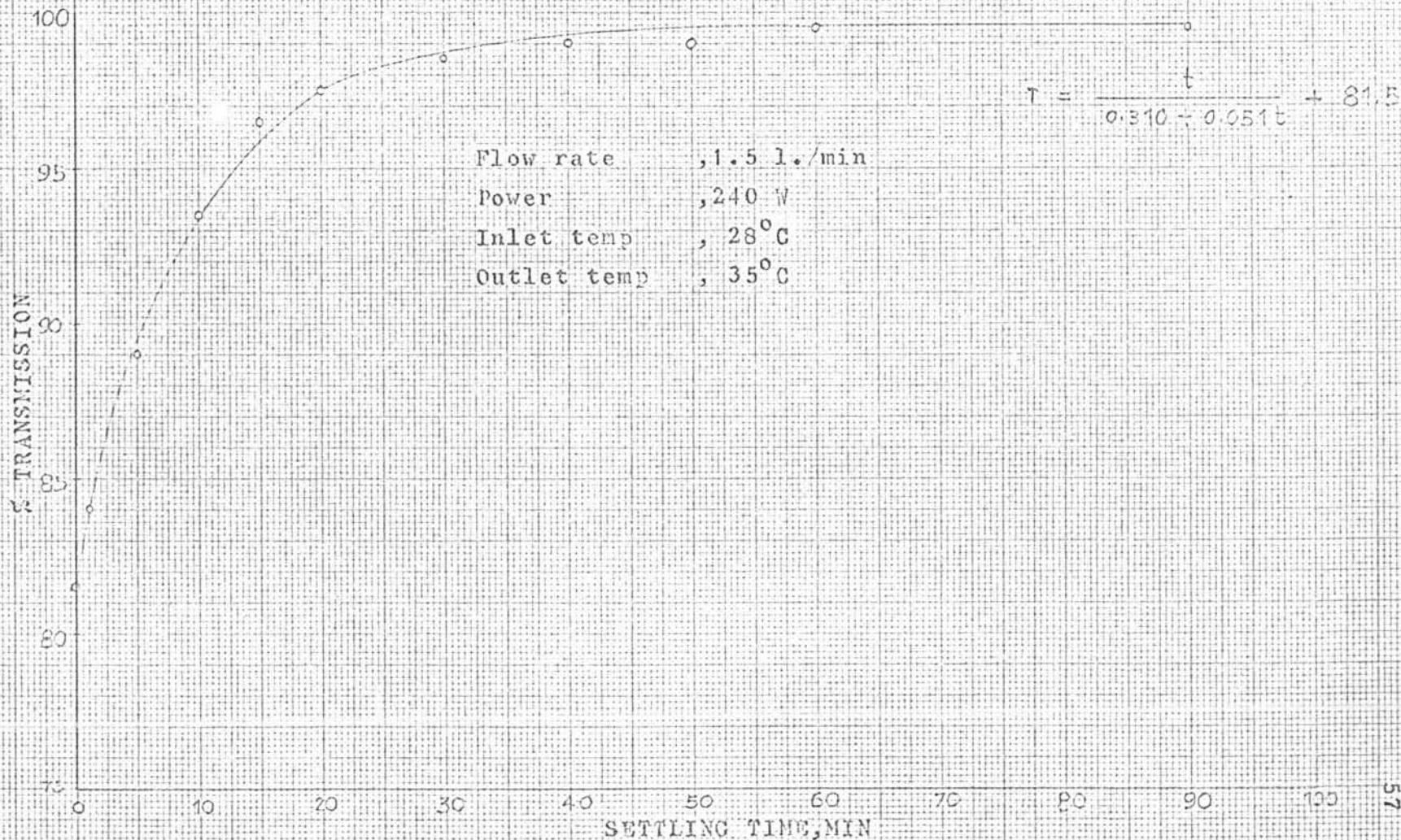


Fig.25-Settling Curve on Electrical Coagulation

Test No 17
 Sample , Surface water
 Turbidity , 80 % transmission
 pH , 7.2
 Alkalinity , 64 mg/l.as CaCO₃

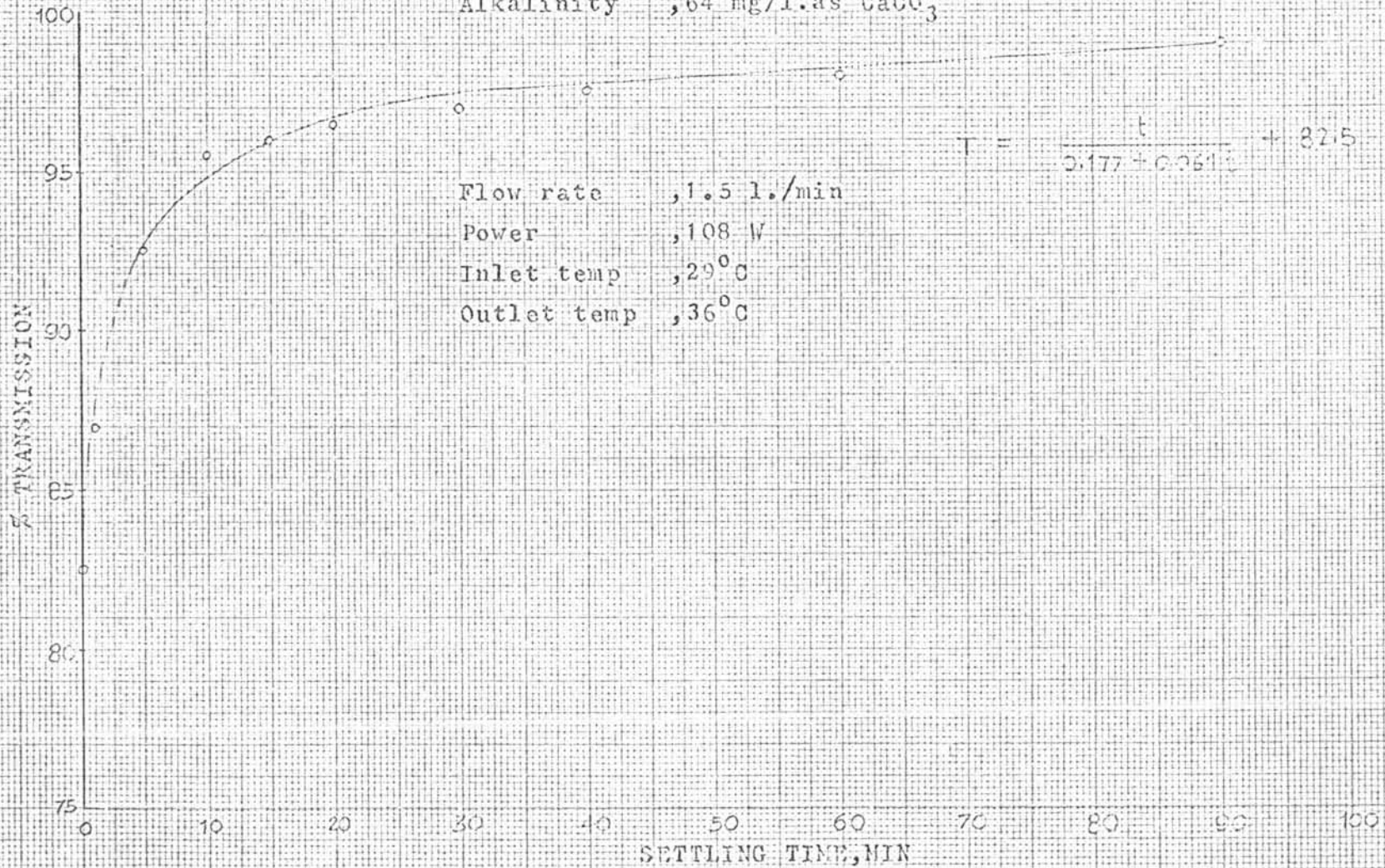


Fig.26-Settling Curve on Electrical Coagulation

Test No 18
 Sample , Surface water
 Turbidity , 80 % transmission
 pH , 7.2
 Alkalinity , 64 mg/l. as CaCO₃
 Flow rate , 1.5 l./min
 Power , 29 W
 Inlet temp , 29°C
 Outlet temp , 34°C

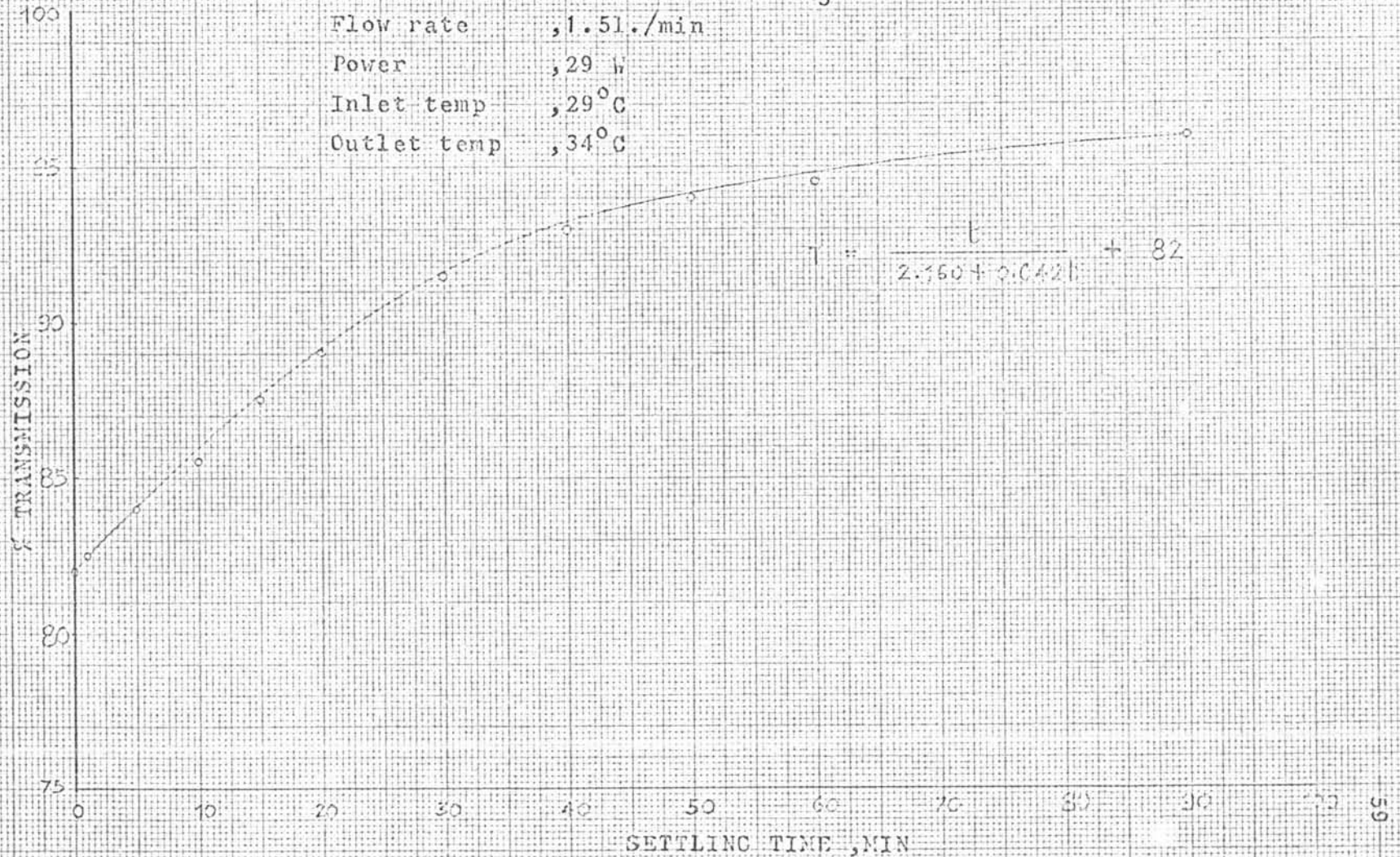


Fig.27-Settling Curve on Electrical Coagulation

Flow rate 1.5 l./min

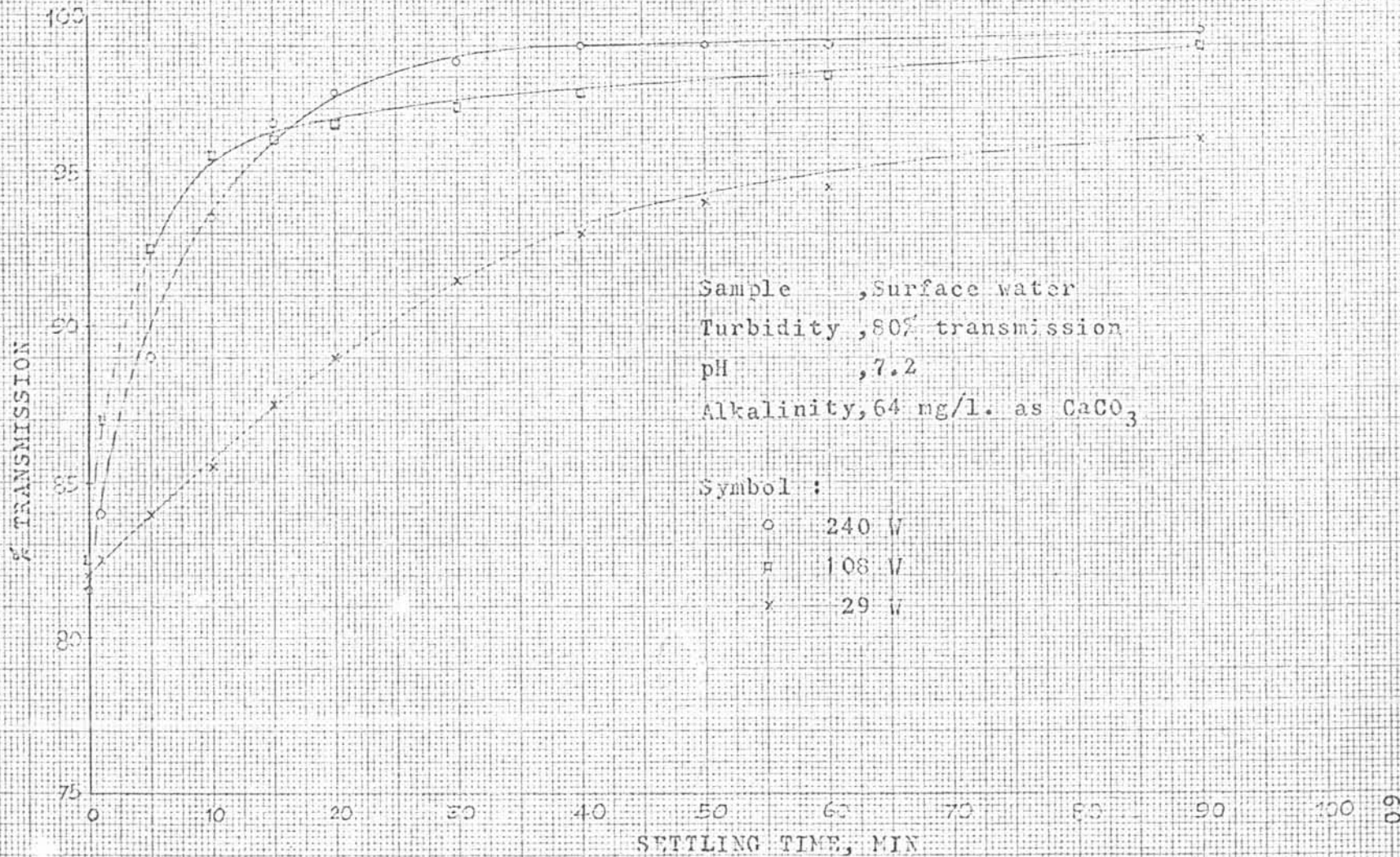


Fig.28-Settling Curve on Electrical Coagulation

Test No 15A-B
 Sample 1 , Surface water
 Turbidity , 89 % transmission
 pH , 7.4
 Alkalinity , 63 mg/l. as CaCO₃

MIXING, 100 RPM, 1MIN

NO MIXING

Flow rate , 1.0 l./min
 Power , 108 W
 Inlet temp , 28°C
 Outlet temp , 33°C
 Stirrer speed, 100 rpm , 1 min

$$x : T = \frac{t}{0.131 + 0.0225t} = 37.5$$

$$o : T = \frac{t}{0.245 + 0.0225t} = 37.5$$

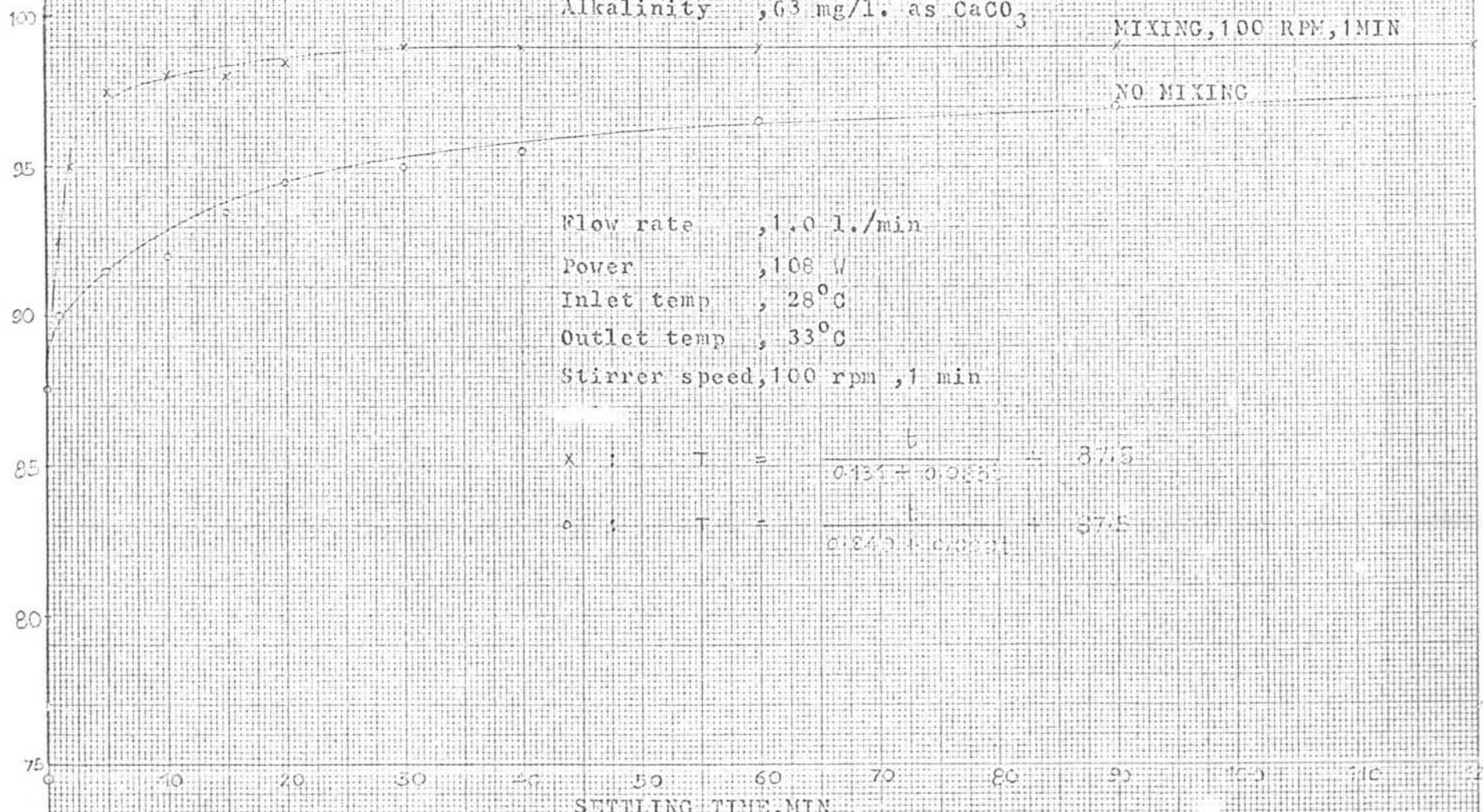
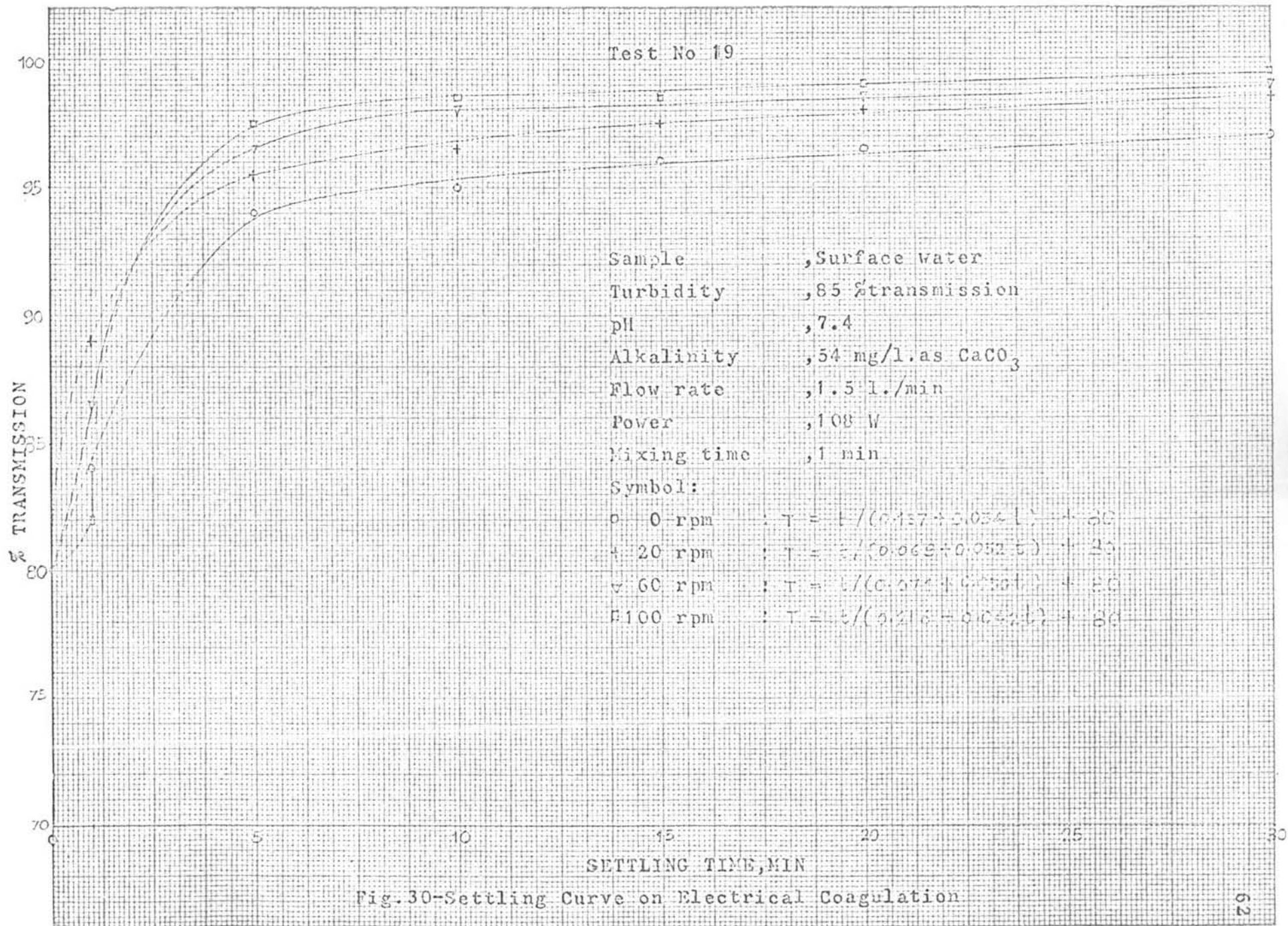


Fig. 29-Settling Curve on Electrical Coagulation



Sample , Surface water
 Turbidity , 85 % transmission
 pH , 7.4
 Alkalinity , 54 mg/l. as CaCO_3
 Flow rate , 1.5 l./min
 Power , 108 W

63

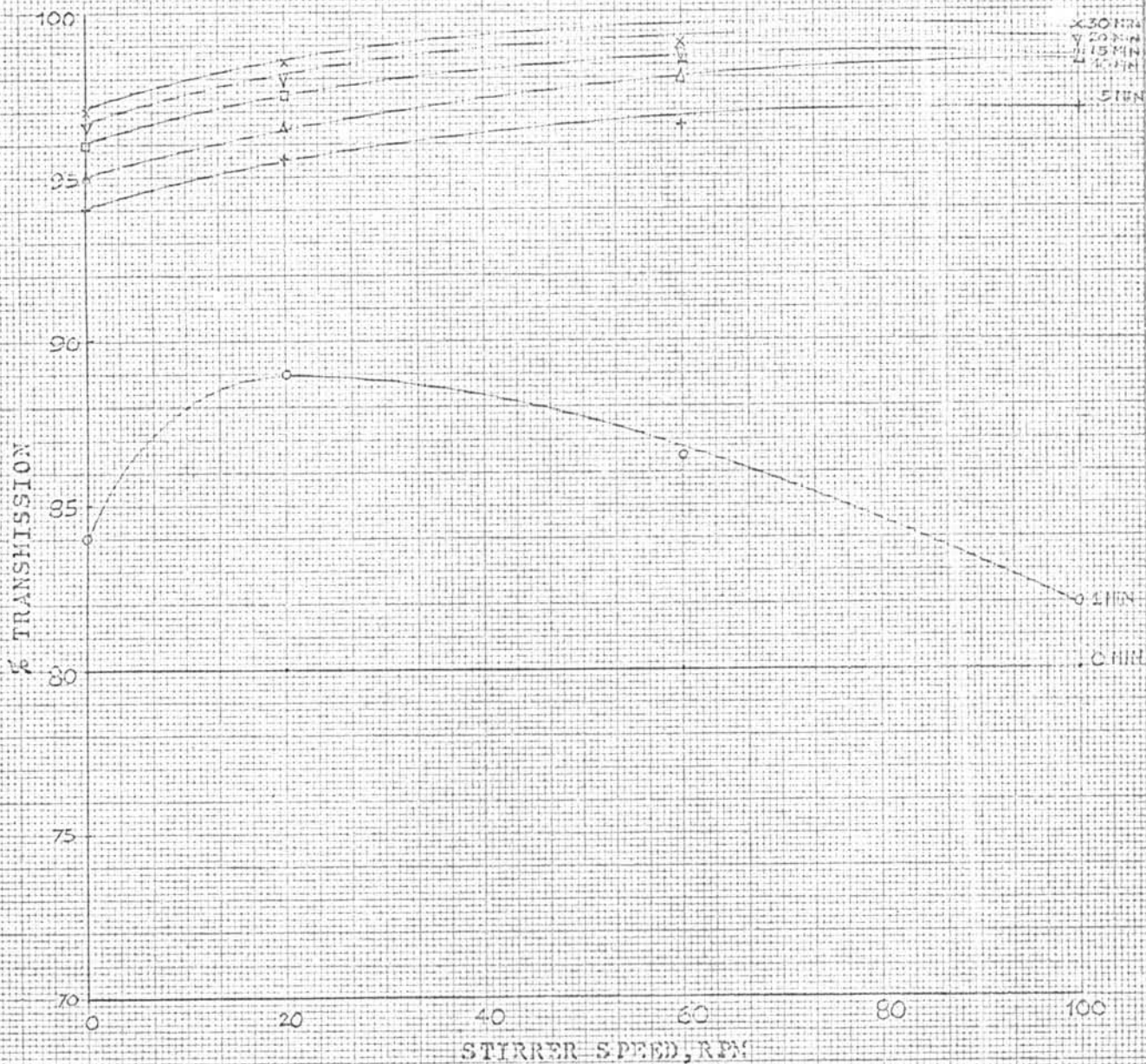


Fig. 31 - Curve of Stirrer Speed and Percent Transmission

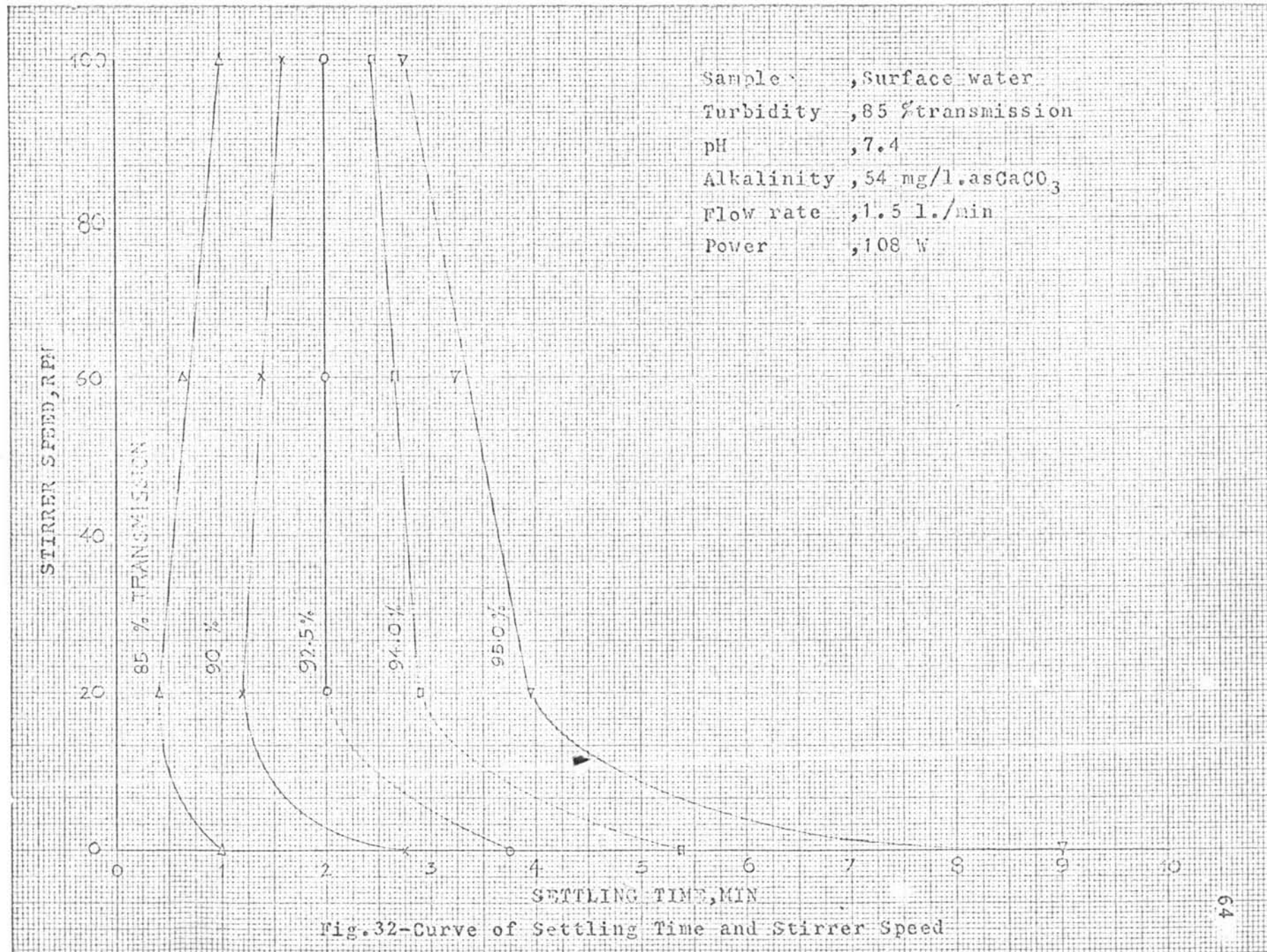




Fig.33-Settling Curve on Electrical Coagulation

Test No 22

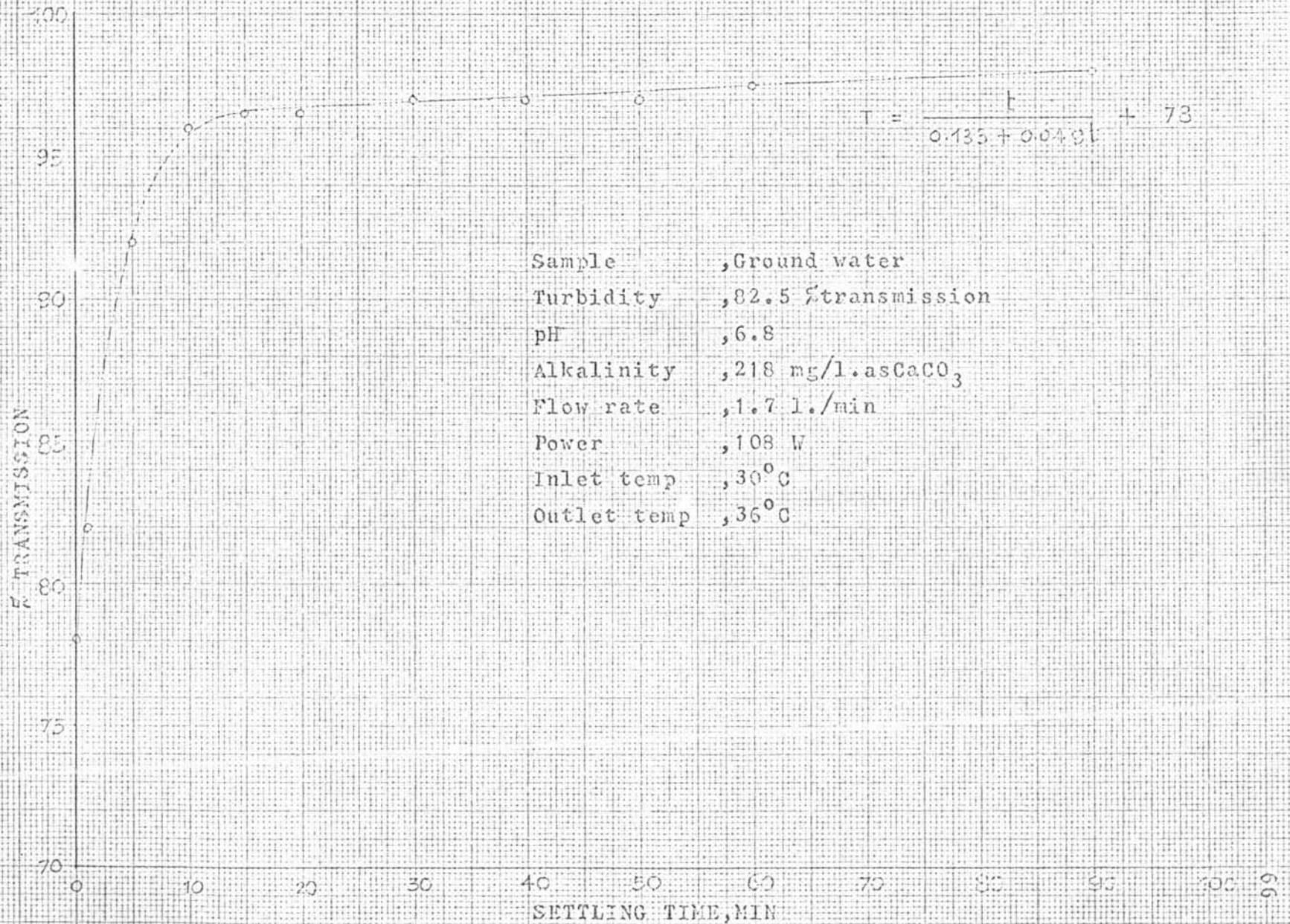


Fig.34-Settling Curve on Electrical Coagulation

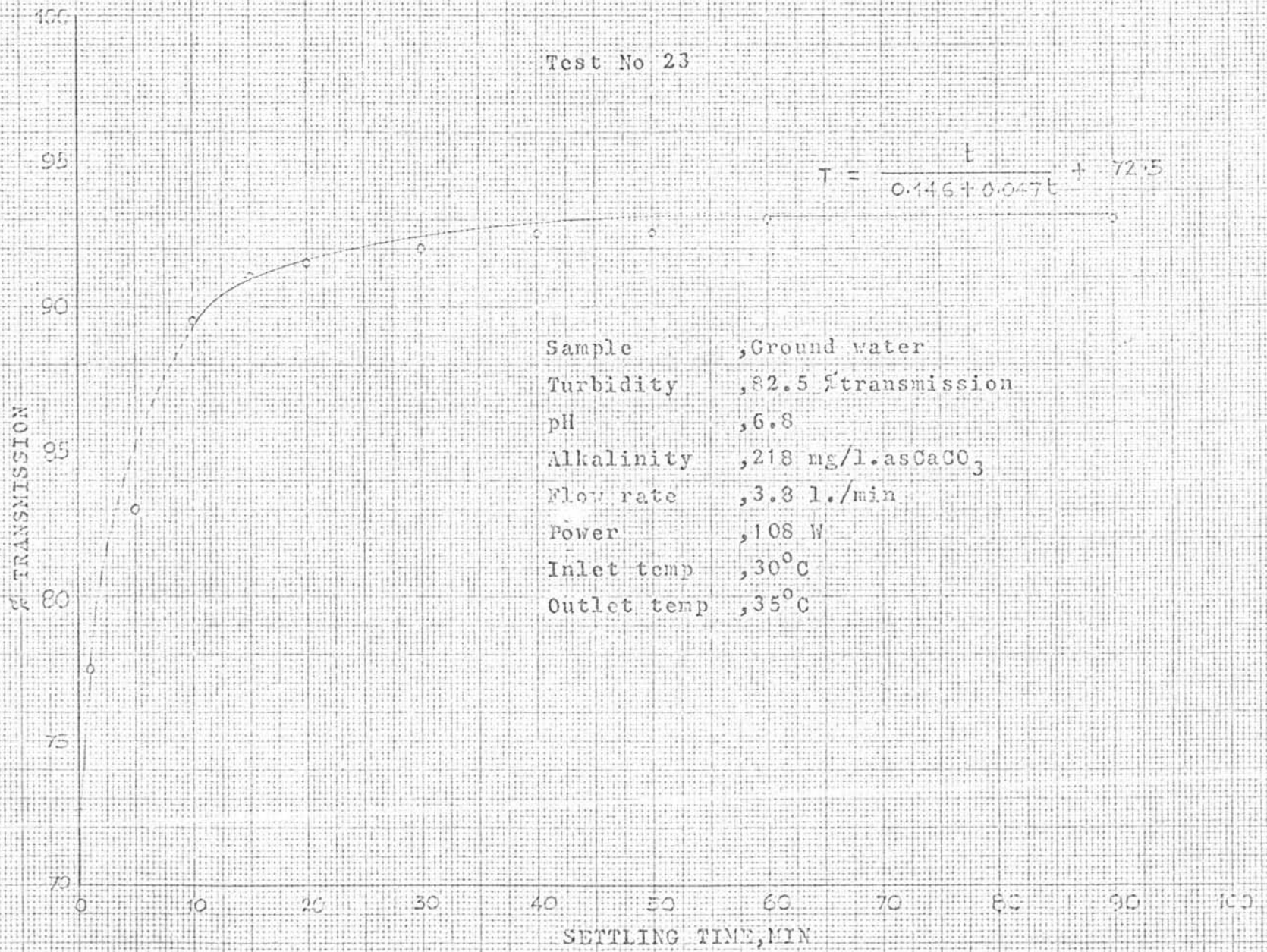


Fig.35-Settling Curve on Electrical Coagulation



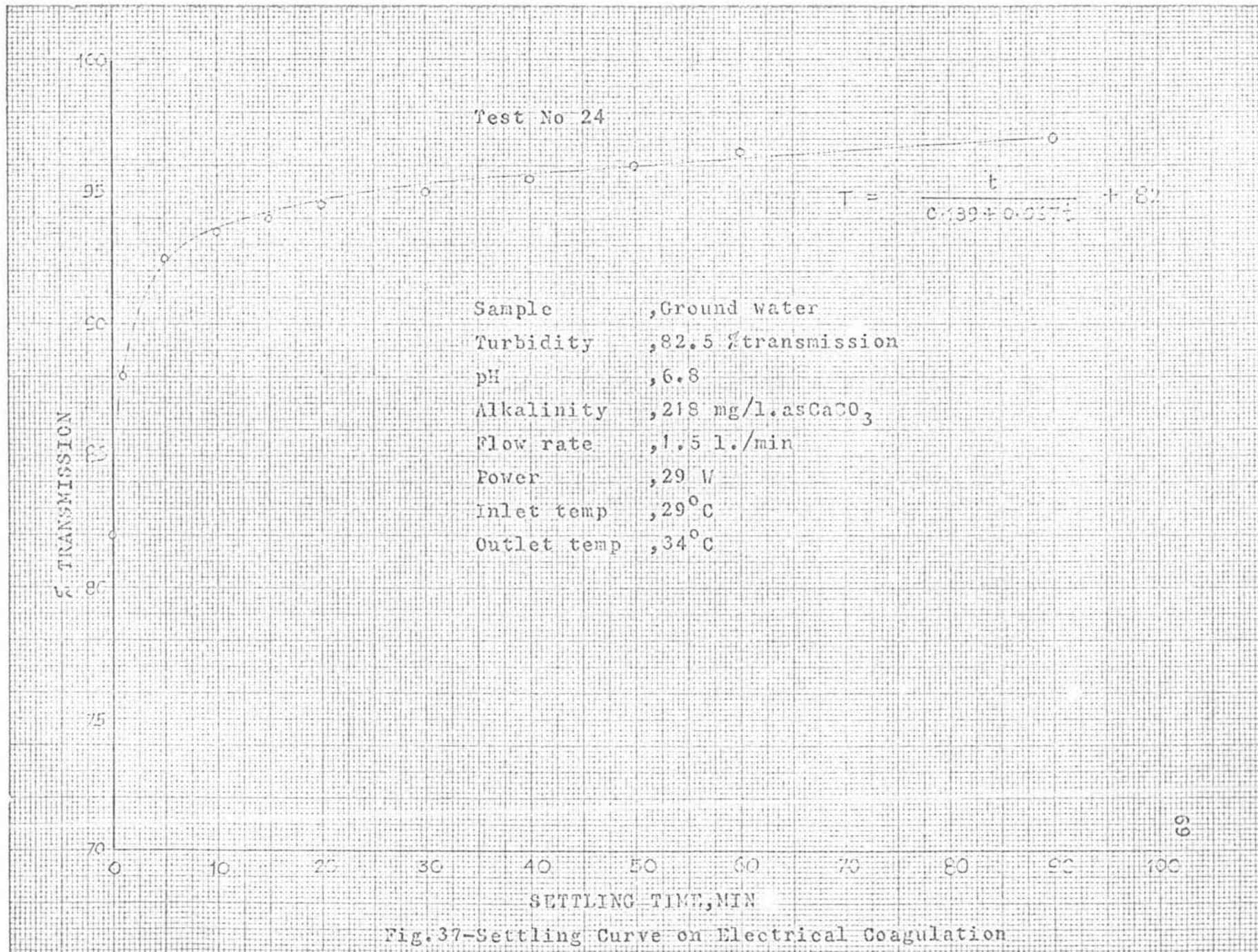


Fig.37-Settling Curve on Electrical Coagulation

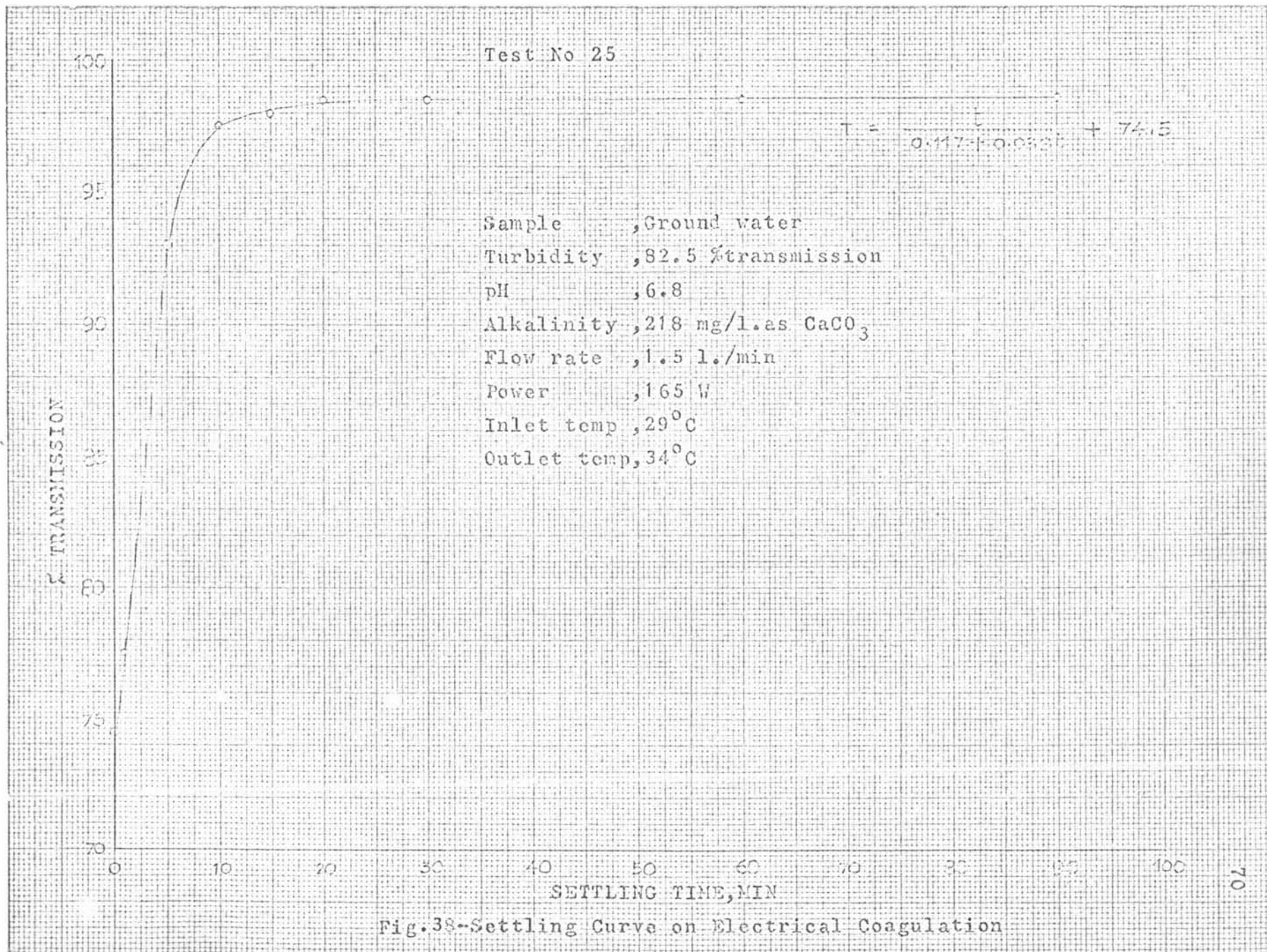


Fig.38-Settling Curve on Electrical Coagulation

Test No 26

$$T = \frac{t}{0.111 + 0.038t} + 74$$

% TRANSMISSION

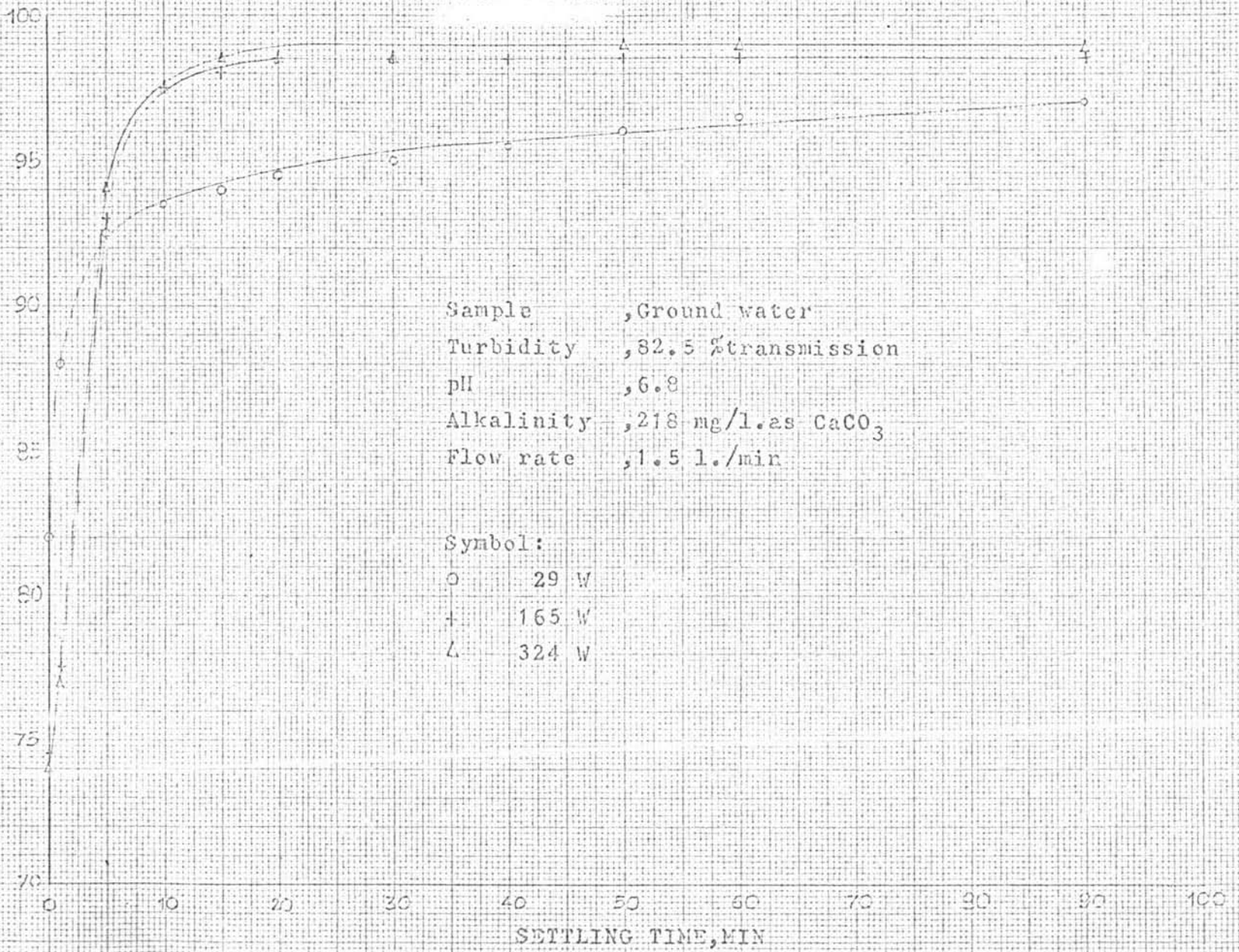
100
95
90
85
80
75
70

Sample , Ground water
Turbidity , 82.5 %transmission
pH , 6.8
Alkalinity , 218 mg/l. asCaCO₃
Flow rate , 1.5 l./min
Power , 324 W
Inlet temp , 29°C
Outlet temp , 35°C

0 10 20 30 40 50 60 70 80 90 100 110
SETTLING TIME, MIN

Fig.39-Settling Curve on Electrical Coagulation

% TRANSMISSION



Sample , Ground water
Turbidity , 82.5 %transmission
pH , 6.8
Alkalinity , 218 mg/l.as CaCO₃
Flow rate , 1.5 l./min

Symbol:
○ 29 W
+ 165 W
△ 324 W

Fig.40-Settling Curve on Electrical Coagulation

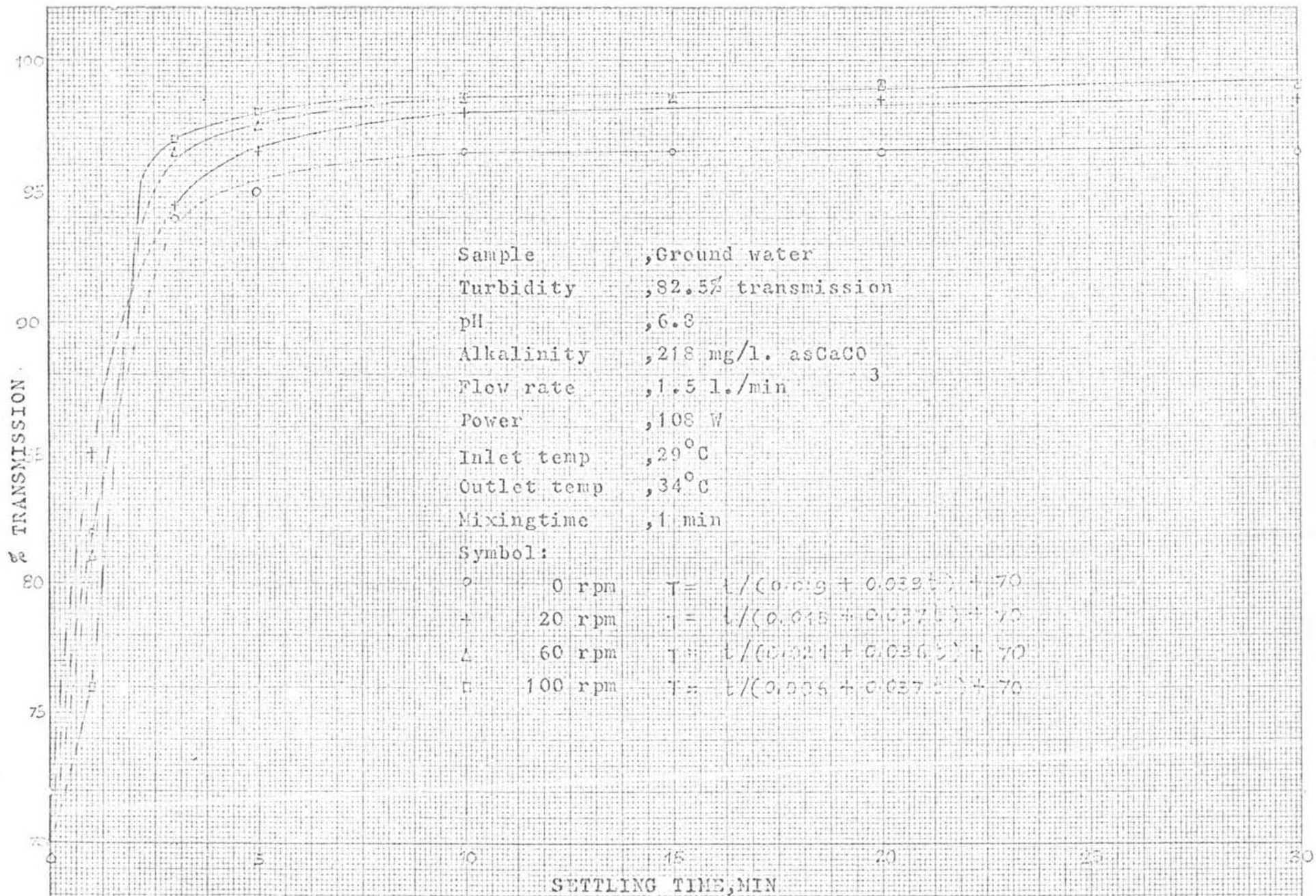


Fig.41-Settling Curve on Electrical Coagulation

Sample , Ground-water
 Turbidity , 82.5 % transmission
 pH , 6.8
 Alkalinity , 218 mg/l. as CaCO_3
 Flow rate , 1.5 l./min
 Power , 108 W
 Mixing , 1 min



Fig. 42-Curve of Stirrer Speed and Percent Transmission

Sample	, Ground water
Turbidity	, 82.5% transmission
pH	, 6.8
Alkalinity	, 218 mg/l. as CaCO ₃
Flow rate	, 1.5 l./min
Power	, 108 W
Mixing	, 1min

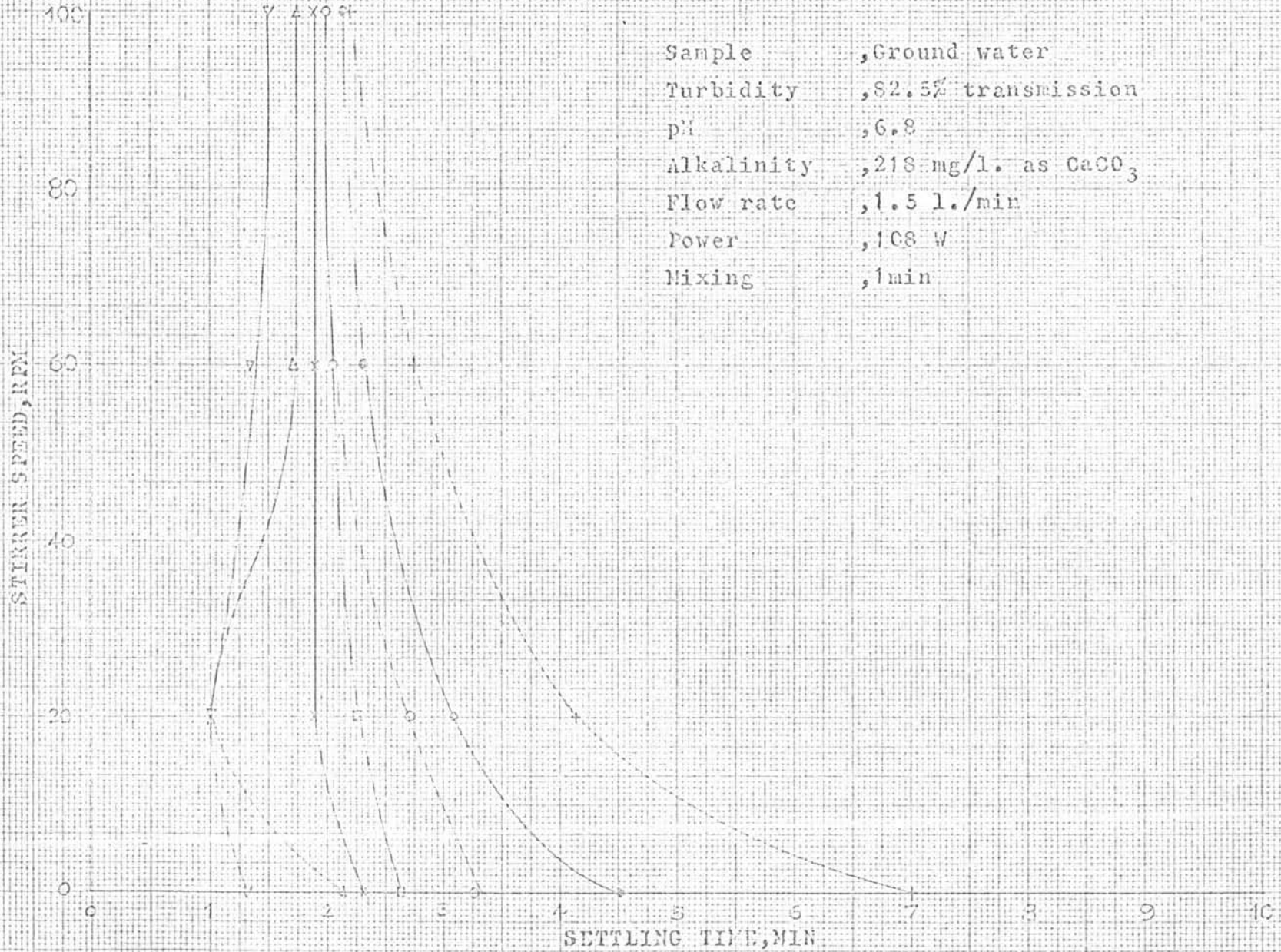


Fig.43-Curve of Settling Time and Stirrer Speed

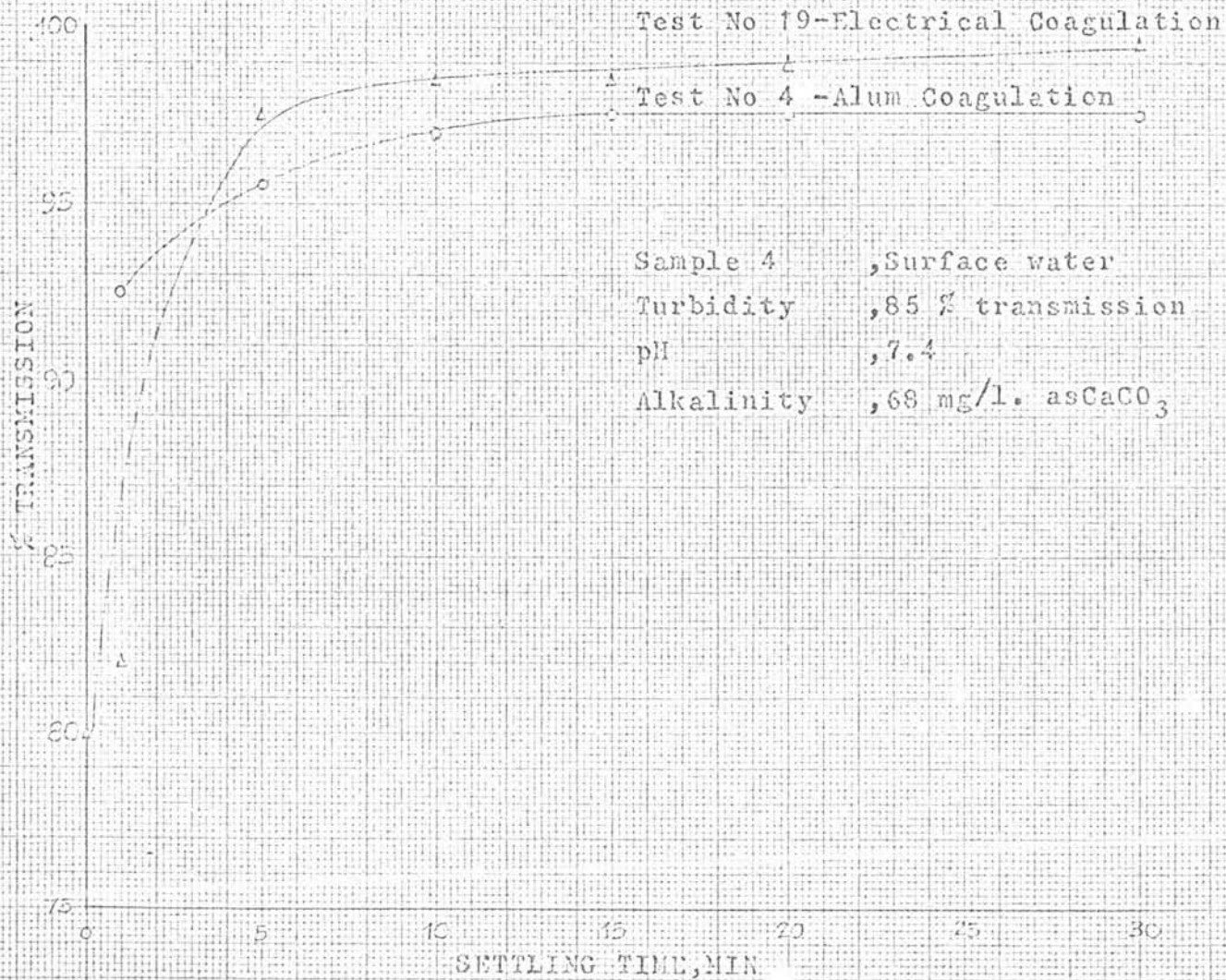


Fig.44-Comparison of Settling Curve on Electrical Coagulation and Alum Coagulation