GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION
SPONSORED PROJECT INITIATION

no action add out

Date: November 19, 1976

Project Title: Measurement of the Pressure-Viscosity Isotherm of Mineral Oils

Project No: E-25-667

Project Director: Dr. Ward O. Winer

Sponsor: Gulf Research and Development Company

Agreement Period: From 9/28/76 Until 12/31/76

Type Agreement: P.O. No. GRL-11535B-76

Amount: $3,000

Reports Required: Final Report

Sponsor Contact Person (s):

Technical Matters

Mr. R. R. Slater
Gulf Research & Development Company
P. O. Drawer 2038
Pittsburgh, PA 15230
(412) 362-1600

Contractual Matters
(thru OCA)

E. J. Abzanka, Buyer
Gulf Research & Dev. Company
P. O. Drawer 2038
Pittsburg, PA 15230
(412) 362-1600

Defense Priority Rating: None

Assigned to: Mechanical Engineering (School/Laboratory)

COPIES TO:

- Project Director
- Division Chief (EES)
- School/Laboratory Director
- Dean/Director—EES
- Accounting Office
- Procurement Office
- Security Coordinator (OCA)
- Reports Coordinator (OCA)
- Library, Technical Reports Section
- Office of Computing Services
- Director, Physical Plant
- EES Information Office
- Project File (OCA)
- Project Code (GTRI)
- Other

CA—3 (3/76)

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

SPONSORED PROJECT TERMINATION

No action
OCA

Date: March 3, 1977

Project Title: Measurement of the Pressure-Viscosity Isotherm of Mineral Oils

Project No: E-25-667

Project Director: Dr. W. O. Winer

Sponsor: Gulf Research & Development Co.

Effective Termination Date: 12/31/76

Clearance of Accounting Charges: 12/31/76

Grant/Contract Closeout Actions Remaining:

- X Final Invoice
- _ Final Fiscal Report
- _ Final Report of Inventions
- _ Govt. Property Inventory & Related Certificate
- _ Classified Material Certificate
- _ Other _____

Assigned to: Mechanical Engineering (School/Laboratory)

COPIES TO:

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- Project File (OCA)
- Project Code (GTRI)
- Other _____

CA-4 (3/76)

FR

GEORGIA INSTITUTE OF TECHNOLOGY
ATLANTA, GEORGIA 30332

SCHOOL OF
MECHANICAL ENGINEERING

E25-667

27 December 1976

Mr. R. R. Slater
Gulf Research and Development Company
P.O. Drawer 2038
Pittsburgh, PA 15230

Dear Mr. Slater:

Subject: Viscosity-Pressure Measurements
Your P.O. Number 11535B-76

Attached are the data obtained on the four fluids you sent under the subject purchase order. The upper limits of pressure were controlled by the high viscosity of the test fluid which was in the intensifier lines.

Each data point plotted and entered in the table is the average of at least two separate readings. The separate readings typically differed by no more than 2%.

I trust these data meet your needs. If there are any questions please let me know.

Sincerely,

Ward O. Winer
Professor

WOW:jv

bc: Ted: Please close out account and bill Gulf.

PRESSURE VISCOSITY MEASUREMENTS

for

Gulf Research and Development Company

by

S. Bair
W. O. Winer
Georgia Institute of Technology
Atlanta, Georgia

December 1976

These measurements were made on four fluids supplied and identified by Gulf Research and Development Company. The method used was the falling body method and represent low shear stress behavior.

FLUID: LIGHT NEUTRAL

Pressure KPSI	Temperature C	Viscosity cp
0	37.8	18.52
5	37.75	34.7
10	37.8	62.9
20	37.8	209.5
30	38.0	553
40	37.9	1,117
50	37.8	4,339
60.5	37.8	135,425
0	98.9	4.01
10	98.9	9.96
20	98.9	19.6
30	98.9	38.5
40	98.9	77.2
50	98.9	151.3
61.2	98.9	407.6

FLUID: 100 PARAFIN

0	37.8	17.87
5	37.8	35.64
10	37.8	70.25
20	37.7	279.3
30	37.7	963.6
40	37.7	3,059
50	37.7	9,419
60	38.8	45,370
0	98.9	3.80
10	98.7	9.69
20	98.7	19.8
30	98.7	46.7
40	99.0	97.2
50	99.1	194.0

FLUID: 100 TEXAS

Pressure KPSI	Temperature C	Viscosity cp
0	37.8	19.26
5	37.8	38.0
10	37.8	88.1
20	37.8	416.0
30	37.9	1,841
40	37.6	8,009
50	37.8	34,682
0	98.9	3.78
10	98.9	10.8
20	98.9	23.0
30	98.9	55.2
40	98.8	130.5

FLUID: 100 PARATEX

0	37.8	19.17
5	37.8	38.16
10	37.7	86.5
15	37.5	178.6
20	37.7	377
30	37.9	1,252
40	38.0	4,832
50	37.9	17,372
55.8	37.8	36,280
50	37.8	19,118
40	37.9	5,130
0	98.9	3.80
10	98.9	8.51
20	98.9	22.2
30	98.9	55.1
40	98.9	125.5
50	98.9	301.2

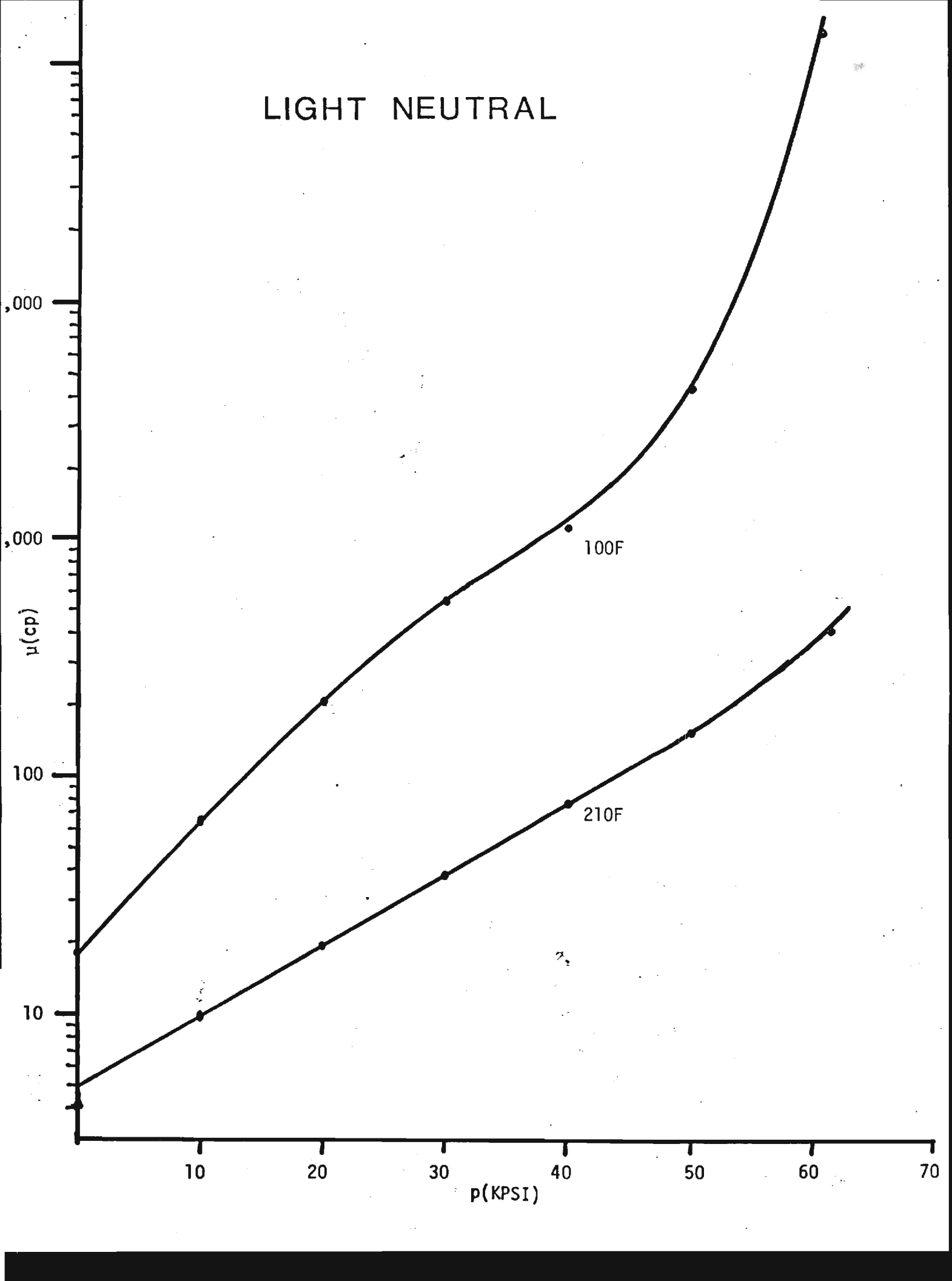
PRESSURE VISCOSITY COEFFICIENTS[1] [psi^{-1}]

	$\alpha_o \times 10^4$		$\alpha^* \times 10^4$	
Fluid	100F	210F	100F	210F
Gulf Light Neutral	1.29	.689	1.08	.806
Gulf 100 paraffin	1.42	.847	1.38	.867
Gulf 100 Texas	1.54	.869	1.48	.983
Gulf 100 Paratex	1.51	.879	1.58	.860

1) Definitions:

$$\alpha_o \equiv \left.\frac{d\ell n\mu}{dp}\right|_{T,p\,=\,0}$$

$$\alpha^* \equiv \left.\left\{\int_o^p \frac{\mu(0)}{\mu(p)}\,dp\right\}^{-1}\right|_{T,p\to\infty}$$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10
μ(cp)
100F
210F
10
20
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50
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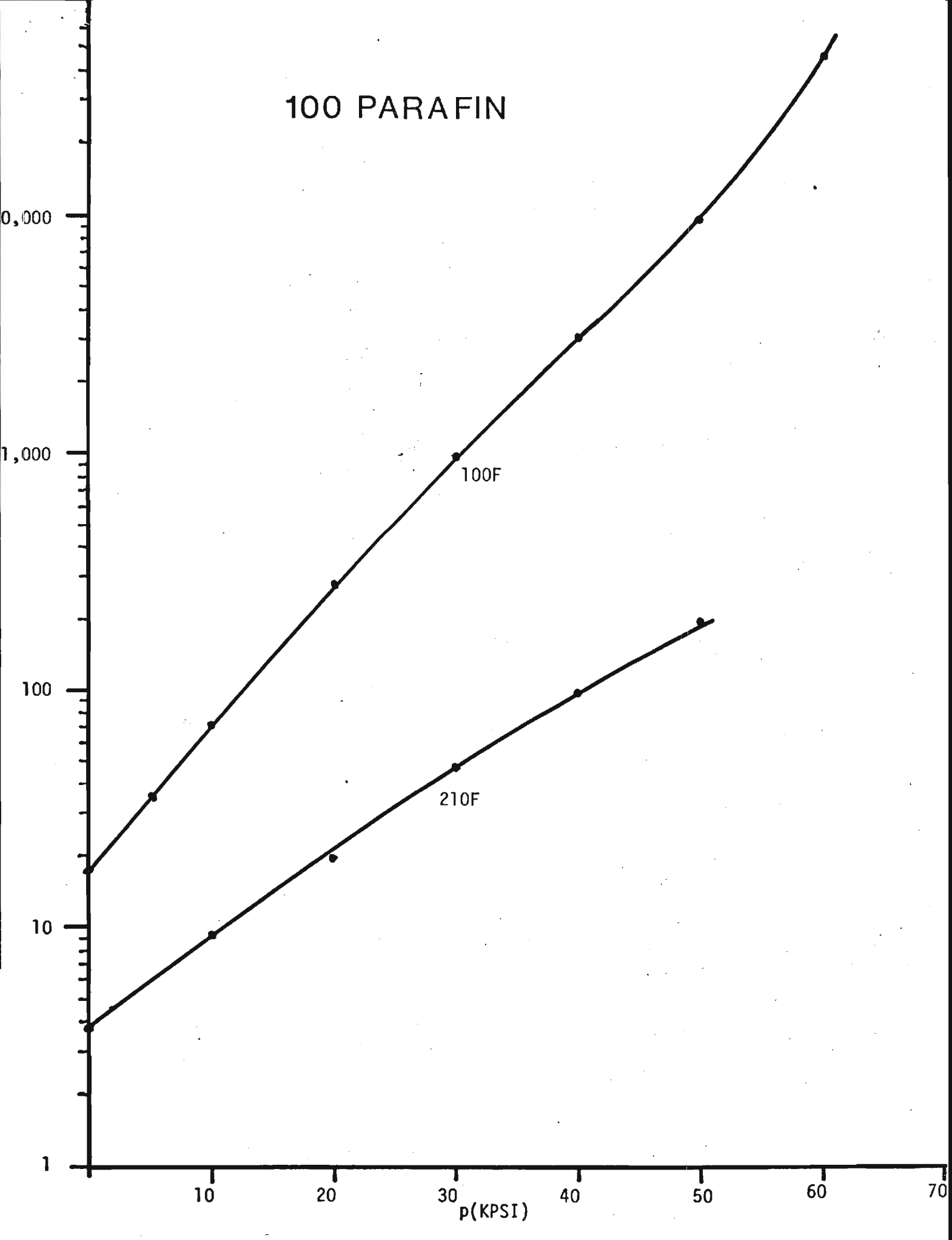
70
p(KPSI)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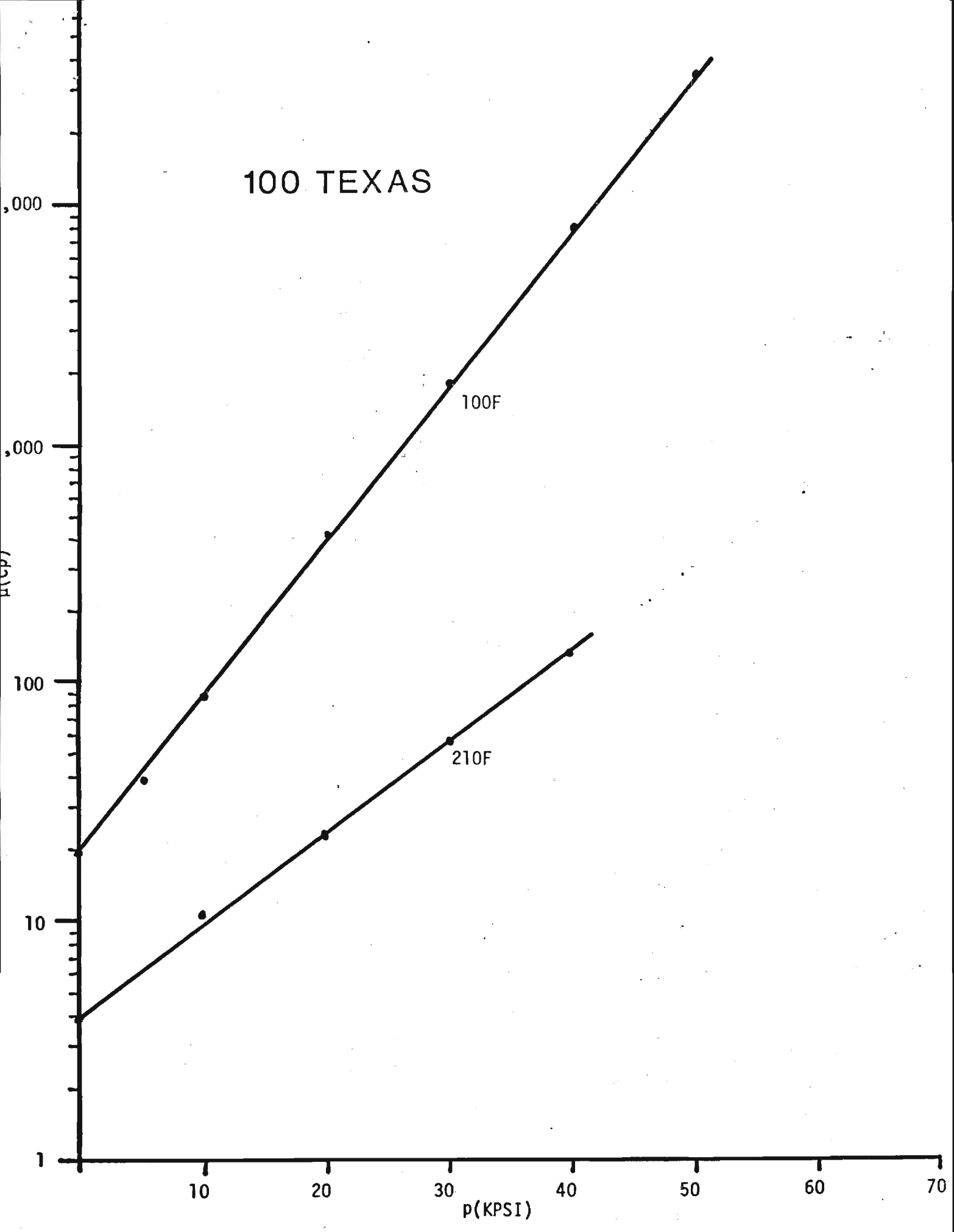
p(KPSI)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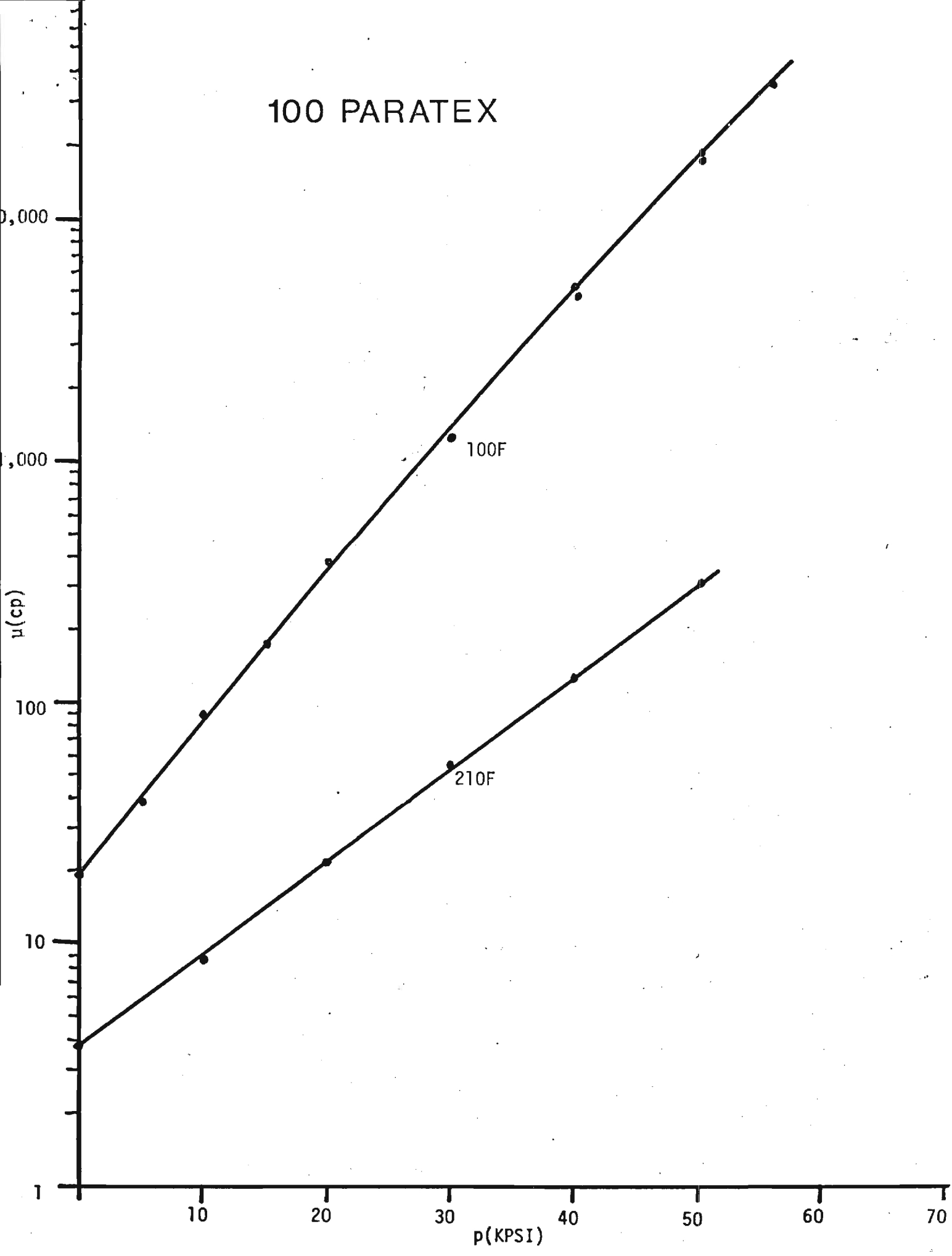
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