BOOK 4 OF 6

K-ELK RIVER 77 (4) B

CORE SAMPLES
ANALYSES.

D.H. 61 TO D.H. 82

276

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 61 - 1 Warnock Hersey Lab. No.: 76 - 11309

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.8	27.8	19.4	52.0	0.71	94.8	28.0	19.6	52.4	0.72

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	86.3	0.5	29.6	0.70	29.7	0.70
65 x 0	13.7	0.6	20.0	1.02	20.2	1.03
TOTAL	100.0	--	--	--	28.4	0.74

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	46.2	0.6	6.7	25.1	67.6	0.85	6.7	25.3	68.0	0.86
1.40	1.50	9.8	0.6	19.5	20.4	59.5	0.79	19.6	20.6	59.8	0.80
1.50	1.60	7.4	0.6	28.0	17.3	54.1	0.72	28.2	17.4	54.4	0.72
1.60		36.6	--	--	--	--	--	64.6	--	--	--
TOTAL		100.0	--	--	--	--	--	30.7	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.020						

Lab. No. 8098 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11309

Starting Temperature °C: 350

Softening Temperature °C: 372

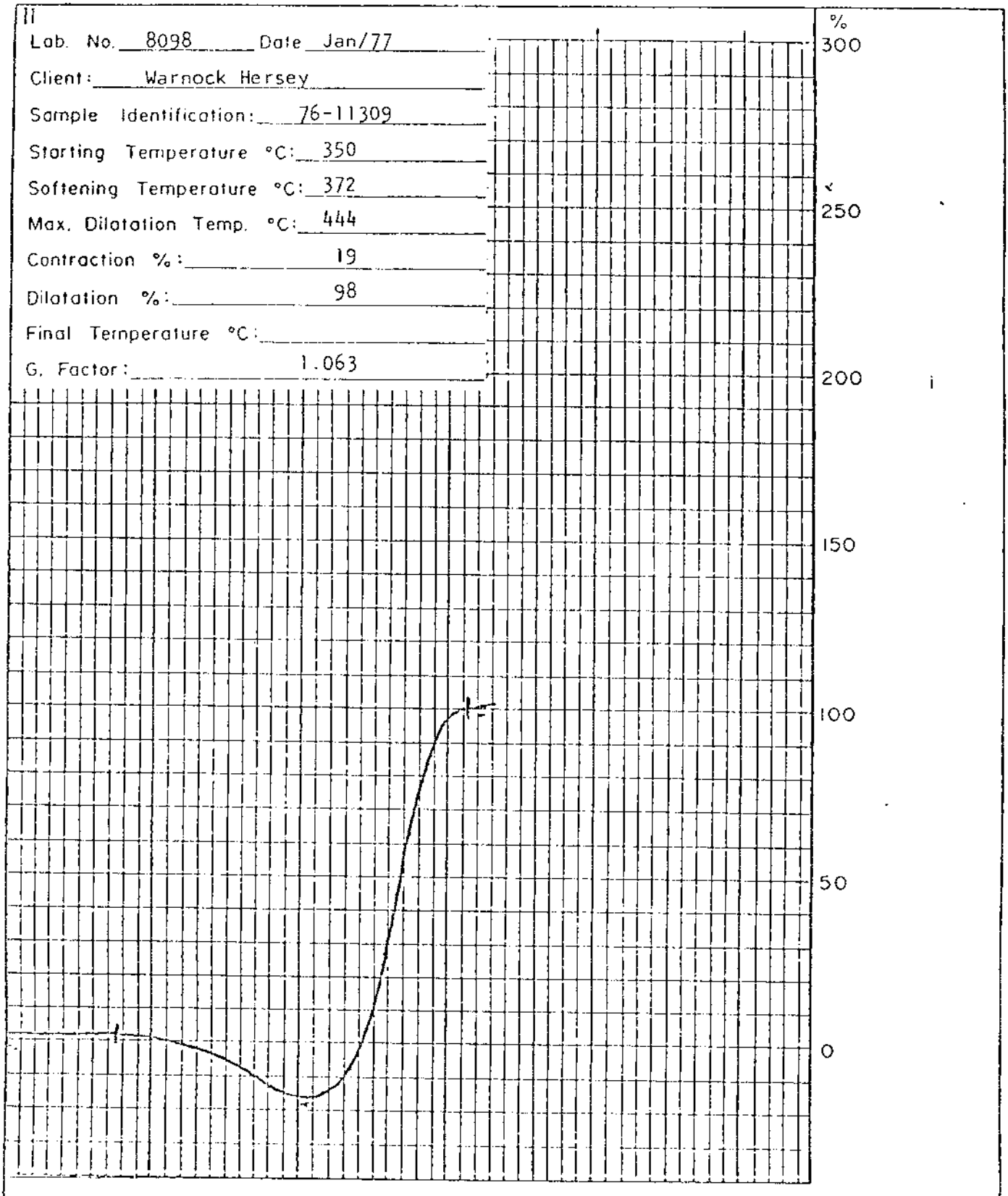
Max. Dilatation Temp. °C: 444

Contraction %: 19

Dilatation %: 98

Final Temperature °C:

G. Factor: 1.063



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 61 - 2 Warnock Hersey Lab. No.: 76 - 11310

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.5	25.2	20.7	53.6	0.72	105.9	25.3	20.8	53.9	0.72

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	82.8	0.5	26.9	0.72	27.1	0.72
65 x 0	17.2	0.6	18.0	0.72	18.1	0.72
TOTAL	100.0	--	--	--	25.5	0.72

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	61.5	0.7	4.6	24.3	70.4	0.81	4.7	24.5	70.8	0.82
1.40	1.50	5.5	0.6	17.7	20.4	61.3	0.84	17.8	20.5	61.7	0.84
1.50	1.60	3.0	0.5	25.6	18.1	55.8	0.78	25.7	18.2	56.1	0.78
1.60		30.0	--	--	--	--	--	74.8	--	--	--
TOTAL		100.0	--	--	--	--	--	27.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"C" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.022						

Lab. No. 8099 Date Jan. 22/77

Client: Warnock Hersey

Sample Identification: 76-11310

Starting Temperature °C: 350

Softening Temperature °C: 383

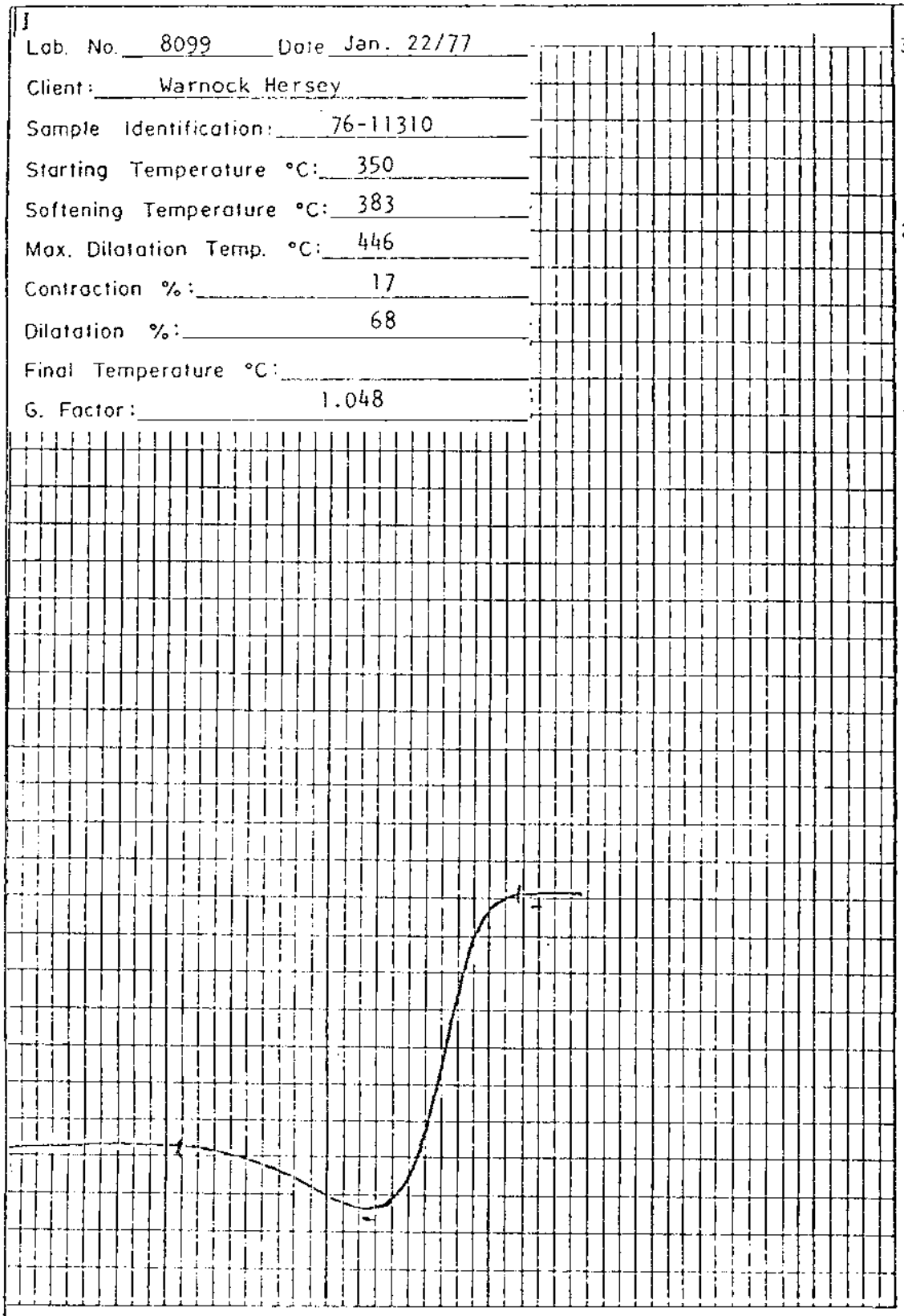
Max. Dilatation Temp. °C: 446

Contraction %: 17

Dilatation %: 68

Final Temperature °C:

G. Factor: 1.048



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 61 - 3 Warnock Hersey Lab. No.: 76 - 11311

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.6	12.6	19.6	67.2	0.40	111.7	12.7	19.7	67.6	0.40

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	79.1	0.6	13.5	0.43	13.6	0.43
65 x 0	20.9	0.7	9.3	0.42	9.4	0.42
TOTAL	100.0	--	--	--	12.7	0.43

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	78.6	0.8	5.2	21.7	72.3	0.59	5.3	21.9	72.8	0.60
1.40	1.50	7.5	0.7	17.4	18.7	63.2	0.58	17.5	18.8	63.7	0.58
1.50	1.60	3.5	0.7	25.1	16.6	57.6	0.53	25.3	16.7	58.0	0.53
1.60		10.4	--	--	--	--	--	64.5	--	--	--
TOTAL		100.0	--	--	--	--	--	13.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
3	0.020						

Lab. No. 8100 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11311

Starting Temperature °C: 350

Softening Temperature °C: 398

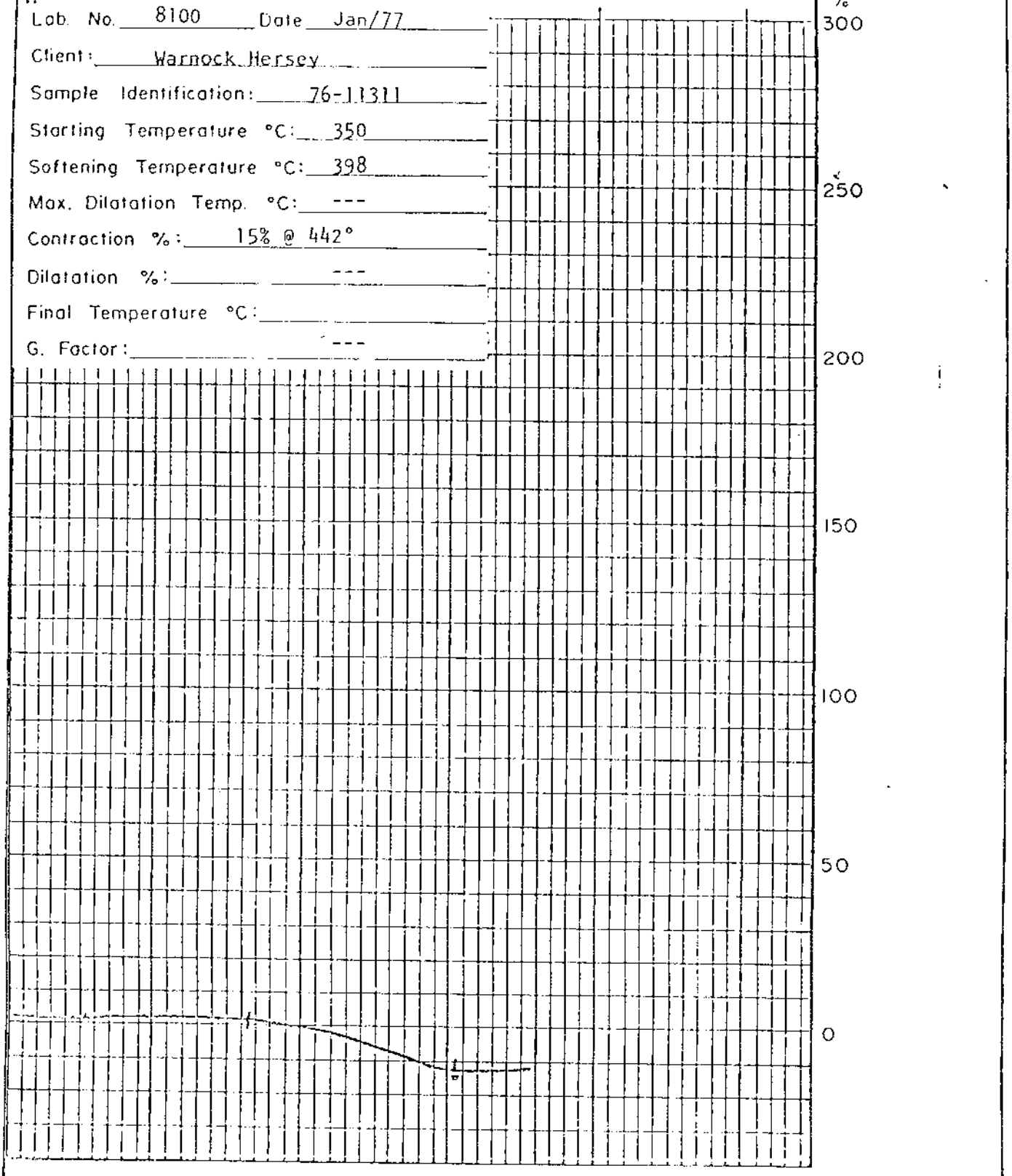
Max. Dilatation Temp. °C: ---

Contraction %: 15% @ 442°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCC MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 61 - 4 Warnock Hersey Lab. No.: 76 - 11312

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.5	19.9	19.6	60.0	0.49	93.4	20.0	19.7	60.3	0.49

TABLE II Screen Analysis

Size	AIR DRIED BASIS				DRY BASIS	
	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.7	0.5	20.8	0.51	20.9	0.51
65 x 0	19.3	0.6	13.6	0.49	13.6	0.49
TOTAL	100.0	--	--	--	19.5	0.51

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	58.1	0.5	5.8	20.3	73.4	0.58	5.9	20.4	73.7	0.68
1.40	1.50	9.8	0.6	17.7	16.8	64.9	0.50	17.8	16.9	65.3	0.50
1.50	1.60	6.5	0.5	24.1	15.0	60.4	0.48	24.2	15.1	60.7	0.48
1.60		25.6	--	--	--	--	--	57.8	--	--	--
TOTAL		100.0	--	--	--	--	--	21.5	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
2	0.052						

Lab. No. 8101 Date Jan. 22/77

Client: Warnock Hersey

Sample Identification: 76-11312

Starting Temperature °C: 350

Softening Temperature °C: 404

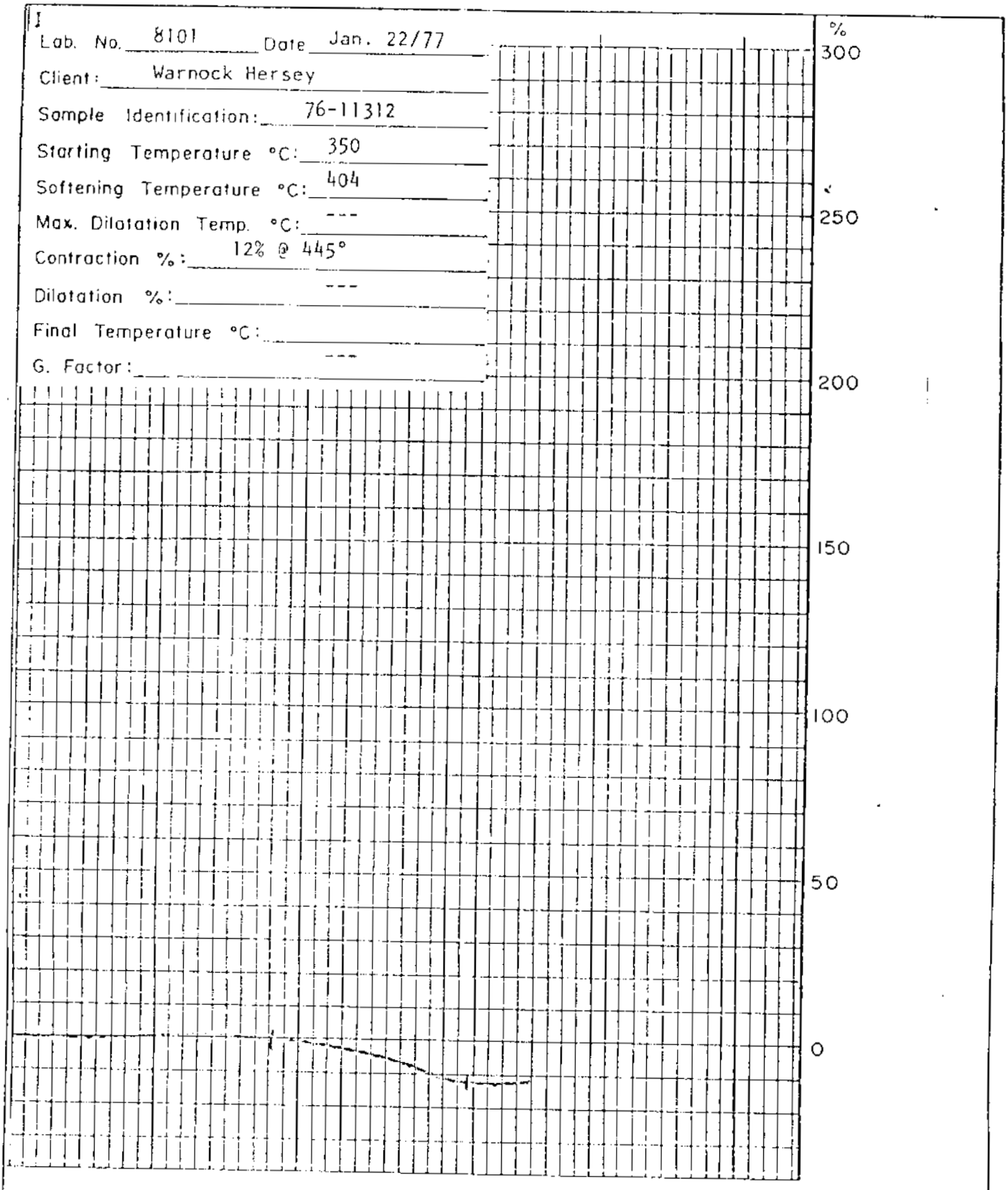
Max. Dilatation Temp. °C: ---

Contraction %: 12% @ 445°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING, LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 1 — Warnock Hersey Lab. No.: 76 - 11280

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.7	30.1	23.7	45.5	0.53	104.1	27.2	30.3	42.5	0.53

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.4	0.7	36.8	0.45	37.1	0.45
65 x 0	19.6	0.8	18.7	0.58	18.9	0.58
TOTAL	100.0	--	--	--	33.5	0.52

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	50.1	1.2	4.3	29.5	65.0	0.92	4.4	29.9	65.7	0.93
1.40	1.50	5.6	0.8	14.0	28.1	57.1	0.70	14.2	28.3	57.5	0.71
1.50	1.60	4.1	0.8	24.6	23.1	51.5	0.45	24.8	23.3	51.9	0.46
1.60		40.2	--	--	--	--	--	78.8	--	--	--
TOTAL		100.0	--	--	--	--	--	35.7	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorous (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"C" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.018						

Lab. No 8068 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11280 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 362

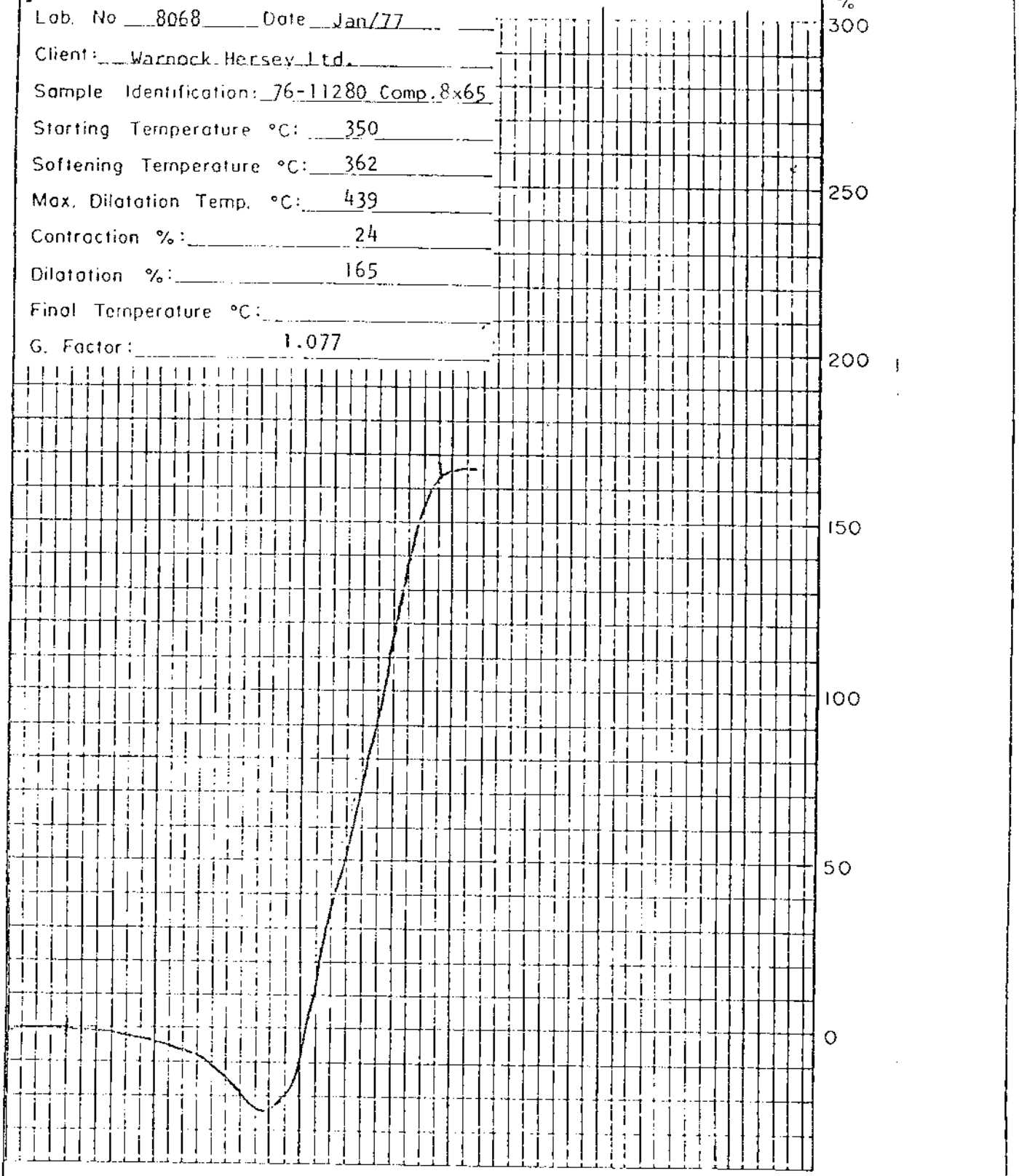
Max. Dilatation Temp. °C: 439

Contraction %: 24

Dilatation %: 165

Final Temperature °C:

G. Factor: 1.077



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 2

Warnock Hersey Lab. No.: 76 - 11281

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.6	21.4	24.5	53.5	0.64	87.8	21.6	24.6	53.8	0.64

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	82.6	0.5	22.0	0.60	22.1	0.60
65 x 0	17.4	0.7	17.5	0.61	17.6	0.61
TOTAL	100.0	--	--	--	21.3	0.60

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	59.1	0.7	4.3	29.1	65.9	0.70	4.3	29.3	66.4	0.70
1.40	1.50	6.6	0.7	15.7	26.9	56.7	0.67	15.8	27.0	57.2	0.68
1.50	1.60	5.8	0.7	28.0	22.6	48.7	0.63	28.1	22.8	49.1	0.63
1.60		28.5	--	--	--	--	--	61.3	--	--	--
TOTAL		100.0	--	--	--	--	--	22.7	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.015						

Lab. No. 8069 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76 - 11281 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 367

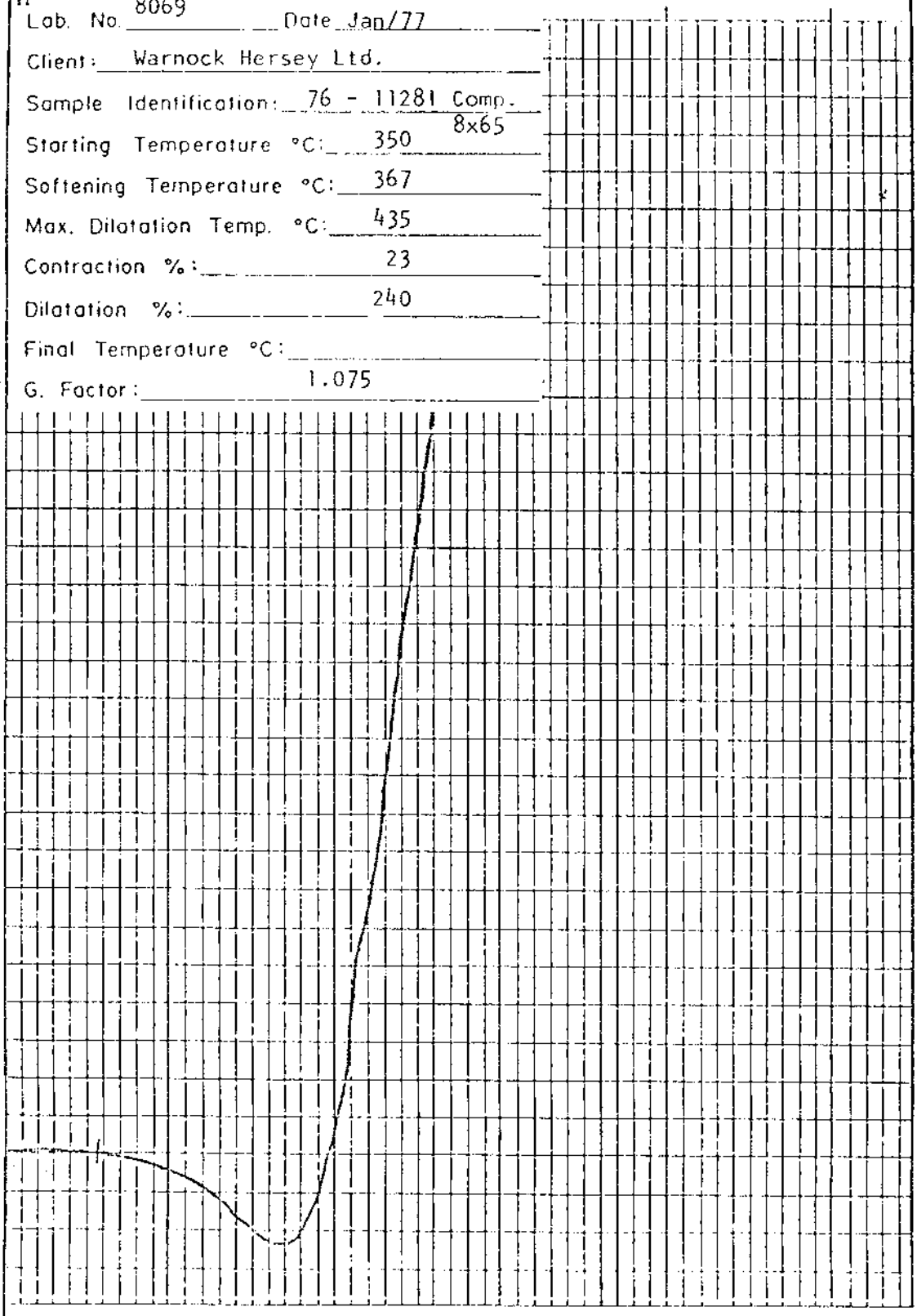
Max. Dilatation Temp. °C: 435

Contraction %: 23

Dilatation %: 240

Final Temperature °C:

G. Factor: 1.075



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 3 Warnock Hersey Lab. No.: 76 - 11282

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.5	11.7	26.1	61.7	0.88	90.6	11.8	26.2	62.0	0.88

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	83.2	0.5	11.1	0.90	11.2	.90
65 x 0	16.8	0.7	8.5	0.83	8.6	0.84
TOTAL	100.0	--	--	--	10.8	0.89

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	83.8	0.5	4.2	28.6	66.7	0.82	4.2	28.8	67.0	0.82
1.40	1.50	7.1	0.6	18.3	25.6	55.5	0.80	18.4	25.8	55.8	0.80
1.50	1.60	2.2	0.6	28.9	22.7	47.8	0.77	29.1	22.8	48.1	0.78
1.60		6.9	--	--	--	--	--	63.1	--	--	--
TOTAL		100.0	--	--	--	--	--	9.8	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.028						

I

Lab. No. 8070 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76 - 11282 Comp.

Starting Temperature °C: 350

Softening Temperature °C: 355

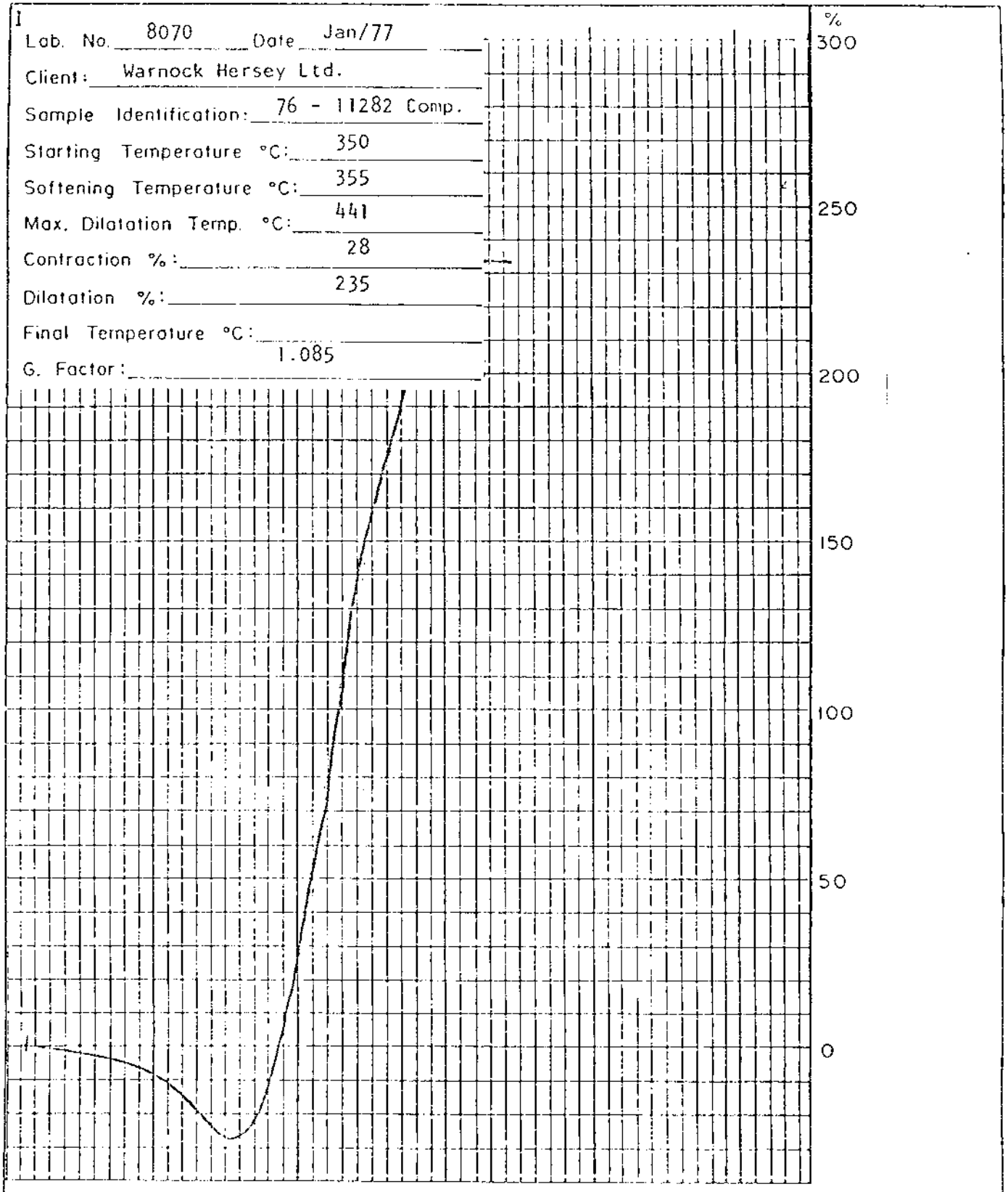
Max. Dilatation Temp. °C: 441

Contraction %: 28

Dilatation %: 235

Final Temperature °C:

G. Factor: 1.085



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.: Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 4 Warnock Hersey Lab. No.: 76 - 11283

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.5	36.4	21.3	41.8	3.92	68.4	36.5	21.4	42.1	3.94

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	79.8	0.5	36.4	3.44	36.6	3.46
65 x 0	20.2	0.7	36.2	8.10	36.4	8.16
TOTAL	100.0	--	--	--	36.6	4.41

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	30.3	0.6	5.6	27.4	66.4	0.88	5.7	27.5	66.8	0.88
1.40	1.50	6.8	0.8	15.0	26.6	57.6	0.78	15.1	26,8	58.1	0.79
1.50	1.60	5.3	0.7	25.8	23.5	50.0	0.67	26.0	23.7	50.3	0.67
1.60		57.6	--	--	--	--	--	58.4	--	--	--
TOTAL		100.0	--	--	--	--	--	37.8	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.063						

Lab. No. 8071 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76 - 11283 Comp.

Starting Temperature °C: 350

Softening Temperature °C: 364

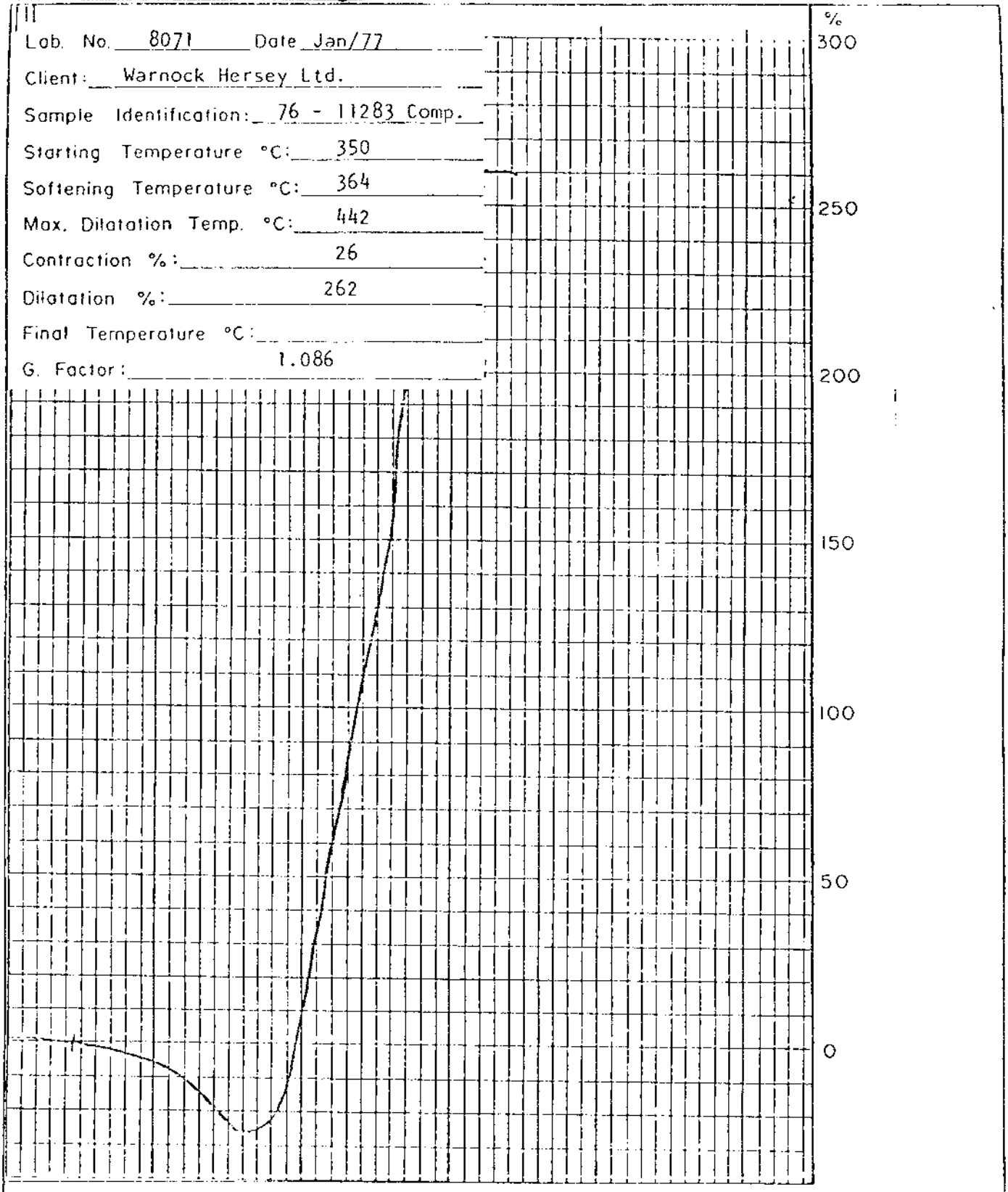
Max. Dilatation Temp. °C: 442

Contraction %: 26

Dilatation %: 262

Final Temperature °C:

G. Factor: 1.086



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 62 – 5 Lab. No.: 76-11283B Date: March 14, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C %	S.%	H.G.I.	REMARKS
0.9	22.6	23.1	53.4	0.58	113.5	Air Dried Basis
--	22.8	23.3	53.9	0.58	---	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼ x 65	90.4	0.9	22.3	0.57	90.4	22.3	0.57	A.D.B.
	90.4	--	22.5	0.58	90.4	22.5	0.58	D.B.
65 x 0	9.6	0.8	16.5	0.65	100.0	21.7	0.58	A.D.B.
	9.6	--	16.7	0.66	100.0	21.9	0.59	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	63.5	1.2	3.8	26.5	68.5	0.72	63.5	3.8	A.D.B.
	63.4	--	3.9	26.8	69.3	0.73	63.4	3.9	D.B.
1.40-1.50	7.1	0.6	15.4	22.2	61.8	0.50	70.6	5.0	A.D.B.
	7.1	--	15.5	22.3	62.2	0.50	70.5	5.1	D.B.
1.50-1.60	3.1	0.9	24.7	--	--	--	73.7	5.8	A.D.B.
	3.1	--	25.0	--	--	--	73.6	5.9	D.B.
+1.60	26.3	1.0	69.0	--	--	--	100.0	22.4	A.D.B.
	26.4	--	69.7	--	--	--	100.0	22.7	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
7	0.024	374	443	23	16	0.985

Lab. No. 8616 Date March/77

Client: Warnock Hersey

Sample Identification: 76-11283B DH-62-5

Starting Temperature °C: 350

Softening Temperature °C: 374

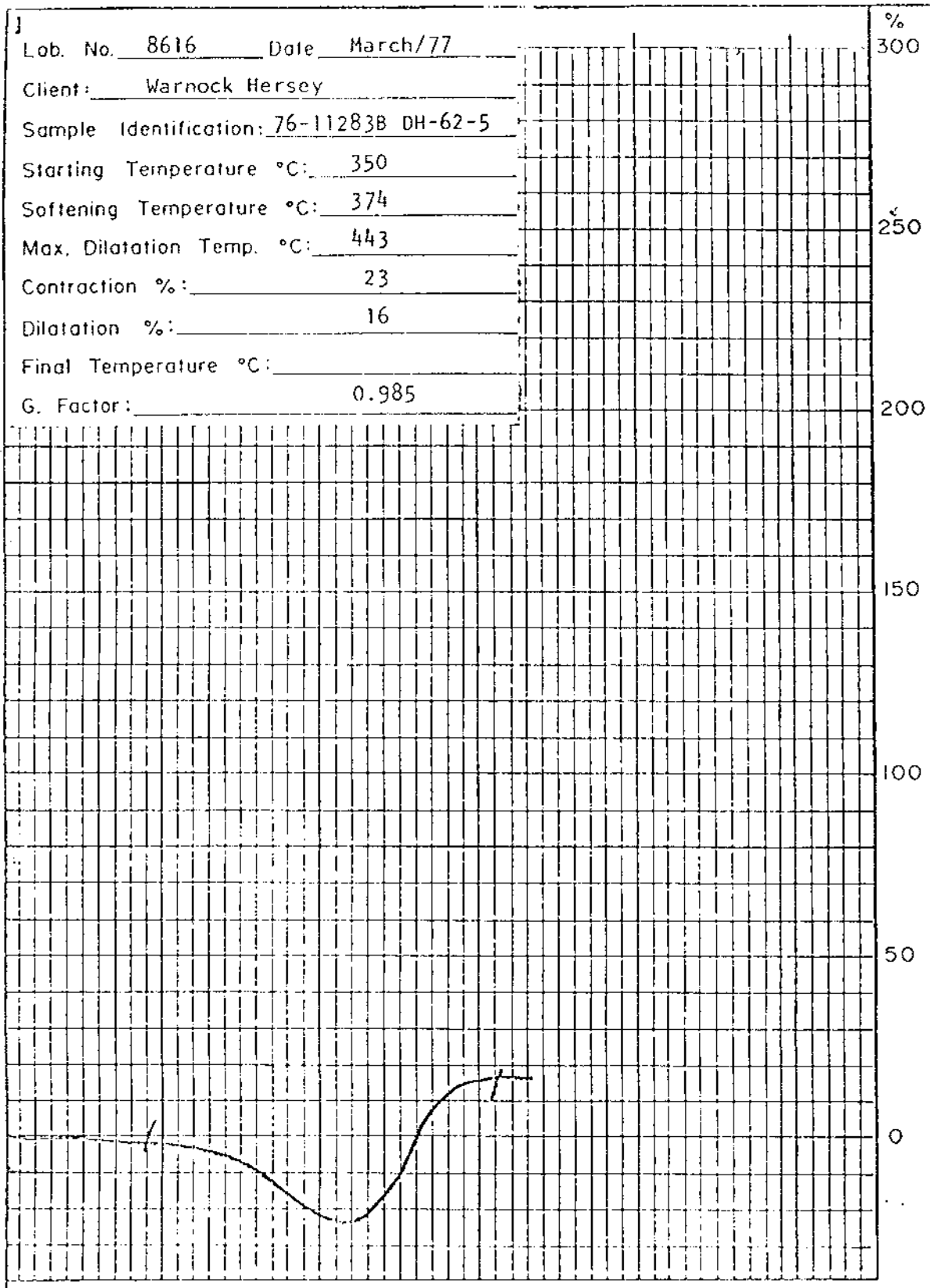
Max. Dilatation Temp. °C: 443

Contraction %: 23

Dilatation %: 16

Final Temperature °C:

G. Factor: 0.985



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 6 Warnock Hersey Lab. No.: 76 - 11284

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.5	39.4	20.4	39.7	0.56	103.1	39.6	20.5	39.9	0.56

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.3	0.5	43.2	0.48	43.4	0.56
65 x 0	19.7	0.8	27.9	0.76	28.1	0.77
TOTAL	100.0	--	--	--	40.4	0.54

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	34.6	0.7	6.0	25.9	67.4	0.79	6.0	26.1	67.9	0.80
1.40	1.50	4.4	0.7	11.2	25.3	62.8	0.83	11.3	25.5	63.2	0.84
1.50	1.60	2.3	0.8	18.3	23.6	57.3	0.71	18.4	23.8	57.8	0.72
1.60		58.7	--	--	--	--	--	70.2	--	--	--
TOTAL		100.0	--	--	--	--	--	44.2	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.044						

Lab. No. 8072 Date Jan. 21/77

Client: Warnock Hersey

Sample Identification: 76-11284

Starting Temperature °C: 350

Softening Temperature °C: 366

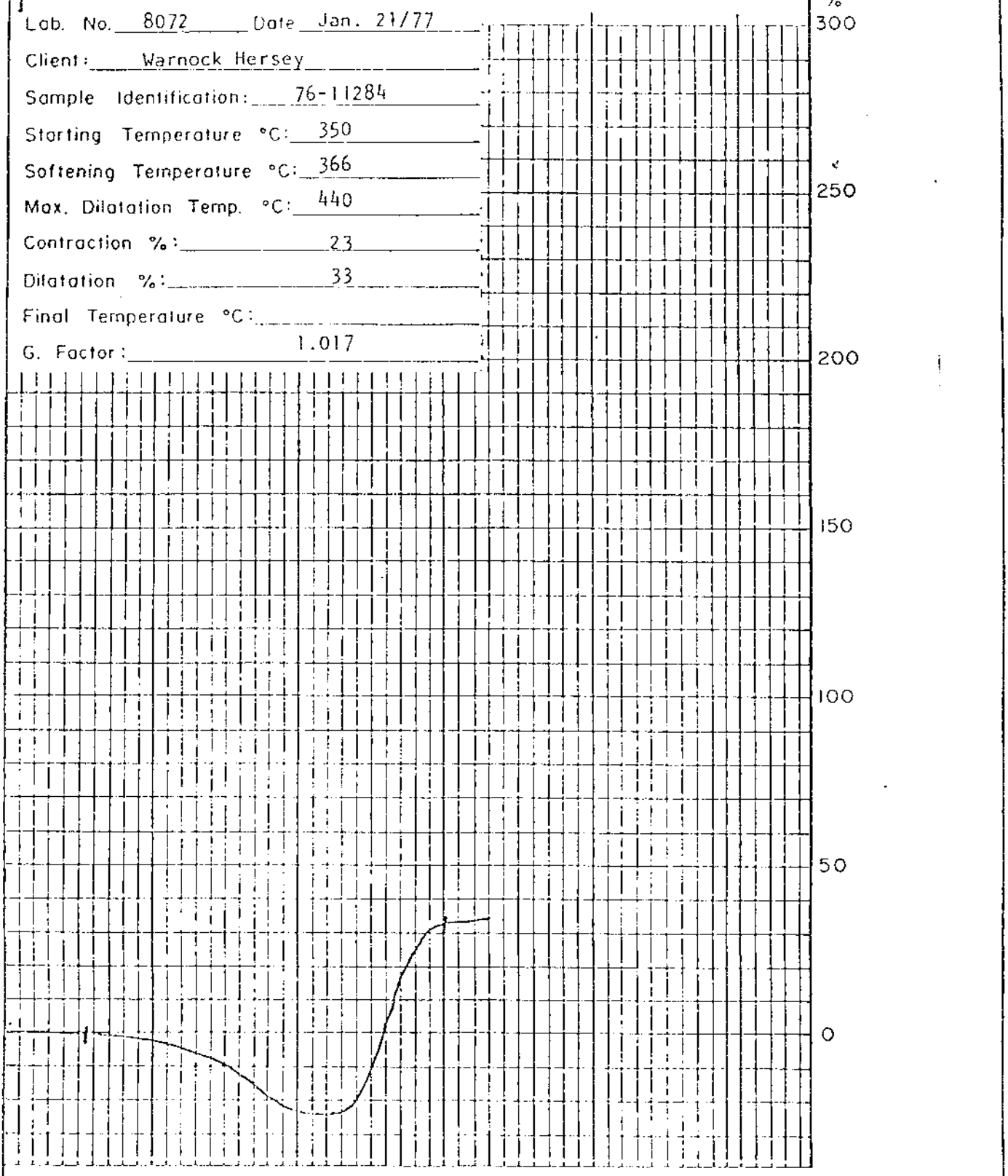
Max. Dilatation Temp. °C: 440

Contraction %: 23

Dilatation %: 33

Final Temperature °C:

G. Factor: 1.017



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification DH 62 - 7 Warnock Hersey Lab. No.: 76 - 11285

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.6	16.0	27.2	56.2	0.90	113.5	16.1	27.4	56.5	0.90

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.3	0.5	16.2	0.89	16.2	0.89
65 x 0	19.7	0.7	13.0	0.90	13.1	0.91
TOTAL	100.0	--	--	--	15.6	0.89

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	74.8	1.1	3.0	28.0	67.9	1.31	3.0	28.3	68.7	1.32
1.40	1.50	4.0	0.7	7.1	29.1	63.1	0.77	7.1	29.3	63.6	0.78
1.50	1.60	1.4	0.9	23.3	24.3	51.5	0.73	23.5	24.5	52.0	0.74
1.60		19.8	--	--	--	--	--	63.8	--	--	--
TOTAL		100.0	--	--	--	--	--	15.5	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.009						

II

Lab. No. 8073 Date Jan. 21/77

Client: Warnock Hersey

Sample Identification: 76-11285

Starting Temperature °C: 350

Softening Temperature °C: 372

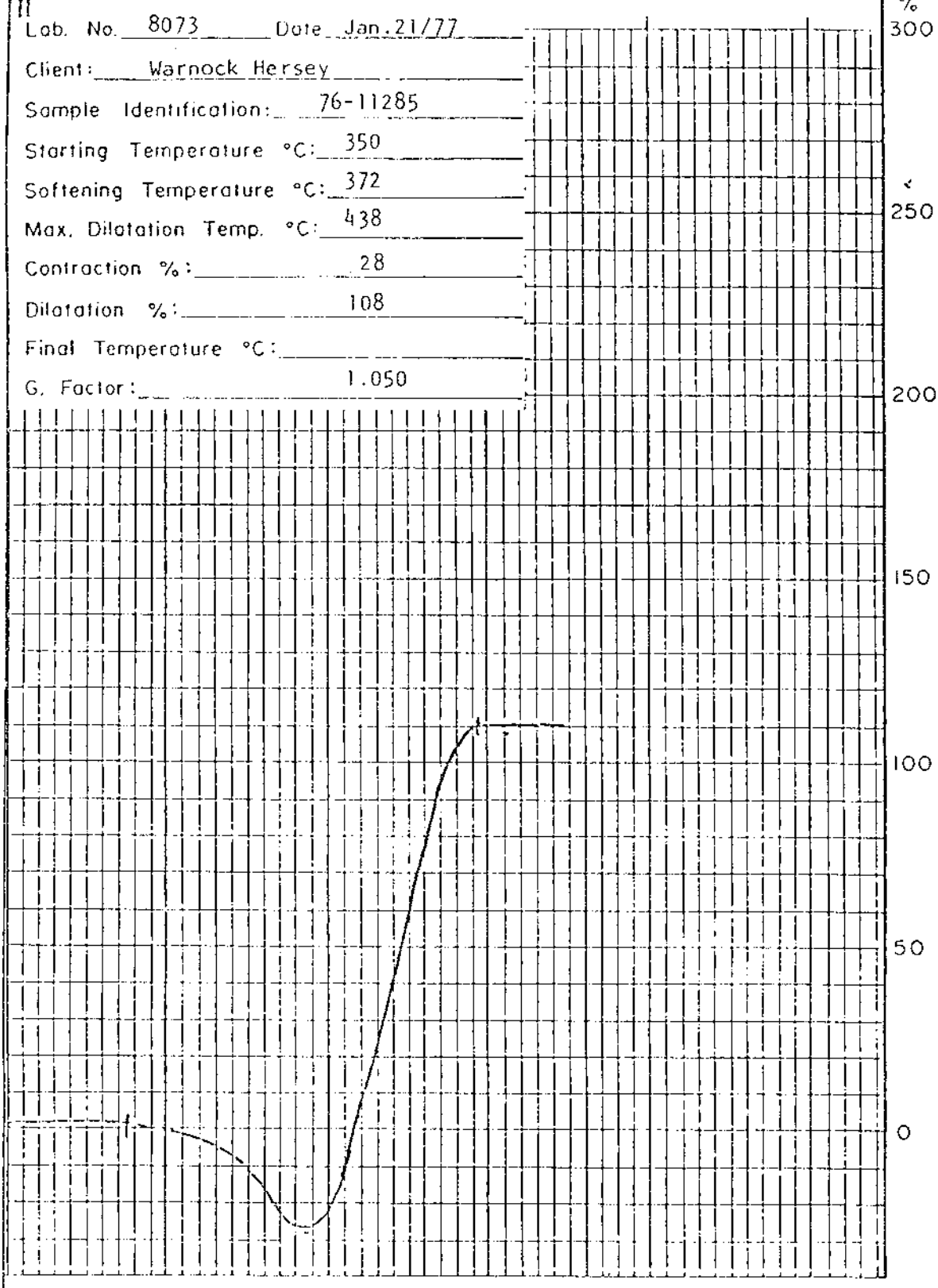
Max. Dilatation Temp. °C: 438

Contraction %: 28

Dilatation %: 108

Final Temperature °C:

G. Factor: 1.050



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 8 Warnock Hersey Lab. No.: 76 - 11286

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.5	24.9	23.4	51.2	0.85	122.5	25.0	23.6	51.4	0.85

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	77.4	0.5	24.7	0.88	24.8	0.85
65 x 0	22.6	0.7	20.5	0.80	20.6	0.80
TOTAL	100.0	--	--	--	23.9	0.86

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	51.5	1.1	5.5	27.9	65.5	0.88	5.6	28.2	66.2	0.89
1.40	1.50	18.6	0.8	16.0	25.2	58.0	0.82	16.1	25.4	58.5	0.83
1.50	1.60	8.1	0.8	24.8	22.8	51.6	0.80	25.0	23.0	52.0	0.81
1.60		21.8	--	--	--	--	--	71.5	--	--	--
TOTAL		100.0	--	--	--	--	--	23.5			

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.036						

Lab. No. 8074 Date Jan. 21/77

Client: Warnock Hersey

Sample Identification: 76-11286

Starting Temperature °C: 350

Softening Temperature °C: 360

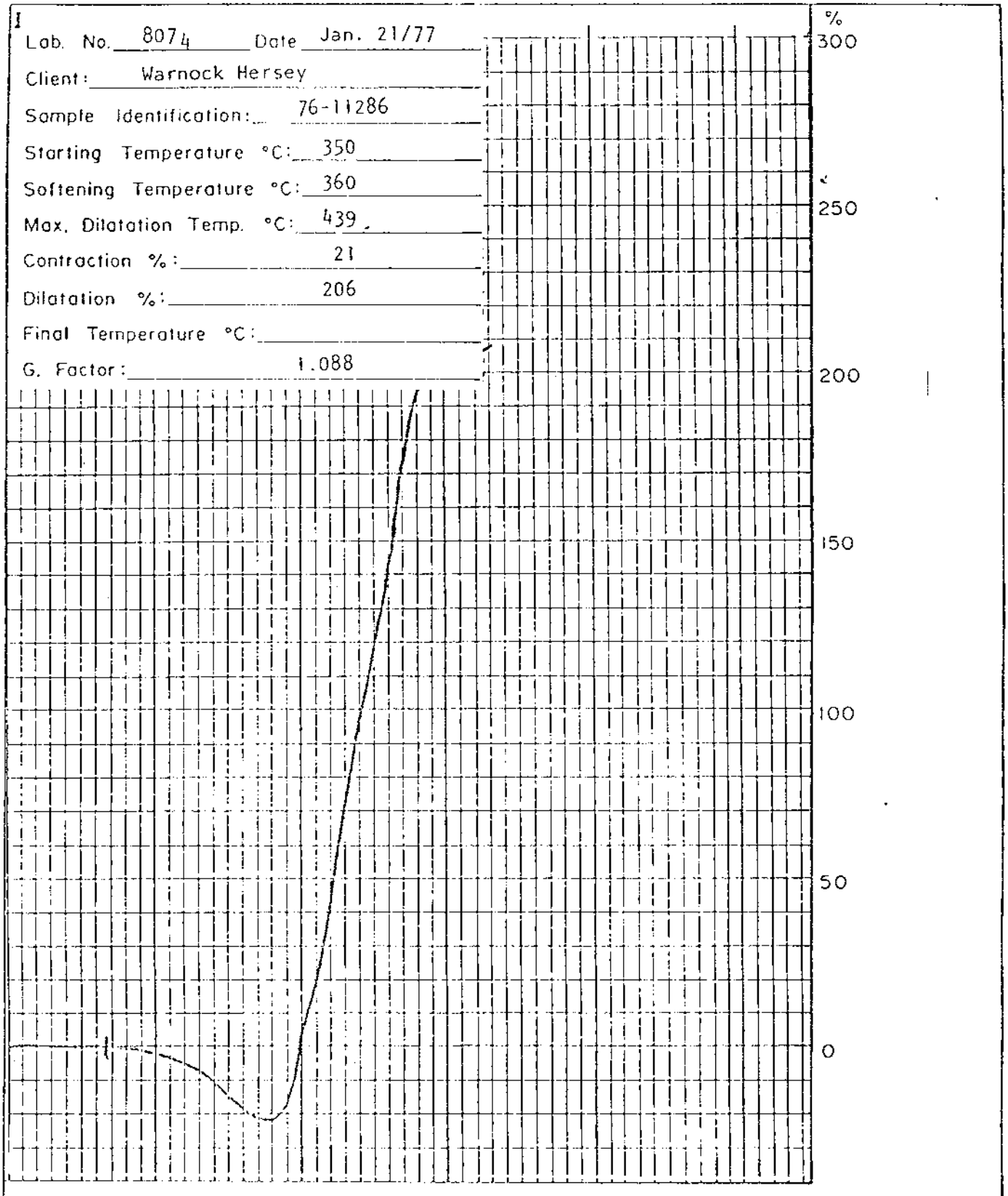
Max. Dilatation Temp. °C: 439

Contraction %: 21

Dilatation %: 206

Final Temperature °C:

G. Factor: 1.088



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 9

Warnock Hersey Lab. No.: 76 - 1

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.5	35.9	17.1	46.5	0.57	123.9	36.1	17.2	46.7	0.57

TABLE II Screen Analysis

Size	AIR DRIED BASIS				DRY BASIS	
	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	72.1	0.6	45.7	0.52	45.9	0.57
65 x 0	27.9	0.6	24.4	0.81	24.5	0.82
TOTAL	100.0	--	--	--	39.9	0.60

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulph.
	1.40	42.5	0.7	5.1	24.6	69.6	0.67	5.1	24.7	70.2	0.68
1.40	1.50	3.1	0.8	15.2	22.1	61.9	0.60	15.3	22.3	62.4	0.60
1.50	1.60	3.1	0.6	18.8	19.8	60.8	0.58	18.9	19.9	61.2	0.58
1.60		51.3	--	--	--	--	--	84.1	--	--	--
TOTAL		100.0	--	--	--	--	--	46.4	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	"G" FACTOR
7½	0.024						

Lab. No 8102 Date Jan. 22/77

Client: Warnock Hersey

Sample Identification: 76-11313

Starting Temperature °C: 350

Softening Temperature °C: 377

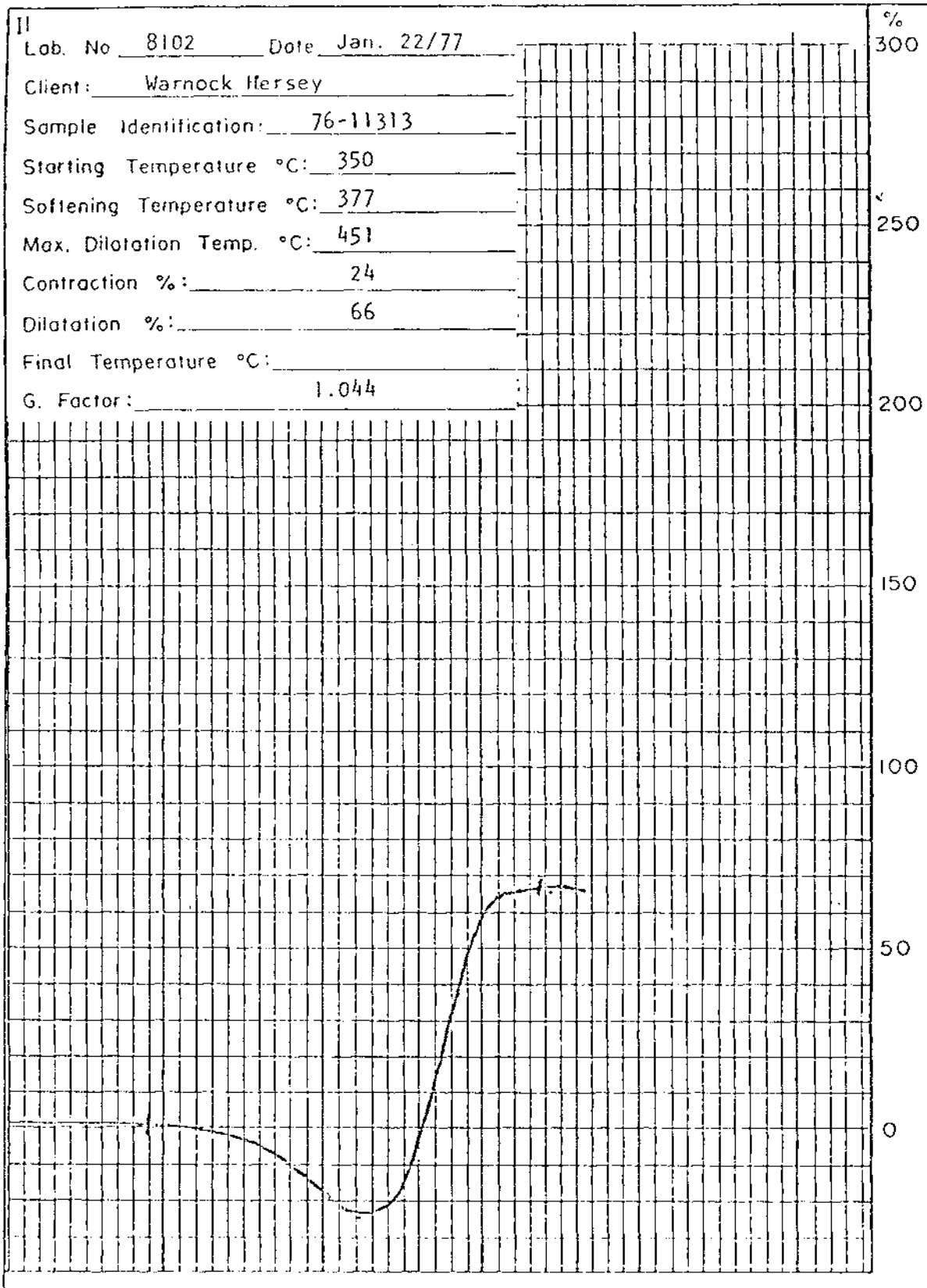
Max. Dilatation Temp. °C: 451

Contraction %: 24

Dilatation %: 66

Final Temperature °C:

G. Factor: 1.044



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 62 - 10 Warnock Hersey Lab. No.: 76 - 11314

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.5	37.4	18.2	43.9	0.66	97.5	37.6	18.3	44.1	0.66

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	84.4	0.6	40.8	0.66	41.1	0.72
65 x 0	15.6	0.6	19.9	0.66	20.0	0.66
TOTAL	100.0	--	--	--	37.8	0.71

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	35.8	0.7	7.4	24.1	67.8	0.84	7.4	24.2	68.4	0.85
1.40	1.50	7.5	0.6	19.7	19.8	59.9	0.75	19.8	19.9	60.3	0.76
1.50	1.60	5.8	0.6	28.6	17.5	53.3	0.73	28.8	17.6	53.6	0.73
1.60		50.9	--	--	--	--	--	71.8	--	--	--
TOTAL		100.0	--	--	--	--	--	42.3	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"C" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7	0.016						

Lab. No. 8103 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11314

Starting Temperature °C: 350

Softening Temperature °C: 381

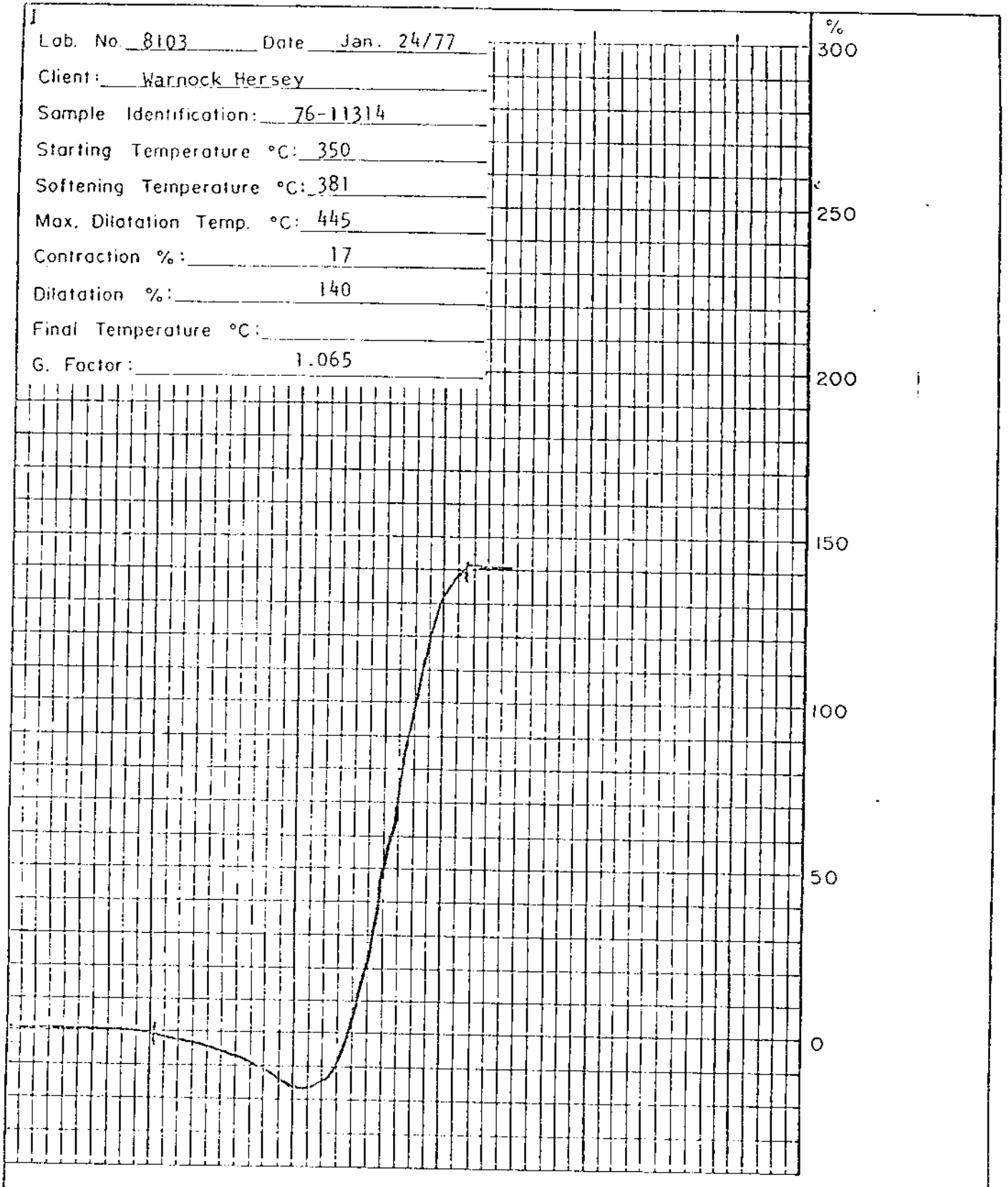
Max. Dilatation Temp. °C: 445

Contraction %: 17

Dilatation %: 140

Final Temperature °C:

G. Factor: 1.065



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 63 - 1 Warnock Hersey Lab. No.: 76 - 11315

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.7	13.1	27.2	59.0	0.64	109.3	13.2	27.4	59.4	0.64

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	77.0	0.8	11.5	0.66	11.6	0.68
65 x 0	23.0	0.8	9.0	0.64	9.0	0.64
TOTAL	100.0	- -	- -	- -	11.0	0.67

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	82.8	0.8	3.5	30.7	65.0	0.72	3.5	31.0	65.5	0.73
1.40	1.50	3.8	0.9	13.6	25.0	60.5	0.64	13.7	25.3	61.0	0.65
1.50	1.60	1.8	0.8	21.1	22.7	55.4	0.61	21.3	22.9	55.8	0.62
1.60		11.6	- -	- -	- -	- -	- -	63.7	- -	- -	- -
TOTAL		100.0	- -	- -	- -	- -	- -	11.2	- -	- -	- -

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.024						

Lab. No. 8104 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11315

Starting Temperature °C: 350

Softening Temperature °C: 361

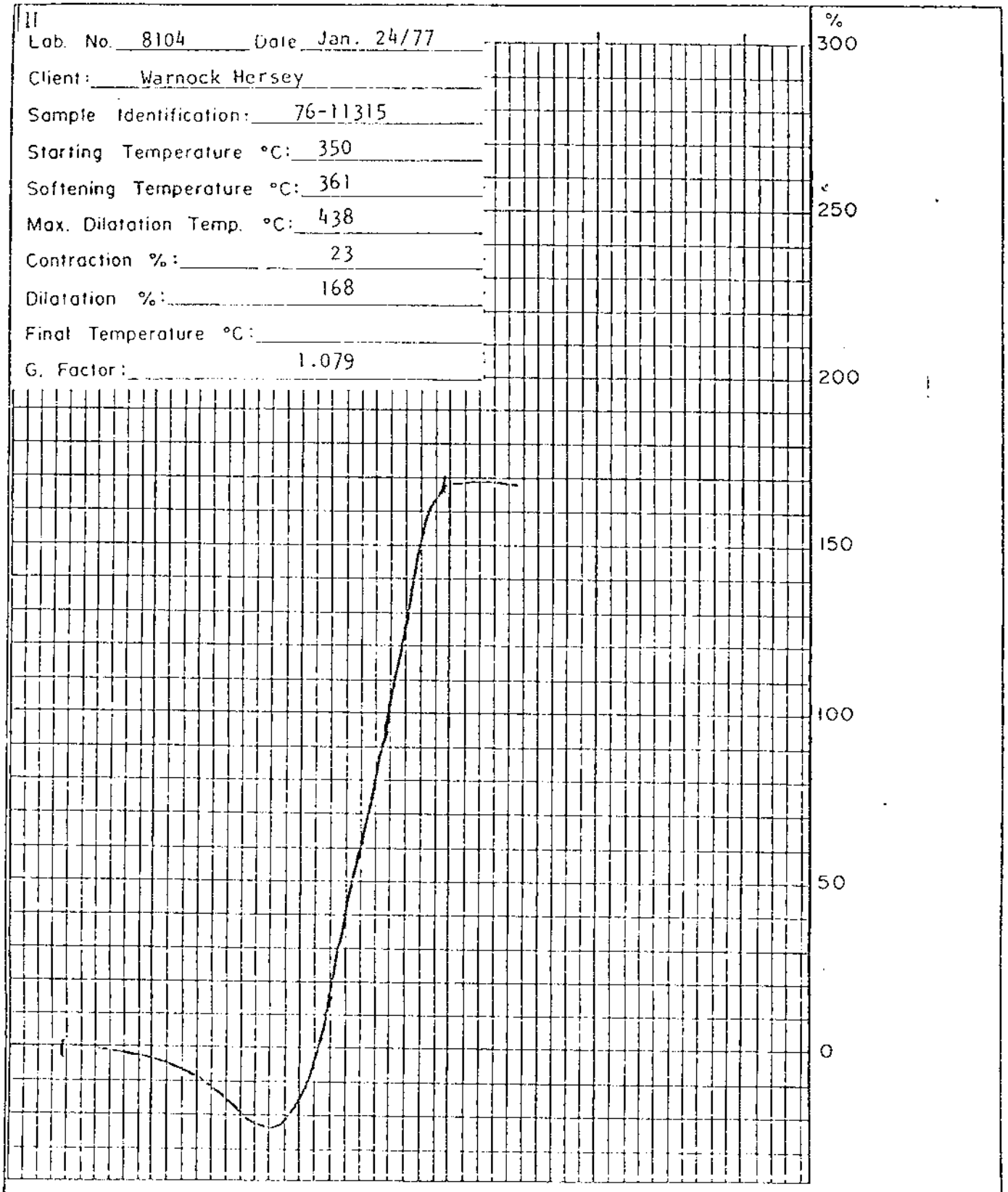
Max. Dilatation Temp. °C: 438

Contraction %: 23

Dilatation %: 168

Final Temperature °C:

G. Factor: 1.079



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 63 - 2 Warnock Hersey Lab. No.: 76 - 11316

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.6	11.0	26.9	61.5	0.98	121.8	11.1	27.0	61.9	0.99

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	74.6	0.6	10.4	1.03	10.4	1.04
65 x 0	25.4	0.7	8.9	1.01	9.0	1.02
TOTAL	100.0	--	--	--	10.0	1.03

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	80.5	0.7	3.0	31.0	65.3	1.01	3.0	31.3	65.7	1.02
1.40	1.50	4.1	0.8	10.7	26.8	61.7	0.95	10.8	27.0	62.2	0.96
1.50	1.60	3.1	0.7	19.6	23.5	56.2	0.92	19.7	23.7	56.6	0.93
1.60		12.3	--	--	--	--	--	54.8	--	--	--
TOTAL		100.0	--	--	--	--	--	10.2	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.021						

Lab. No. 8105 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11316

Starting Temperature °C: 350

Softening Temperature °C: 370

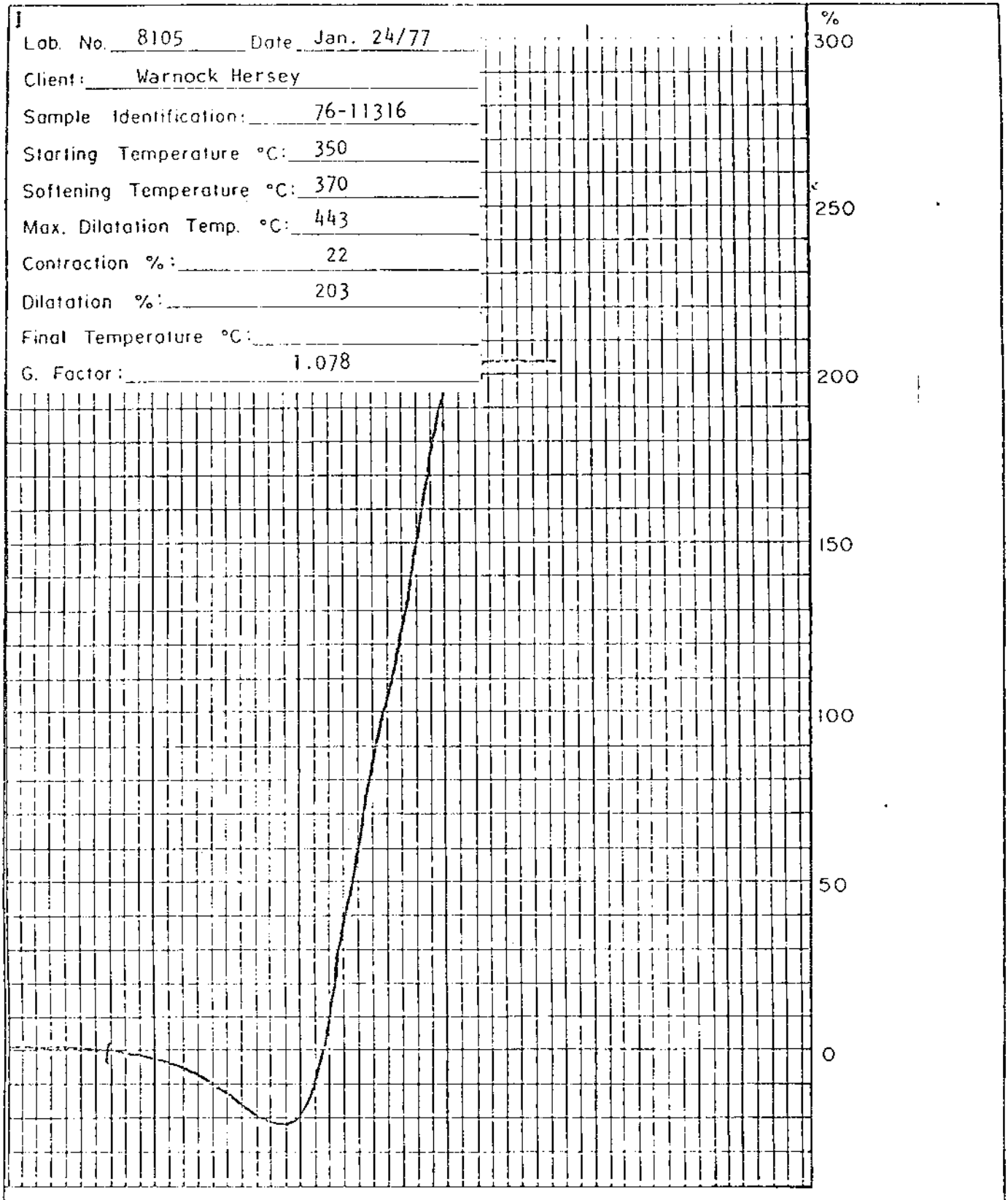
Max. Dilatation Temp. °C: 443

Contraction %: 22

Dilatation %: 203

Final Temperature °C:

G. Factor: 1.078



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 63 - 3 Warnock Hersey Lab. No.: 76 - 11317

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.6	14.3	26.7	58.4	1.68	112.8	14.4	26.8	58.8	1.69

TABLE II Screen Analysis

Size	AIR DRIED BASIS				DRY BASIS	
	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	79.0	0.6	15.8	1.45	15.9	1.49
65 x 0	21.0	0.8	11.1	2.33	11.2	2.35
TOTAL	100.0	--	--	--	14.9	1.67

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	74.2	0.6	3.0	30.1	66.3	1.13	3.0	30.3	66.7	1.14
1.40	1.50	2.2	0.8	13.5	25.7	60.0	1.00	13.6	25.9	60.5	1.01
1.50	1.60	2.5	0.7	15.5	24.8	59.0	1.02	15.6	25.0	59.4	1.03
1.60		21.1	--	--	--	--	--	61.9	--	--	--
TOTAL		100.0	--	--	--	--	--	16.0	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"C" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.023						

Lab. No. 8106 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11317

Starting Temperature °C: 350

Softening Temperature °C: 376

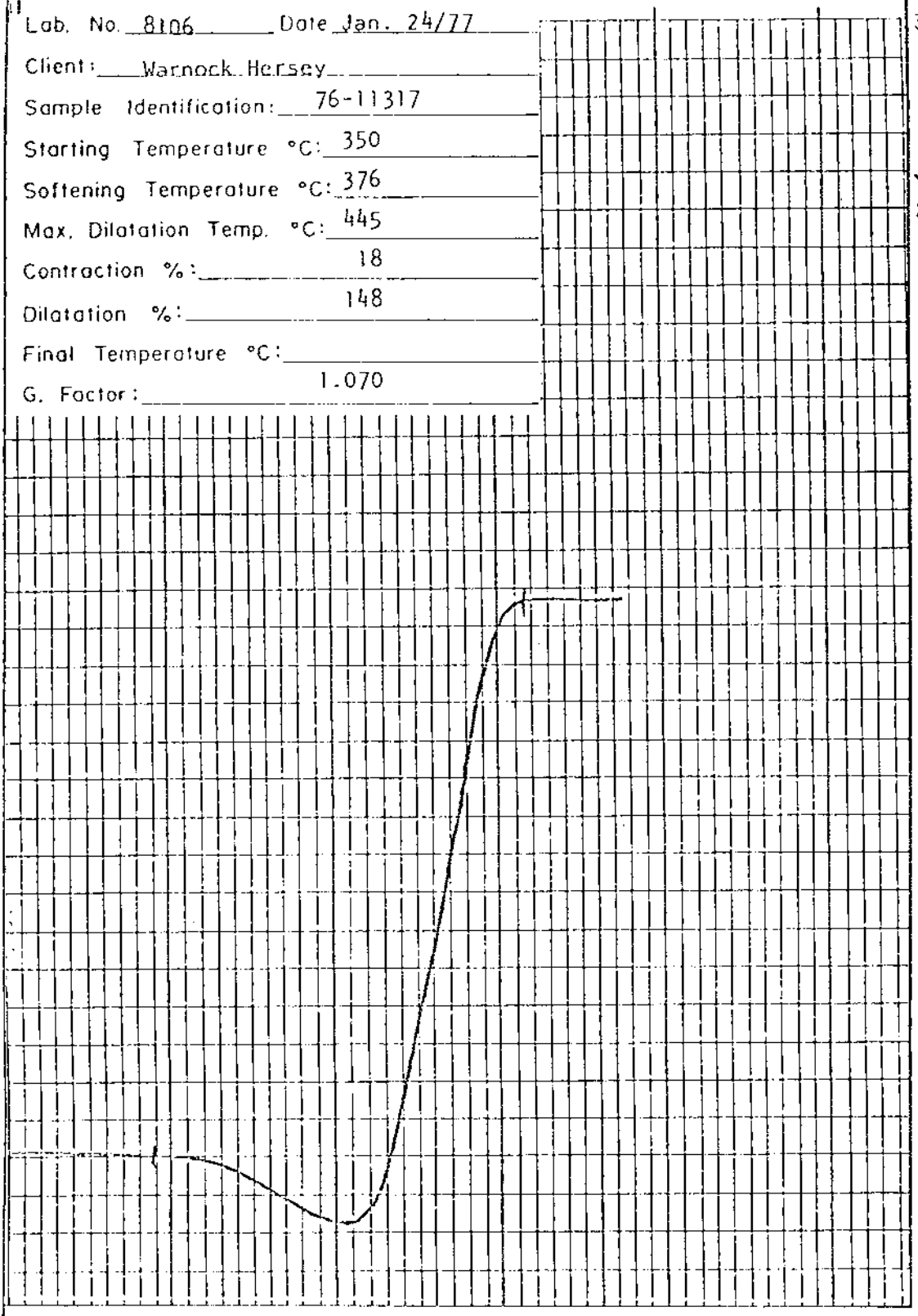
Max. Dilatation Temp. °C: 445

Contraction %: 18

Dilatation %: 148

Final Temperature °C:

G. Factor: 1.070



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drown

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 63 - 4 Warnock Hersey Lab. No.: 76 - 11318

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.6	7.8	26.9	64.7	0.77	121.8	7.9	27.1	65.0	0.78

TABLE II Screen Analysis

Size	AIR DRIED BASIS				DRY BASIS	
	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.2	0.7	7.7	0.81	7.7	0.82
65 x 0	19.8	0.9	6.2	0.87	6.2	0.88
TOTAL	100.0	--	--	--	7.4	0.83

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	90.0	0.7	3.1	29.5	66.7	0.85	3.1	29.7	67.2	0.86
1.40	1.50	2.1	0.9	10.1	25.5	63.5	0.77	10.2	25.8	64.0	0.78
1.50	1.60	1.7	0.7	13.7	24.0	61.6	0.75	13.8	24.2	62.0	0.76
1.60		6.2	--	--	--	--	--	65.6	--	--	--
TOTAL		100.0	--	--	--	--	--	7.3	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.011						

Lab. No. 8107 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11318

Starting Temperature °C: 350

Softening Temperature °C: 378

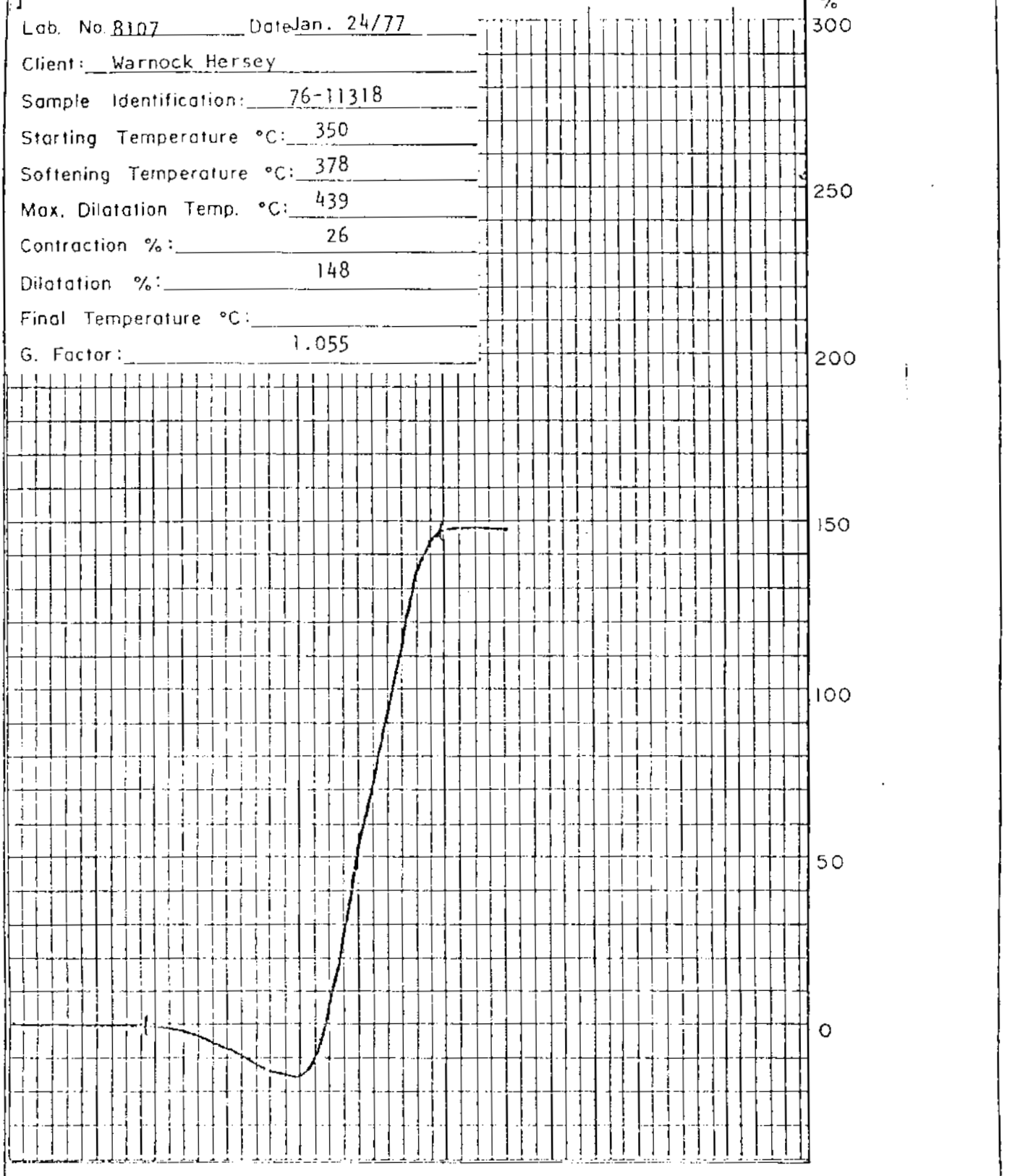
Max. Dilatation Temp. °C: 439

Contraction %: 26

Dilatation %: 148

Final Temperature °C:

G. Factor: 1.055



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH - 63 - 5 Warnock Hersey Lab. No.: 76 - 11319

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.6	14.4	27.7	57.3	0.78	114.9	14.5	27.9	57.6	0.78 0.84

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	75.8	0.6	17.5	0.74	17.6	0.74
65 x 0	24.2	0.8	7.9	0.68	8.0	0.69
TOTAL	100.0	--	--	--	15.3	0.73

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	74.2	0.7	3.7	29.9	65.7	0.84	3.7	30.1	66.2	0.85
1.40	1.50	3.4	0.9	16.6	24.6	57.9	0.74	16.8	24.8	58.4	0.75
1.50	1.60	3.0	0.7	22.2	22.7	54.4	0.71	22.4	22.8	54.8	0.72
1.60		19.4	--	--	--	--	--	70.3	--	--	--
TOTAL		100.0	--	--	--	--	--	17.6	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.029						

11

Lab. No. 8108 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11319

Starting Temperature °C: 350

Softening Temperature °C: 376

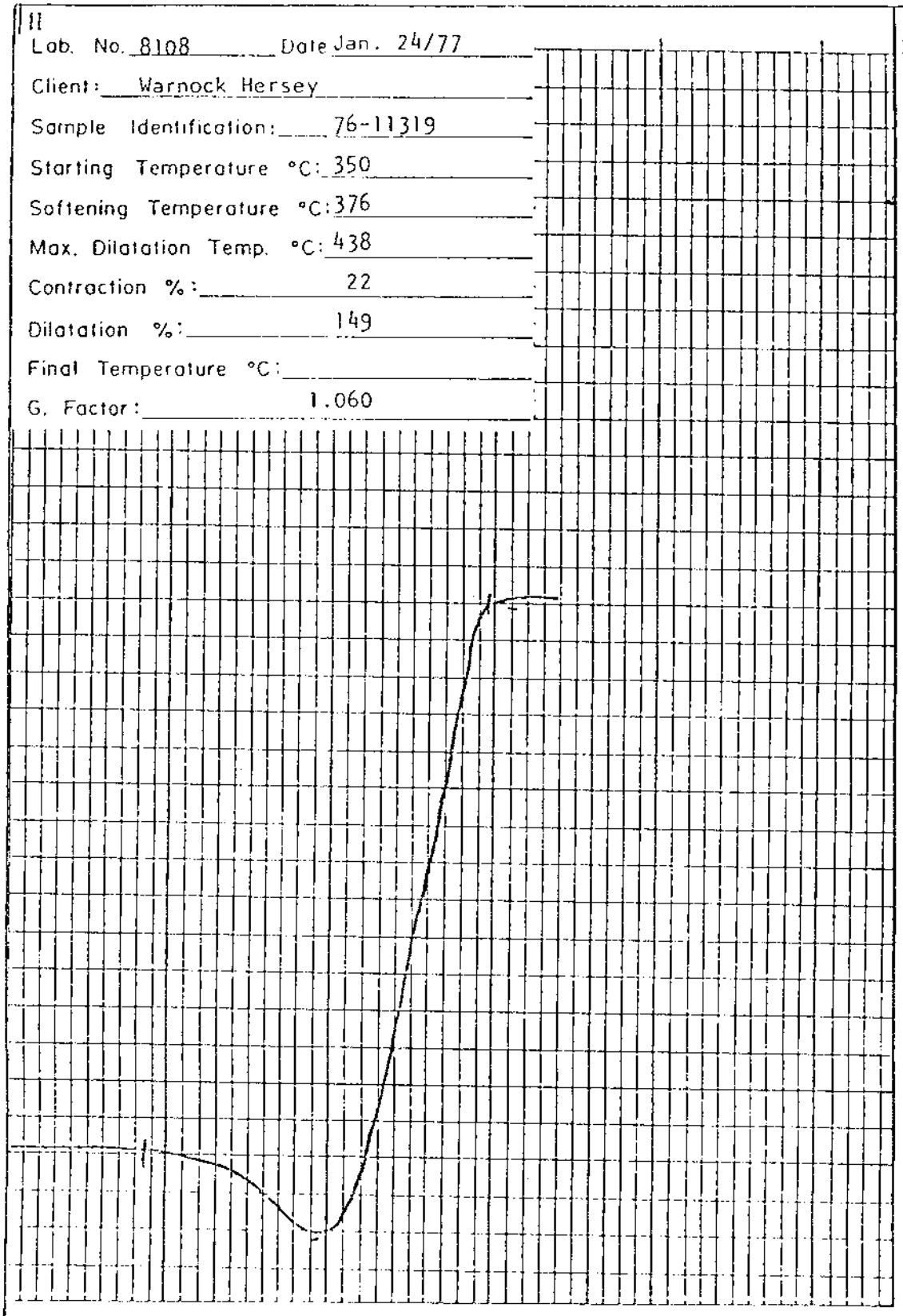
Max. Dilatation Temp. °C: 438

Contraction %: 22

Dilatation %: 149

Final Temperature °C:

G. Factor: 1.060



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 63 - 6 Warnock Hersey Lab. No.: 76 - 11320

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.5	21.9	24.1	53.5	0.96	112.8	22.0	24.2	53.8	0.96

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	78.9	0.6	24.6	0.98	24.7	0.99
65 x 0	21.1	0.7	13.7	0.96	13.6	0.97
TOTAL	100.0	--	--	--	22.4	0.98

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	60.5	0.8	4.2	28.6	66.4	0.99	4.2	28.8	67.0	1.01
1.40	1.50	5.4	0.8	15.4	25.4	58.4	0.93	15.5	25.6	58.9	0.94
1.50	1.60	3.8	0.7	26.7	21.8	50.8	0.87	26.9	21.9	51.2	0.88
1.60		30.3	--	--	--	--	--	67.0	--	--	--
TOTAL		100.0	--	--	--	--	--	24.7	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.025						

Lab. No. 8109 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11320

Starting Temperature °C: 350

Softening Temperature °C: 367

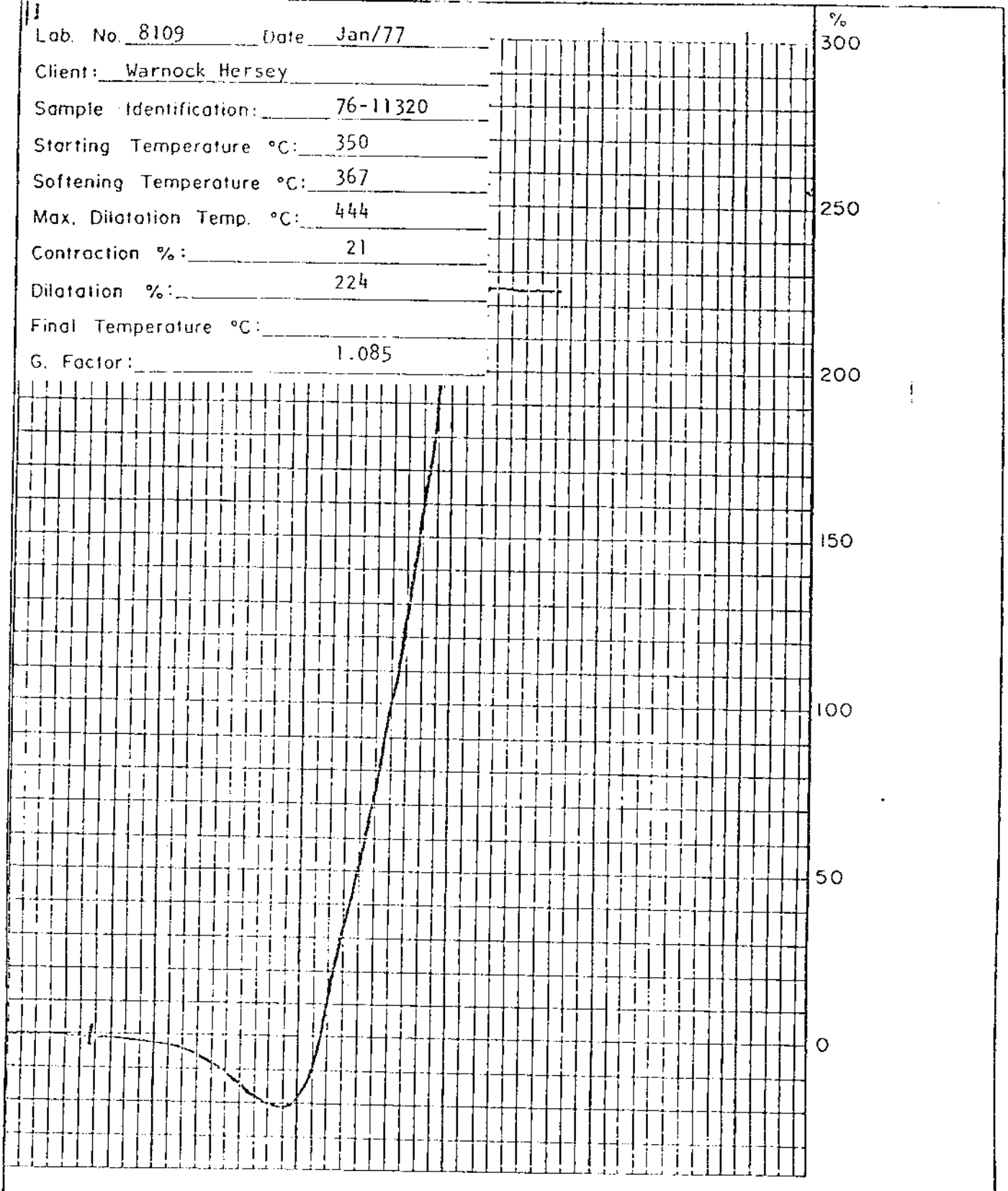
Max. Dilatation Temp. °C: 444

Contraction %: 21

Dilatation %: 224

Final Temperature °C:

G. Factor: 1.085



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 64 - 1

Warnock Hersey Lab. No.: 76 - 11287

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.7	20.1	26.6	52.6	0.64	76.1	20.2	26.8	53.0	0.64

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	82.7	0.7	21.2	0.56	21.4	0.56
65 x 0	17.3	0.9	19.1	0.89	19.2	0.90
TOTAL	100.0	- -	- -	- -	21. 0	0.62

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	69.0	0.8	5.6	33.4	60.2	0.63	5.6	33.7	60.7	0.64
1.40	1.50	8.5	1.0	17.1	27.4	54.5	0.73	17.3	27.7	55.0	0.74
1.50	1.60	2.7	0.9	23.3	25.5	50.3	0.69	23.5	25.7	50.8	0.70
1.60		19.8	- -	- -	- -	- -	- -	70.4	- -	- -	- -
TOTAL		100.0	- -	- -	- -	- -	- -	19.9	- -	- -	- -

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.008						

II

Lab. No. 8075 Date Jan. 21/77

Client: Warnock Hersey

Sample Identification: 76-11287

Starting Temperature °C: 350

Softening Temperature °C: 363

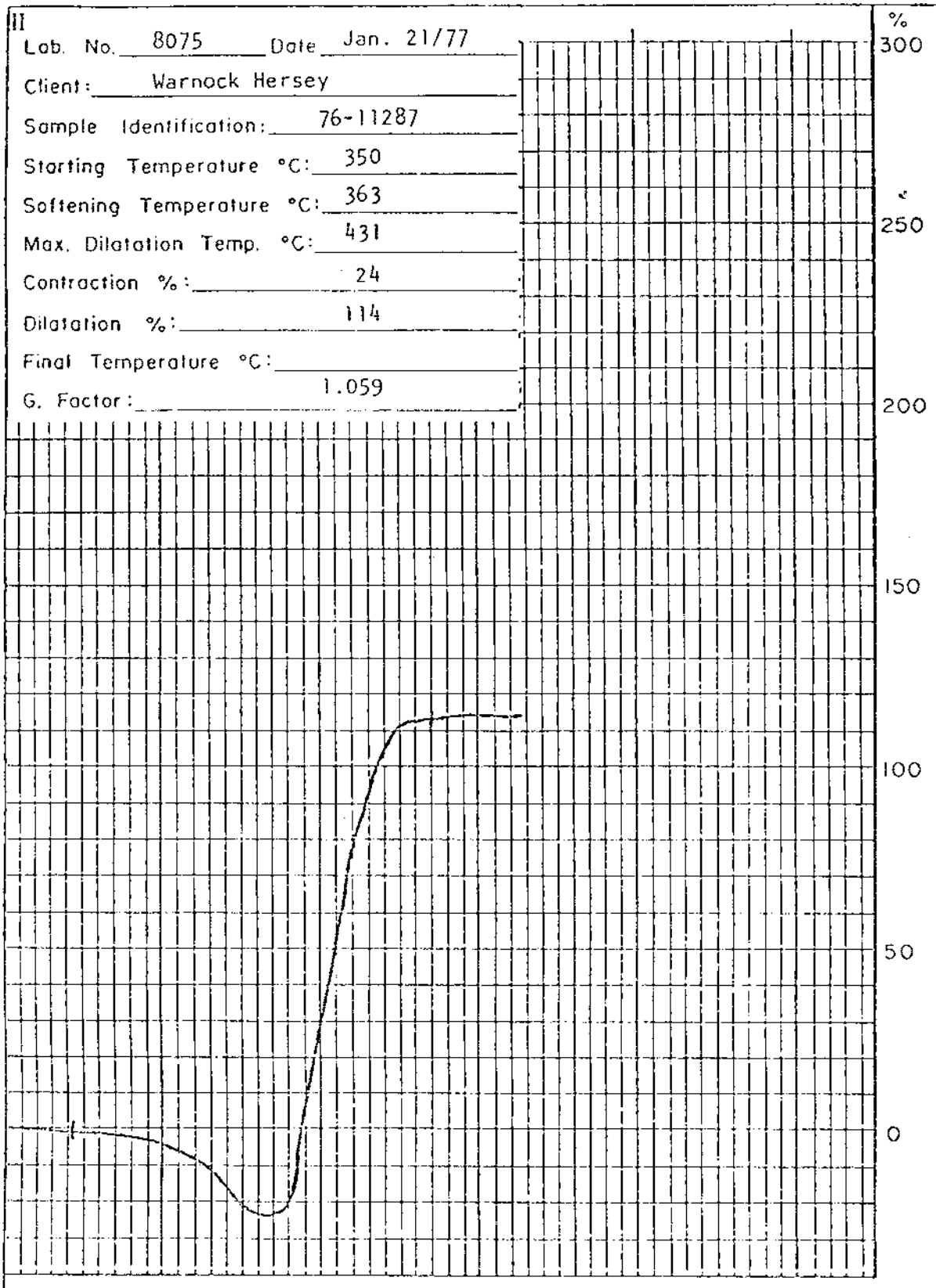
Max. Dilatation Temp. °C: 431

Contraction %: 24

Dilatation %: 114

Final Temperature °C:

G. Factor: 1.059



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 64 - 2 Warnock Hersey Lab. No.: 76 - 11321

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.7	29.6	24.4	45.3	0.59	69.8	29.8	24.6	45.6	0.60

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	84.1	0.8	32.3	0.57	32.6	0.58
65 x 0	14.9	1.0	18.9	0.68	19.0	0.69
TOTAL	100.0	--	--	--	30.2	0.59

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	58.9	0.9	4.0	34.9	60.2	0.70	4.1	35.2	60.7	0.71
1.40	1.50	4.1	0.8	22.3	28.2	48.7	0.72	22.5	28.4	49.1	0.73
1.50	1.60	2.2	0.8	28.4	25.6	45.2	0.63	28.6	25.8	45.6	0.64
1.60		34.8	--	--	--	--	--	82.6	--	--	--
TOTAL		100.0	--	--	--	--	--	32.7	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		" C " FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.021						

Lab. No. 8110 Date Jan./77

Client: Warnock Hersey

Sample Identification: 76-11321

Starting Temperature °C: 350

Softening Temperature °C: 366

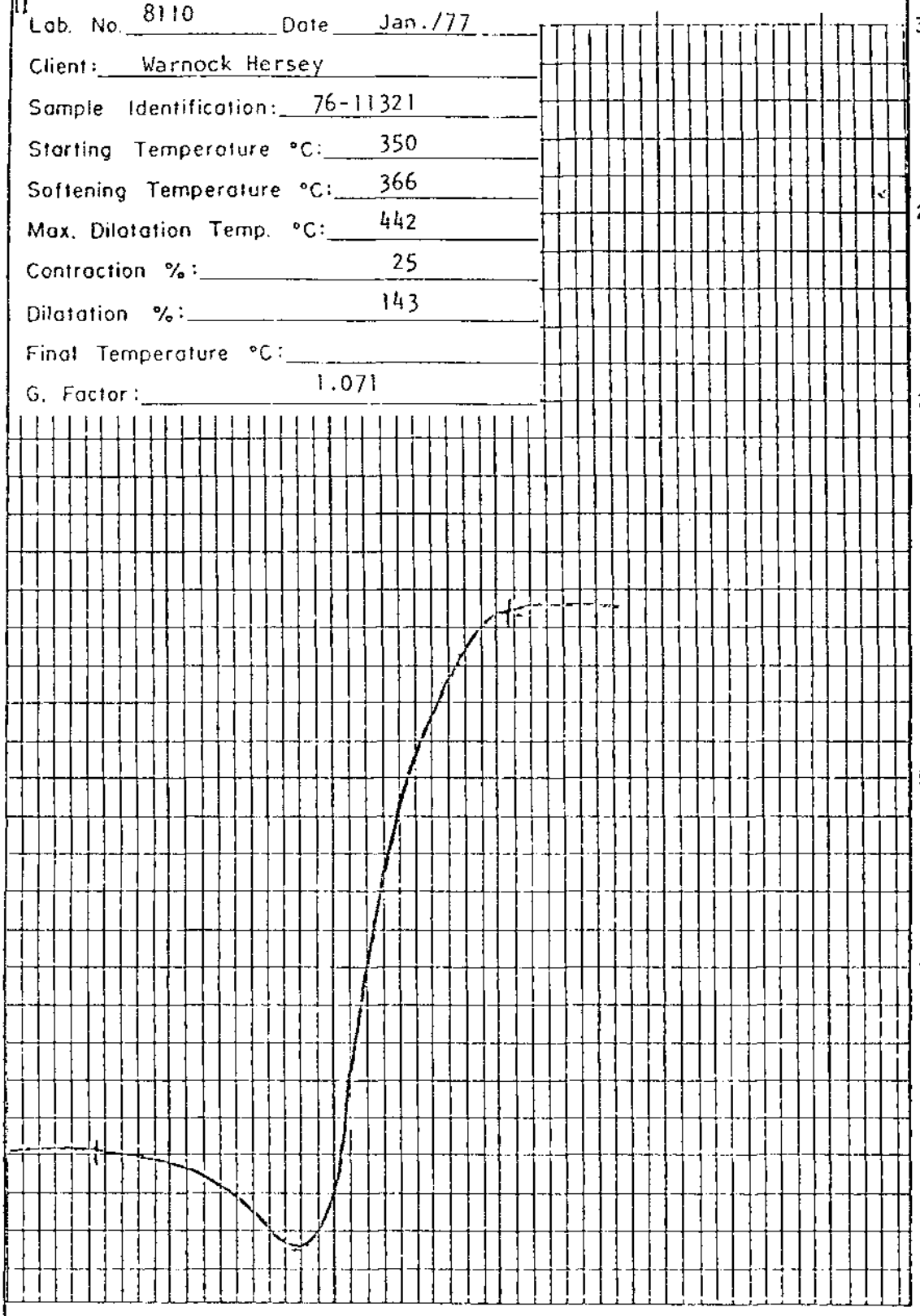
Max. Dilatation Temp. °C: 442

Contraction %: 25

Dilatation %: 143

Final Temperature °C:

G. Factor: 1.071



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH64 - 3 — Warnock Hersey Lab. No.: 76 - 11322

TABLE I — Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	23.8	26.7	48.7	0.85	102.4	24.0	26.9	49.1	0.86

TABLE II — Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	77.2	0.7	25.8	0.86	26.0	0.87
65 x 0	22.8	0.9	17.6	0.97	17.7	0.98
TOTAL	100.0	--	--	--	24.1	0.90

TABLE III — Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	63.4	0.6	4.1	34.0	61.3	0.89	4.2	34.2	61.6	0.90
1.40	1.50	4.4	0.9	13.0	30.6	55.5	0.87	13.1	30.9	56.0	0.88
1.50	1.60	5.6	0.8	20.8	27.7	50.7	0.85	21.0	27.9	51.1	0.86
1.60		26.6	--	--	--	--	--	67.8	--	--	--
TOTAL		100.0	--	--	--	--	--	22.4	--	--	--

TABLE IV — Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.029						

Lab. No. 8111 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11322

Starting Temperature °C: 350

Softening Temperature °C: 357

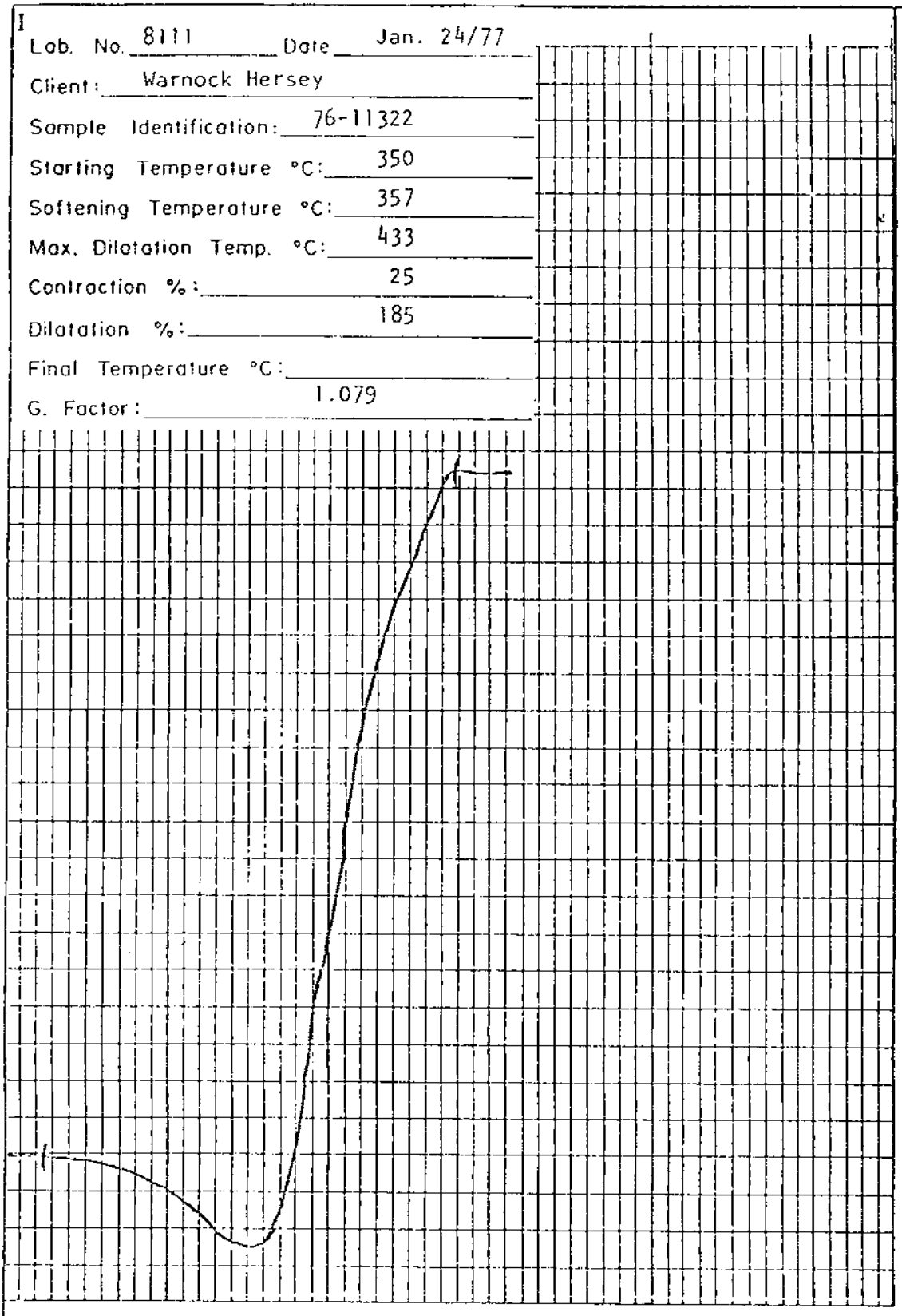
Max. Dilatation Temp. °C: 433

Contraction %: 25

Dilatation %: 185

Final Temperature °C:

G. Factor: 1.079



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 64 - 4 Warnock Hersey Lab. No.: 76 - 11323

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	26.4	26.0	46.8	0.84	82.3	26.6	26.2	47.2	0.85

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	84.3	0.7	28.2	0.89	28.4	0.90
65 x 0	14.7	0.8	16.3	0.88	16.4	0.89
TOTAL	100.0	--	--	--	26.3	0.89

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	52.5	0.9	4.4	34.6	60.1	0.92	4.5	34.9	60.6	0.93
1.40	1.50	8.1	0.8	10.8	32.2	56.2	0.93	10.9	32.5	56.6	0.94
1.50	1.60	5.2	0.8	27.4	25.8	46.0	0.89	27.6	26.0	46.4	0.90
1.60		34.2	--	--	--	--	--	69.4	--	--	--
TOTAL		100.0	--	--	--	--	--	28.4	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.005						

Lab. No. 8112 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11323

Starting Temperature °C: 350

Softening Temperature °C: 357

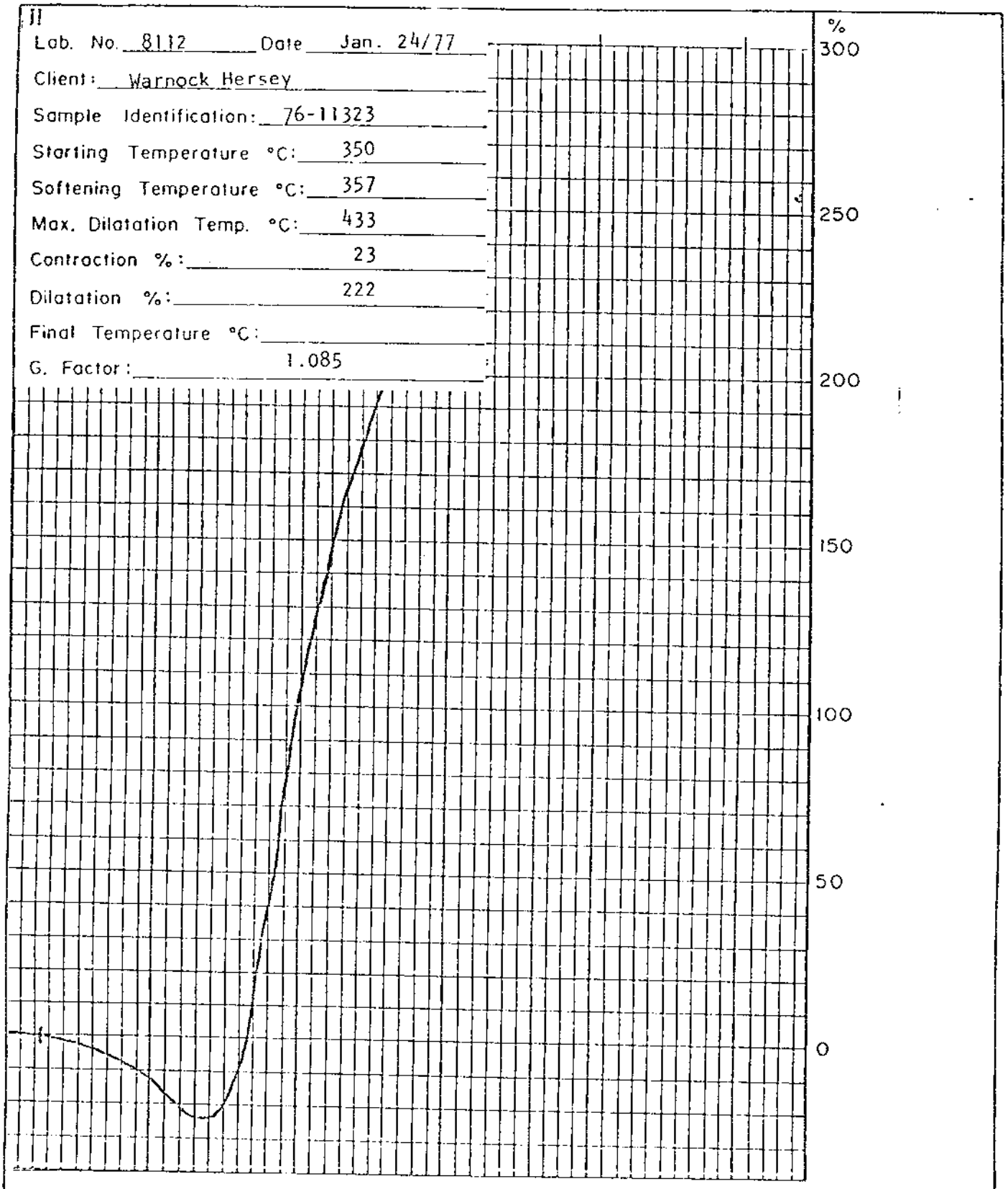
Max. Dilatation Temp. °C: 433

Contraction %: 23

Dilatation %: 222

Final Temperature °C:

G. Factor: 1.085



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 65 - 1 Warnock Hersey Lab. No.: 76 - 11324

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	18.1	26.0	55.1	0.86	86.5	18.2	26.2	55.6	0.87

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	84.4	0.8	20.1	0.80	20.3	0.81
65 x 0	14.6	1.0	15.4	0.92	15.5	0.93
TOTAL	100.0	--	--	--	19.4	0.82

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	73.1	0.9	5.4	35.9	57.8	0.87	5.5	36.2	58.3	0.88
1.40	1.50	4.2	0.8	16.0	30.7	52.5	0.89	16.2	30.9	52.9	0.90
1.50	1.60	3.7	0.8	31.0	24.1	44.1	0.85	31.3	24.3	44.4	0.86
1.60		19.0	--	--	--	--	--	69.2	--	--	--
TOTAL		100.0	--	--	--	--	--	19.0	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.052						

Lab. No. 8113 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11324

Starting Temperature °C: 350

Softening Temperature °C: 353

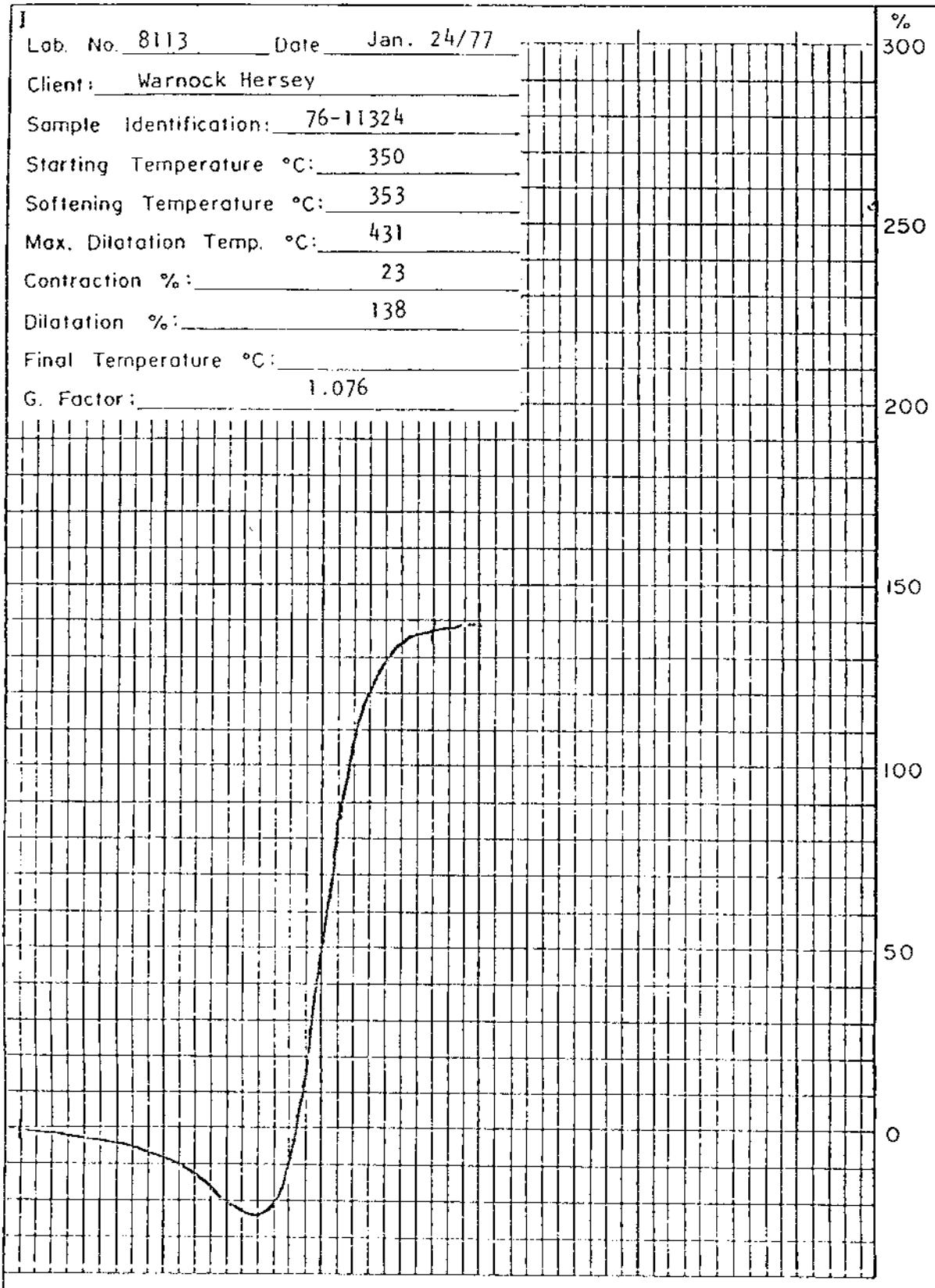
Max. Dilatation Temp. °C: 431

Contraction %: 23

Dilatation %: 138

Final Temperature °C:

G. Factor: 1.076



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 65 - 2 Warnock Hersey Lab. No.: 76 - 11325

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G. I.	Ash	V. M.	F.C.	Sulphur
0.9	12.1	31.8	55.2	0.85	78.8	12.2	32.1	55.7	0.86

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	87.0	0.8	12.0	0.76	12.1	0.77
65 x 0	13.0	1.0	10.0	0.87	10.1	0.88
TOTAL	100.0	--	--	--	11.8	0.78

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	80.5	0.8	4.8	36.4	58.0	0.92	4.9	36.7	58.4	0.93
1.40	1.50	5.8	0.8	15.0	31.6	52.6	0.85	15.2	31.8	53.0	0.86
1.50	1.60	4.4	0.8	30.8	25.1	43.3	0.72	31.0	25.3	43.7	0.73
1.60		9.3	--	--	--	--	--	56.2	--	--	--
TOTAL		100.0	--	--	--	--	--	11.4	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.047						

Lab. No. 8114 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11325

Starting Temperature °C: 350

Softening Temperature °C: 358

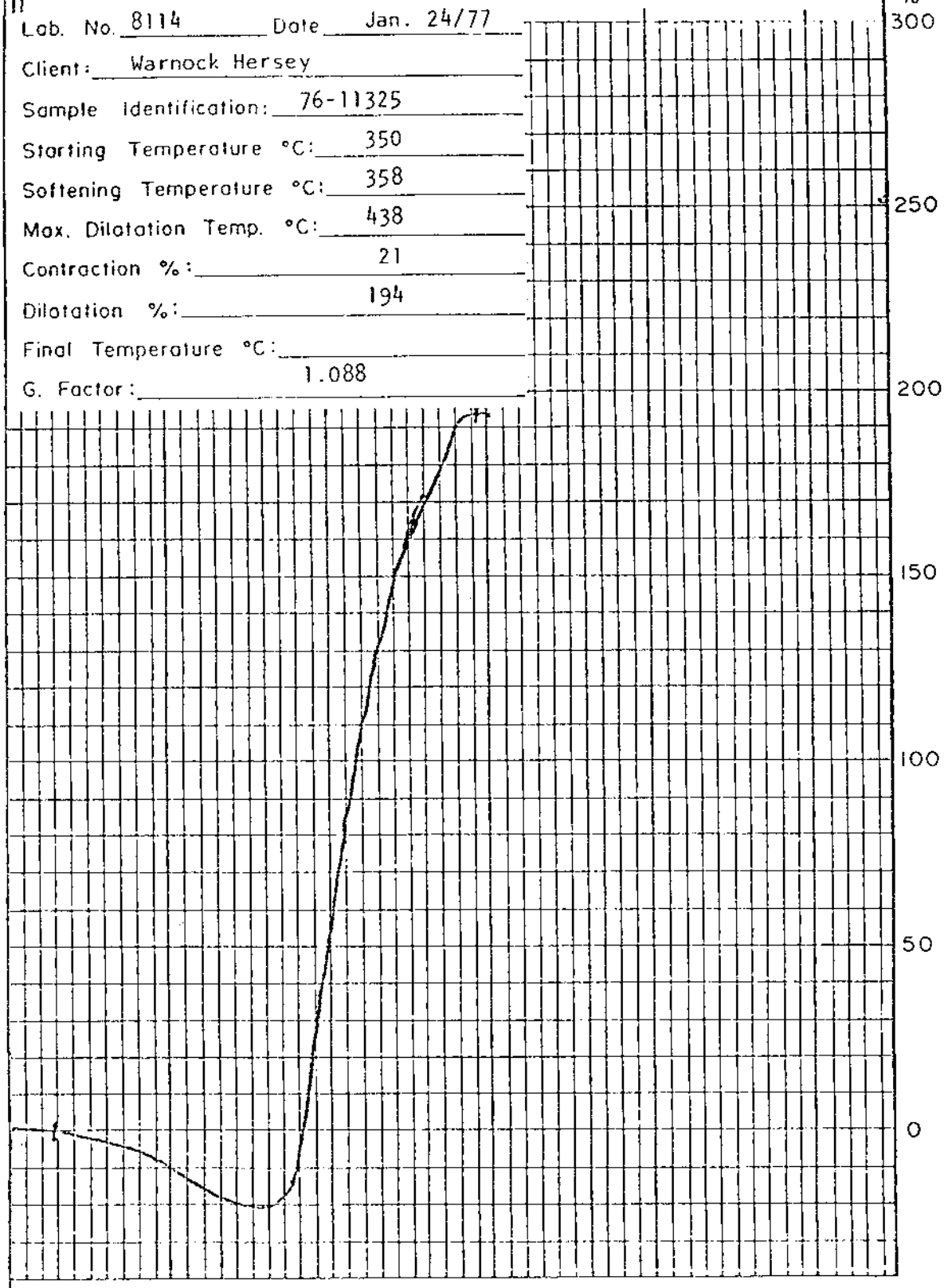
Max. Dilatation Temp. °C: 438

Contraction %: 21

Dilatation %: 194

Final Temperature °C:

G. Factor: 1.088



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 65 - 3 Warnock Hersey Lab. No.: 76 - 11326

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.9	22.7	28.9	47.5	0.75	98.9	22.9	29.2	47.9	0.76

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	81.1	0.8	23.9	0.68	24.1	0.69
65 x 0	19.9	1.0	24.6	0.74	24.9	0.75
TOTAL	100.0	--	--	--	24.5	0.71

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	61.4	0.9	7.3	34.0	57.8	0.81	7.4	34.3	58.3	0.82
1.40	1.50	5.8	0.9	19.1	29.3	50.7	0.78	19.3	29.6	51.1	0.79
1.50	1.60	5.4	0.8	16.9	28.3	54.0	0.73	17.0	28.6	54.4	0.74
1.60		27.4	--	--	--	--	--	59.4	--	--	--
TOTAL		100.0	--	--	--	--	--	22.8	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.014						

Lab. No. 8115 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11326

Starting Temperature °C: 350

Softening Temperature °C: 363

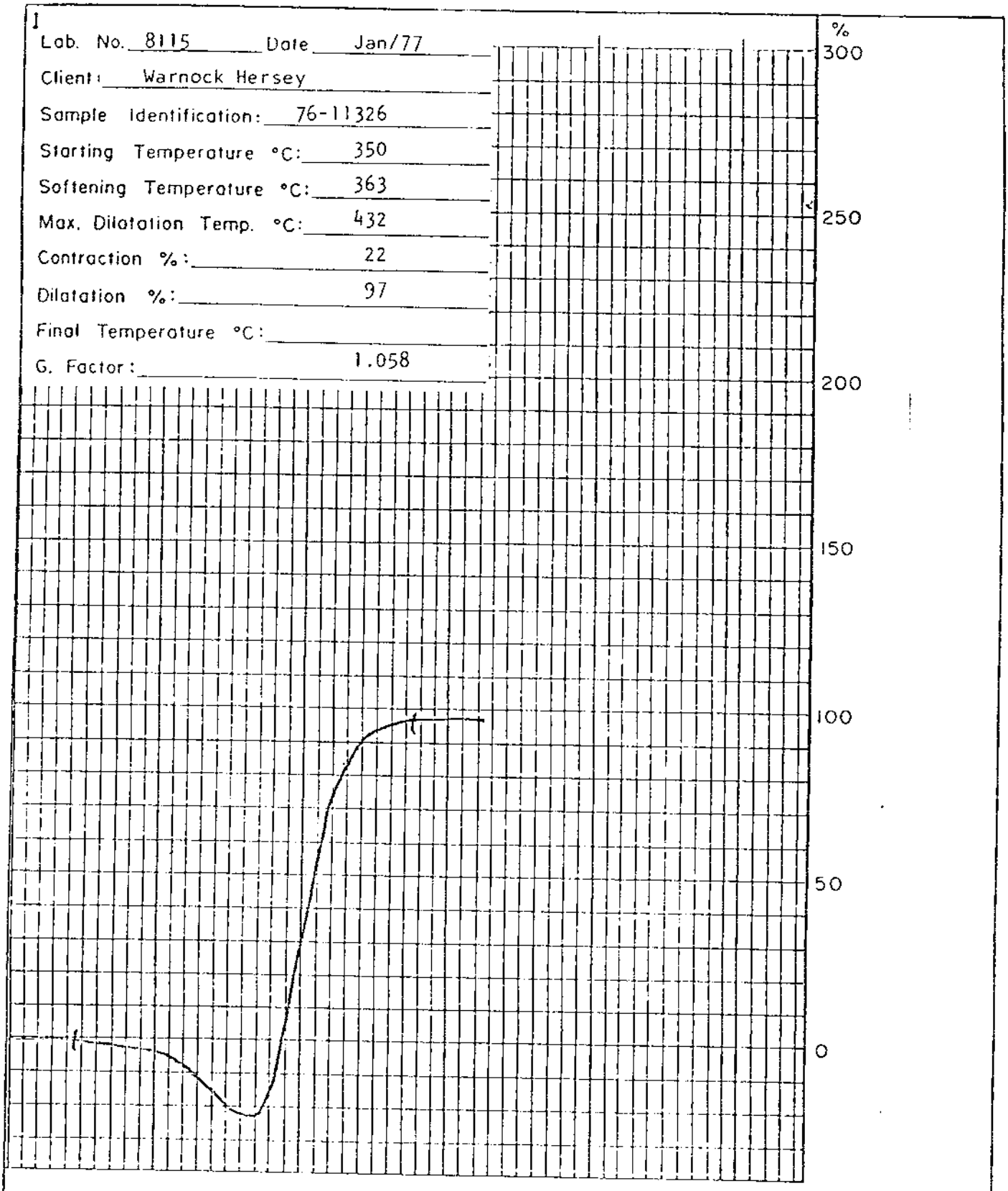
Max. Dilatation Temp. °C: 432

Contraction %: 22

Dilatation %: 97

Final Temperature °C:

G. Factor: 1.058



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 66 - 1 Warnock Hersey Lab. No.: 76 - 11225

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.6	29.7	15.3	54.4	0.49	117.0	29.9	15.4	54.7	0.49

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	69.6	0.8	35.4	0.44	35.7	0.44
65 x 0	30.4	0.6	17.1	0.51	17.2	0.51
TOTAL	100.0	- -	- -	- -	30.1	0.46

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	62.2	0.8	7.4	20.0	71.8	0.45	7.4	20.2	72.4	0.45
1.40	1.50	0.7	0.8	12.9	22.5	63.8	0.38	13.0	22.7	64.3	0.38
1.50	1.60	1.5	0.7	20.7	19.5	59.1	0.40	20.8	19.6	59.6	0.40
1.60		35.6	-	-	-	-	-	82.6	-	-	-
TOTAL		100.0	-	-	-	-	-	34.4	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
2	0.026						

Lab. No. 8051 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11225 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 410

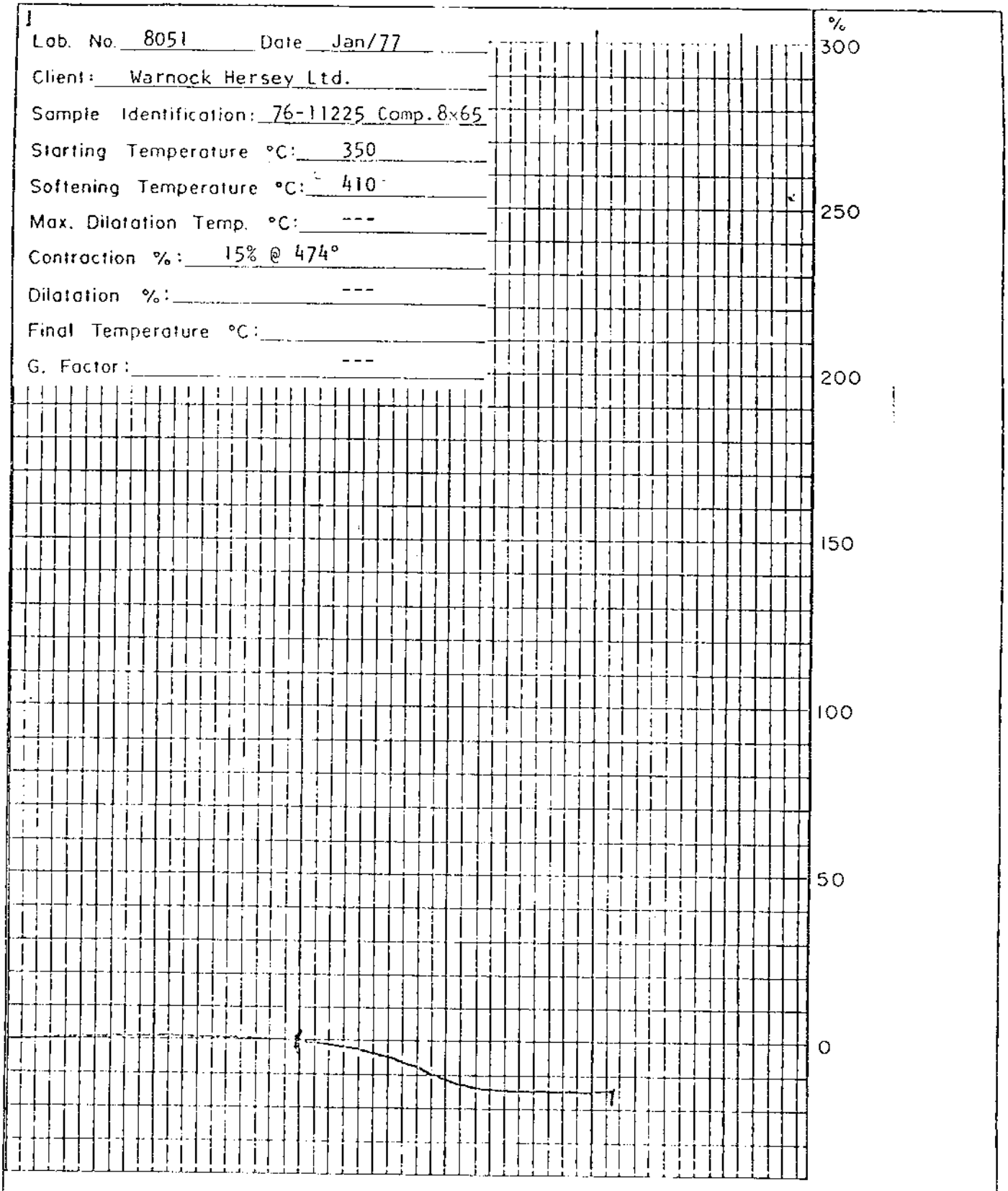
Max. Dilatation Temp. °C: ---

Contraction %: 15% @ 474°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 66 - 2 Warnock Hersey Lab. No.: 76 - 11226

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G. I.	Ash	V. M.	F.C.	Sulphur
0.9	58.7	12.8	27.6	0.35	96.2	59.2	12.9	27.9	0.35

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	76.6	0.9	58.6	0.32	59.1	0.32
65 x 0	23.4	0.6	44.6	0.41	44.9	0.41
TOTAL	100.0	--	--	--	55.8	0.34

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	31.9	1.0	11.3	21.0	66.7	0.41	11.4	21.2	67.4	0.41
1.40	1.50	1.1	0.9	16.0	20.8	62.3	0.45	16.1	21.0	62.9	0.45
1.50	1.60	2.1	0.9	24.4	17.4	57.3	0.38	24.6	17.6	57.8	0.38
1.60		64.9	--	--	--	--	--	79.7	--	--	--
TOTAL		100.0	-	-	-	-	-	56.0	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation.	
7½	0.088						

II

Lab. No. 8051 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11226 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 392

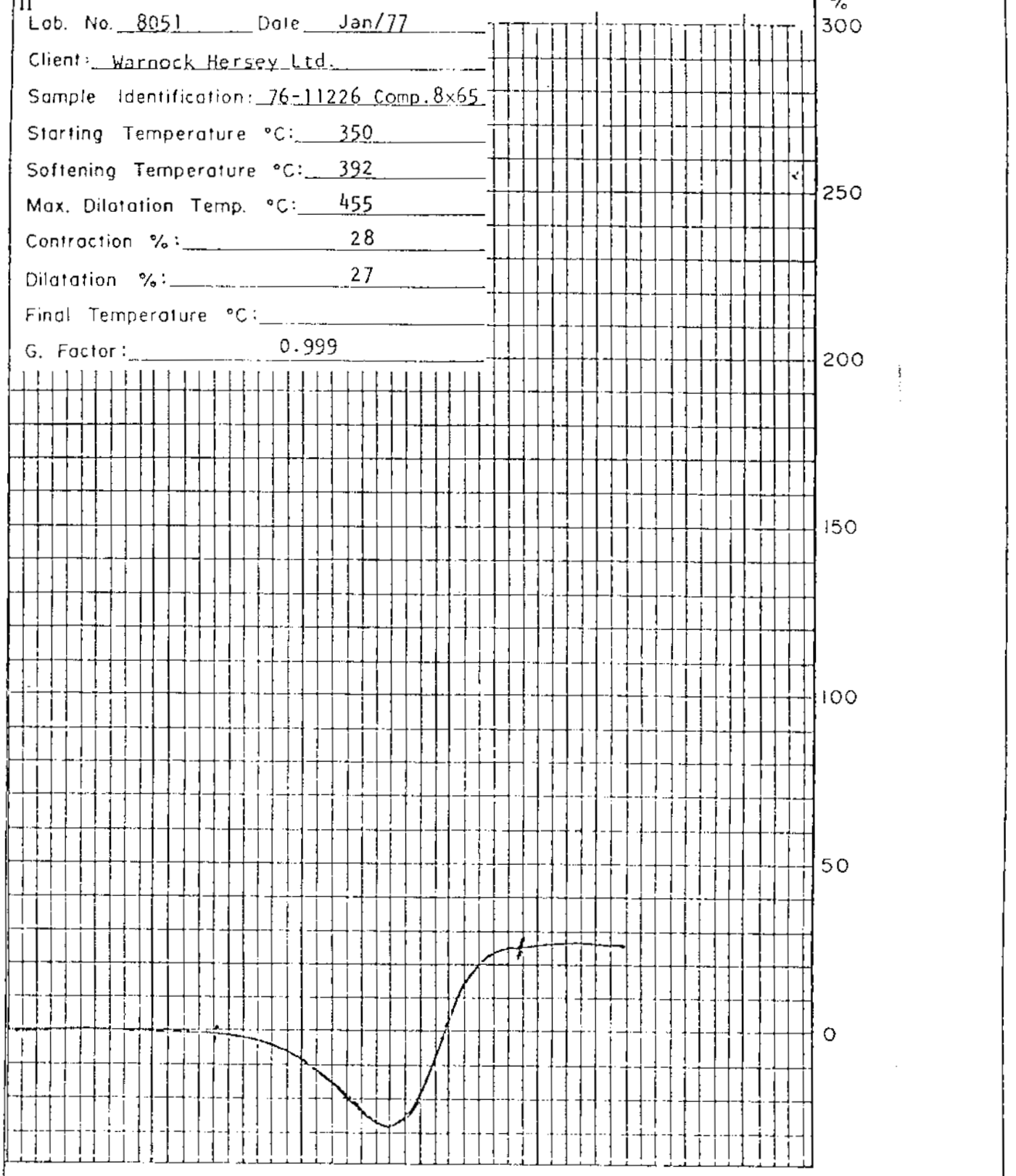
Max. Dilatation Temp. °C: 455

Contraction %: 28

Dilatation %: 27

Final Temperature °C:

G. Factor: 0.999



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 66 - 3 Warnock Hersey Lab. No.: 76 - 11227

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G. I.	Ash	V. M.	F.C.	Sulphur
0.8	51.7	13.5	34.0	0.30	89.3	52.1	13.6	34.3	0.30

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	84.0	1.0	52.3	0.33	52.9	0.33
65 x 0	16.0	0.7	40.9	0.34	41.2	0.34
TOTAL	100.0	--	--	--	51.0	0.33

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	25.2	1.0	7.5	20.8	70.7	0.39	7.6	21.0	71.4	0.39
1.40	1.50	1.5	0.9	12.8	21.3	65.0	0.42	12.9	21.5	65.6	0.42
1.50	1.60	1.8	0.8	22.6	18.6	58.0	0.37	22.8	18.8	58.4	0.37
1.60		71.5	-	--	--	--	--	75.7	--	--	--
TOTAL		100.0	-	-	-	-	-	56.6	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8 ½	0.010						

Lab. No. 8052 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11227 Comp. 8×65

Starting Temperature °C: 350

Softening Temperature °C: 380

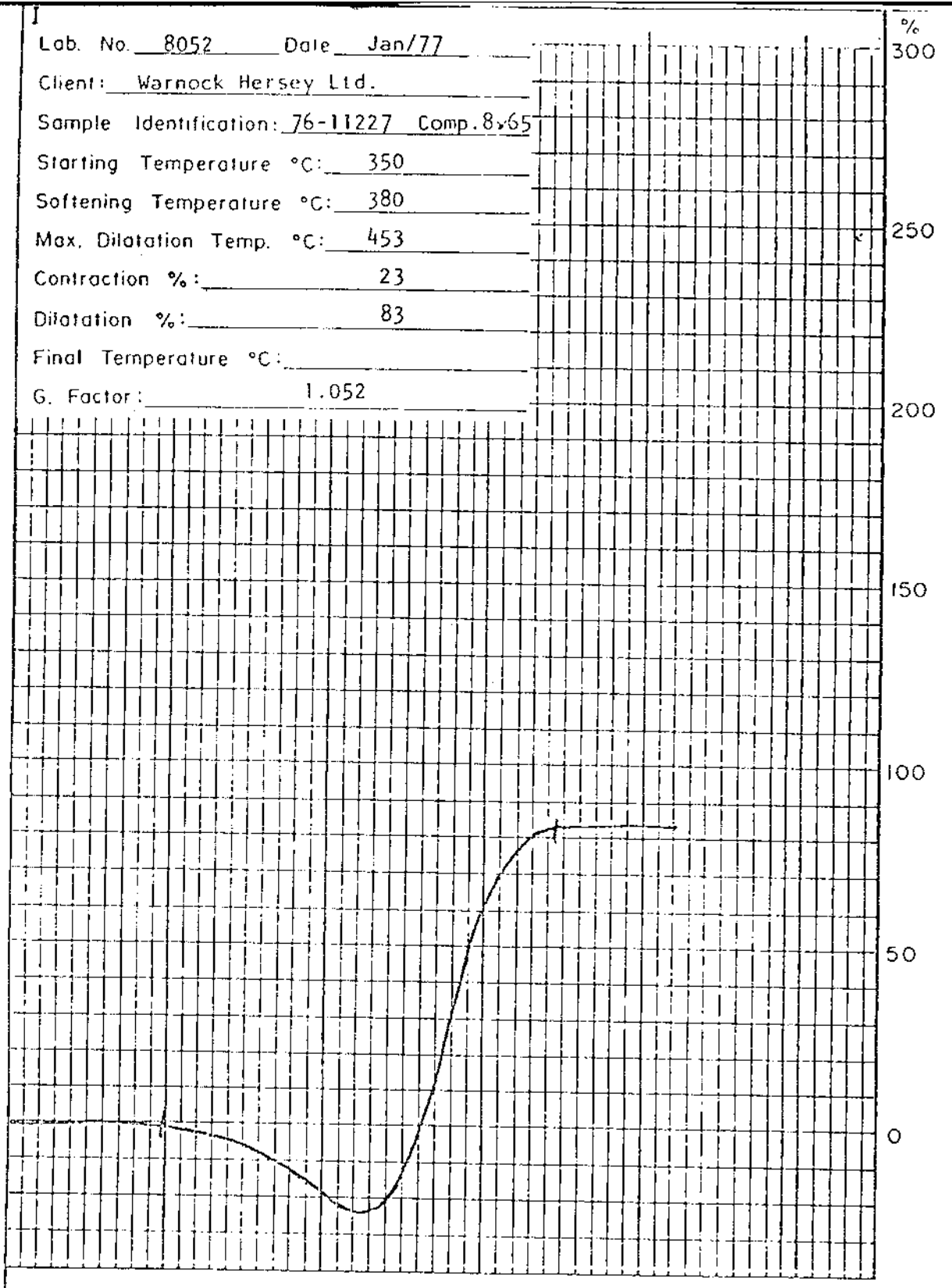
Max. Dilatation Temp. °C: 453

Contraction %: 23

Dilatation %: 83

Final Temperature °C:

G. Factor: 1.052



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. · Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 66 - 4 Warnock Hersey Lab. No.: 76 - 11228

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.4	10.2	22.6	66.8	0.51	119.8	10.2	22.7	67.1	0.51

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	78.3	0.6	11.0	0.51	11.1	0.51
65 x 0	21.7	0.4	10.0	0.53	10.0	0.53
TOTAL	100.0	--	--	--	10.9	0.51

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	76.4	0.6	4.9	21.9	72.6	0.55	4.9	22.0	73.1	0.55
1.40	1.50	10.3	0.5	11.8	21.2	66.5	0.49	11.8	21.3	66.9	0.49
1.50	1.60	4.3	0.5	18.1	19.6	61.8	0.43	18.2	19.7	62.1	0.43
1.60		9.0	--	--	--	--	--	41.4	--	--	--
TOTAL		100.0	--	--	--	--	--	9.5	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
9	0.026						

II

Lab. No. 8053 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11228 Comp 8x65

Starting Temperature °C: 350

Softening Temperature °C: 387

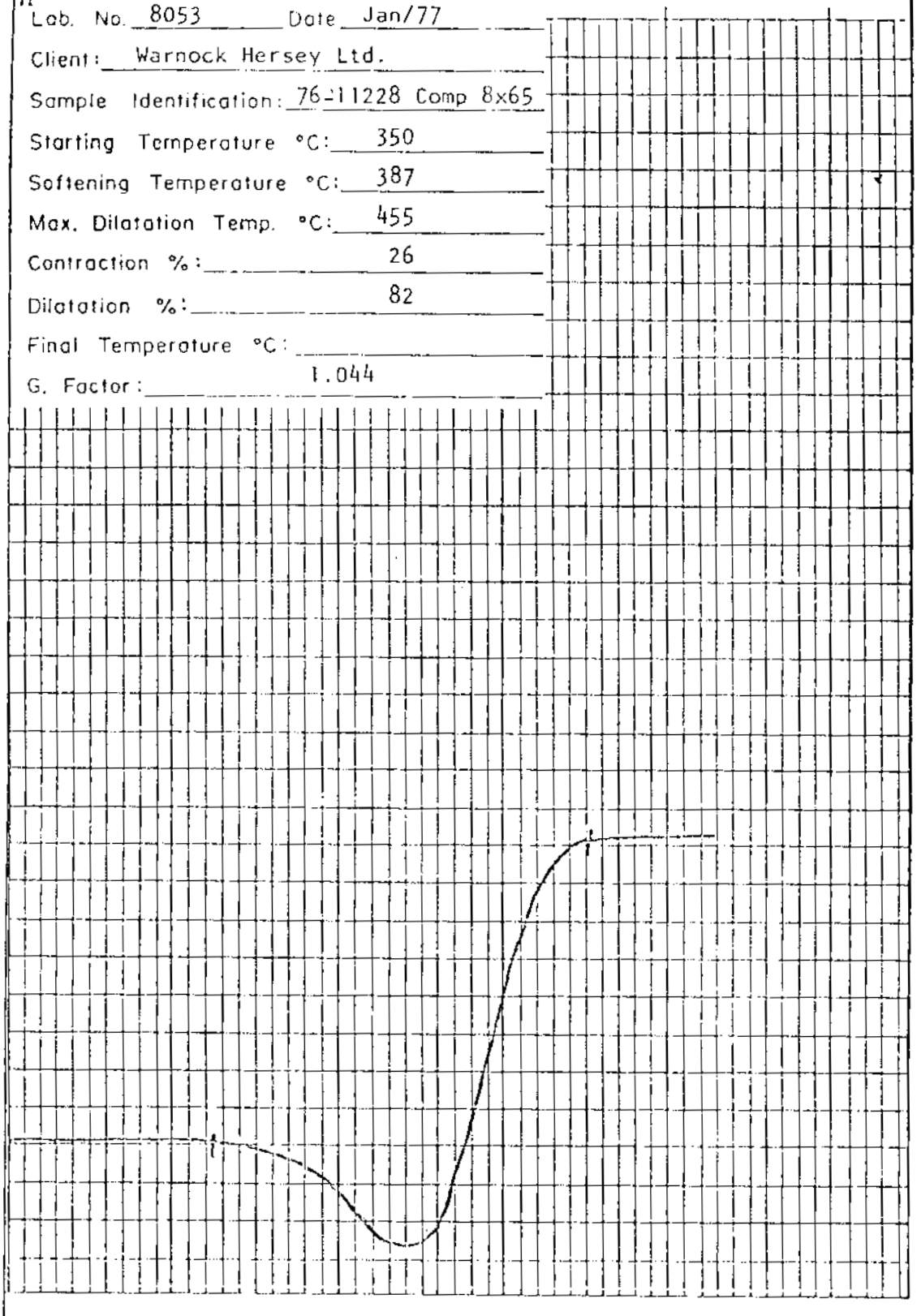
Max. Dilatation Temp. °C: 455

Contraction %: 26

Dilatation %: 82

Final Temperature °C:

G. Factor: 1.044



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 67 - 1 Warnock Hersey Lab. No.: 76 - 11229

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G. I.	Ash	V. M.	F.C.	Sulphur
0.6	26.5	16.6	56.3	0.41	96.2	26.7	16.7	56.6	0.41

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	74.7	0.6	27.3	0.41	27.5	0.41
65 x 0	25.3	0.5	15.0	0.47	15.1	0.47
TOTAL	100.0	--	--	--	24.4	0.42

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	54.0	0.6	5.3	21.1	71.4	0.43	5.3	21.2	73.5	0.43
1.40	1.50	9.1	0.5	14.4	19.5	65.3	0.40	14.5	19.6	65.9	0.40
1.50	1.60	4.9	0.5	20.5	18.9	59.6	0.39	20.6	19.0	60.4	0.39
1.60		32.0	--	--	--	--	--	71.6	--	--	--
TOTAL		100.0	--	--	--	--	--	28.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"C" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
5½	0.032						

I

Lab. No. 8054 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11229 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 405

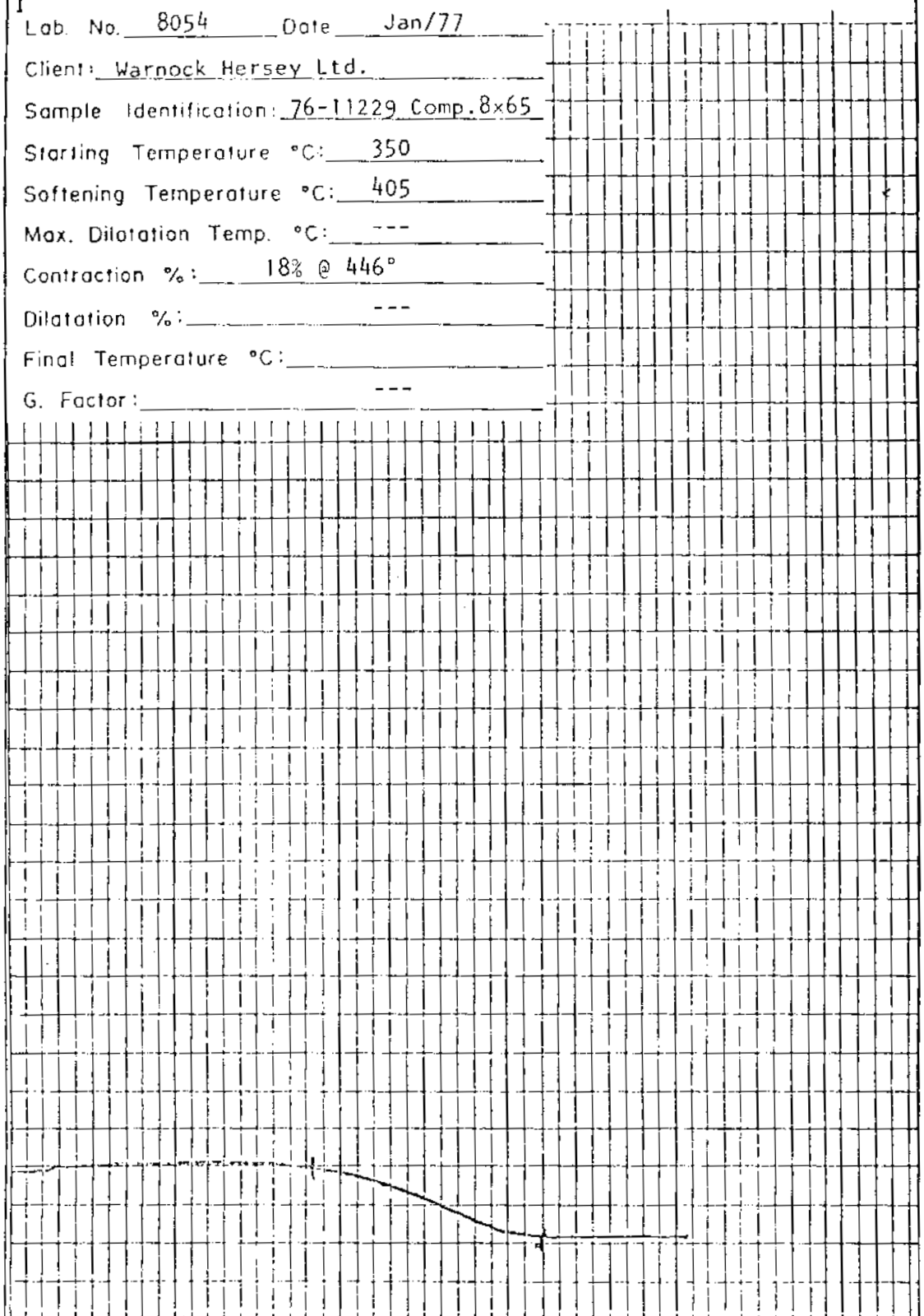
Max. Dilatation Temp. °C: ---

Contraction %: 18% @ 446°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 8000 Date Jan 16, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-68-1

Starting Temperature °C: 350

Softening Temperature °C: 382

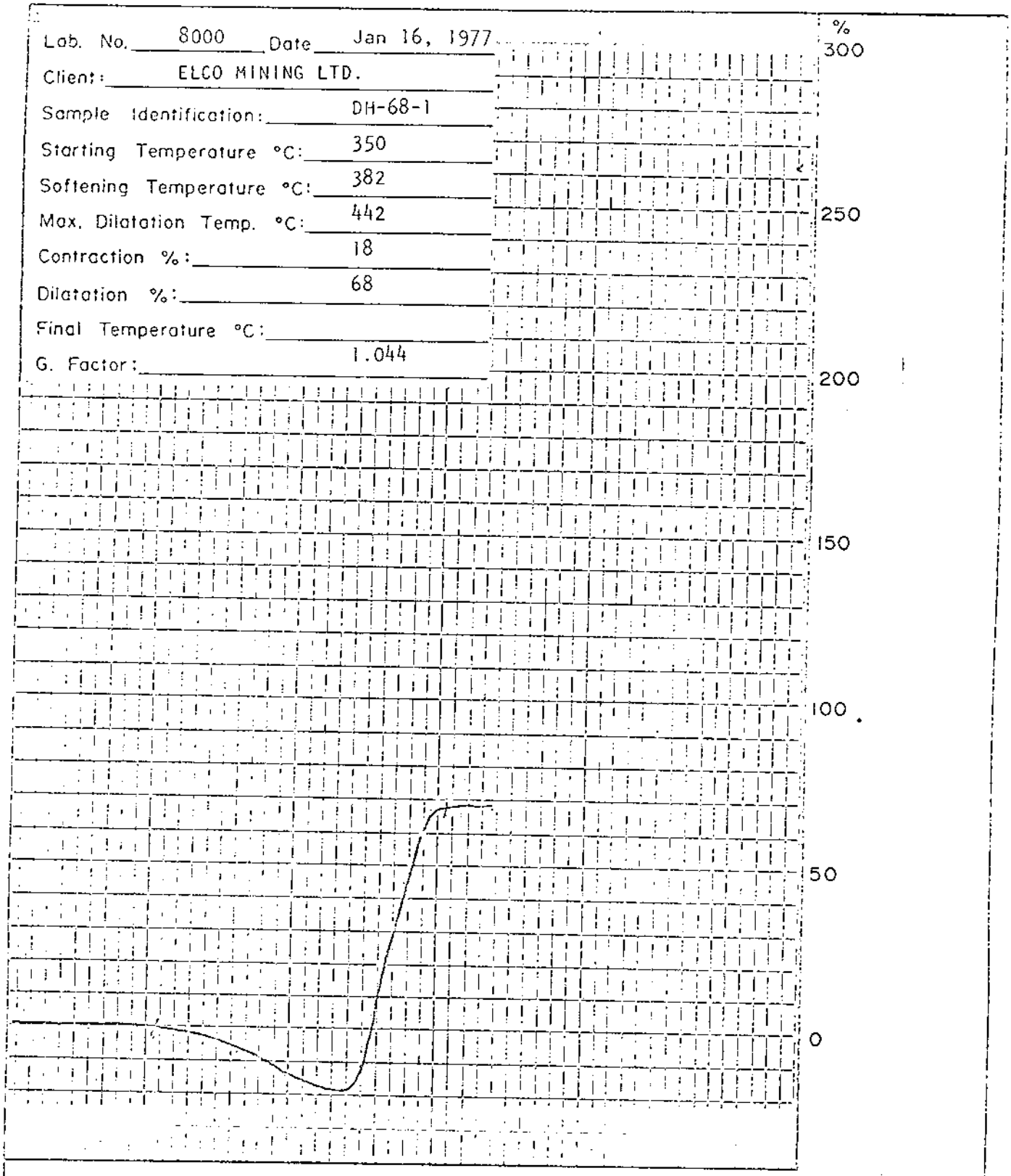
Max. Dilatation Temp. °C: 442

Contraction %: 18

Dilatation %: 68

Final Temperature °C:

G. Factor: 1.044



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 8001 Date Jan 16, 1977.

Client: ELCO MINING LTD.

Sample Identification: DH-68-2

Starting Temperature °C: 350

Softening Temperature °C: 378

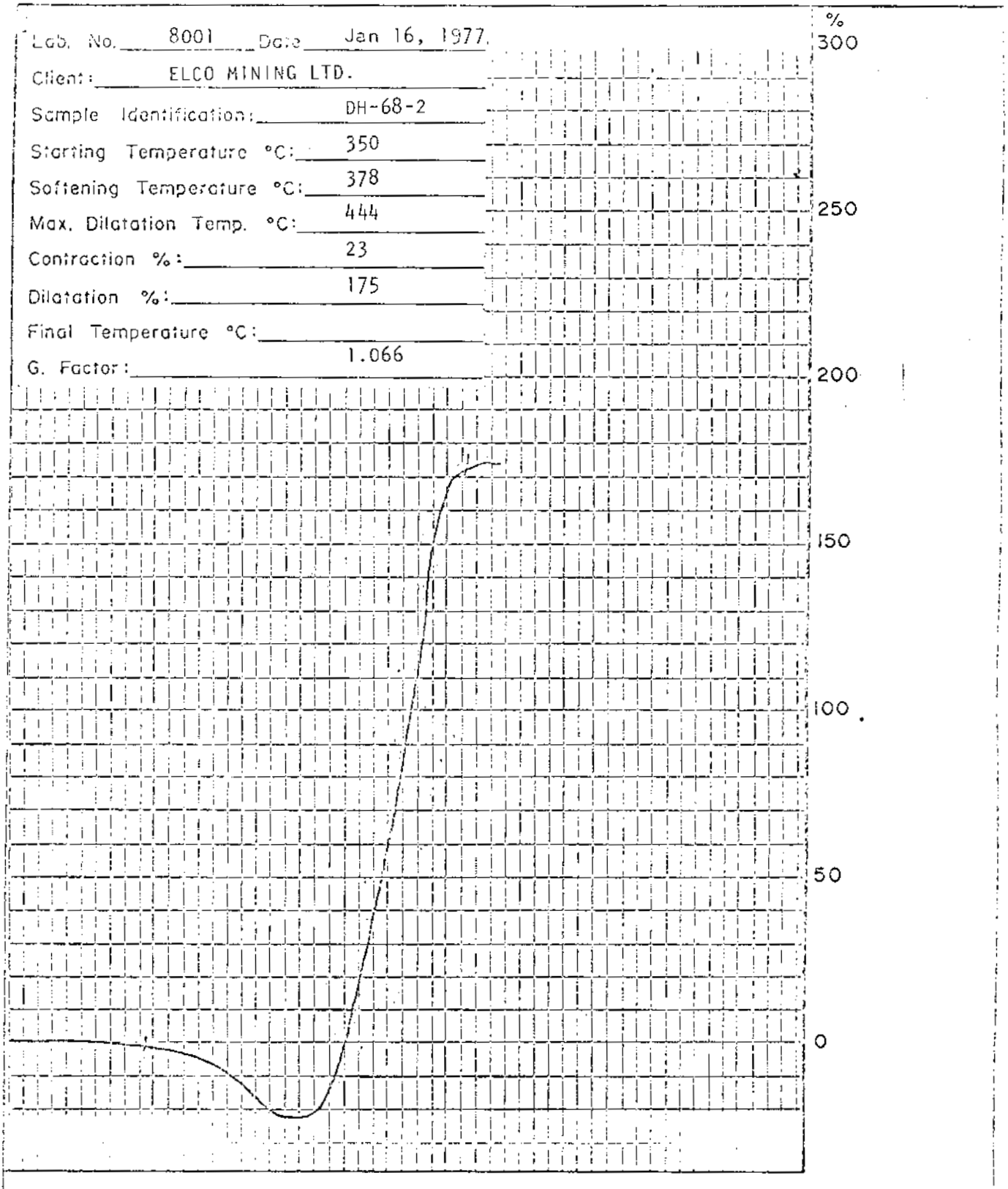
Max. Dilatation Temp. °C: 444

Contraction %: 23

Dilatation %: 175

Final Temperature °C:

G. Factor: 1.066



BARTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 8002 Date Jan 16, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-68-3

Starting Temperature °C: 350

Softening Temperature °C: 387

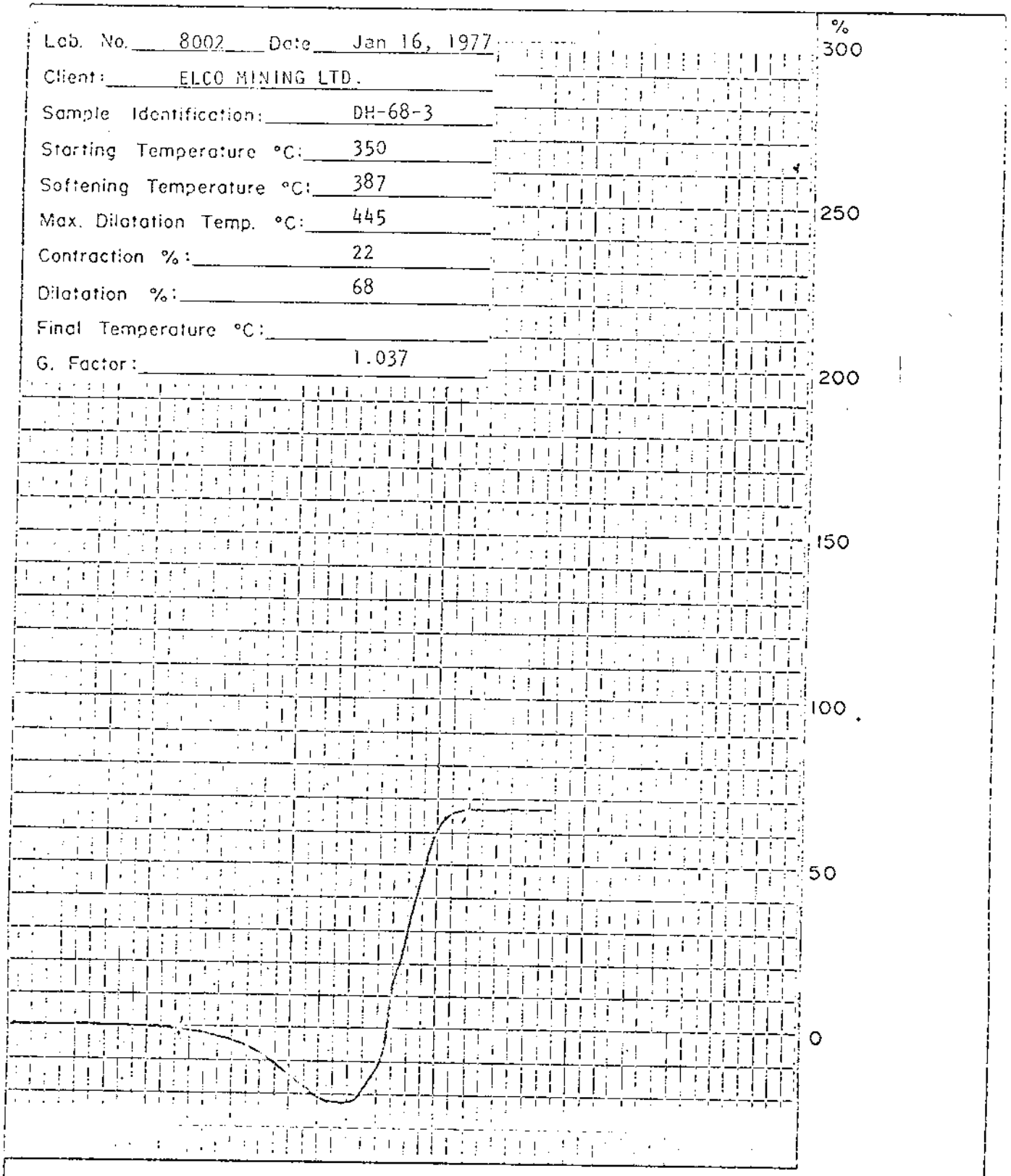
Max. Dilatation Temp. °C: 445

Contraction %: 22

Dilatation %: 68

Final Temperature °C:

G. Factor: 1.037



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 8003 Date Jan 16, 1977.

Client: ELCO MINING LTD.

Sample Identification: DH-68-4

Starting Temperature °C: 350

Softening Temperature °C: 390

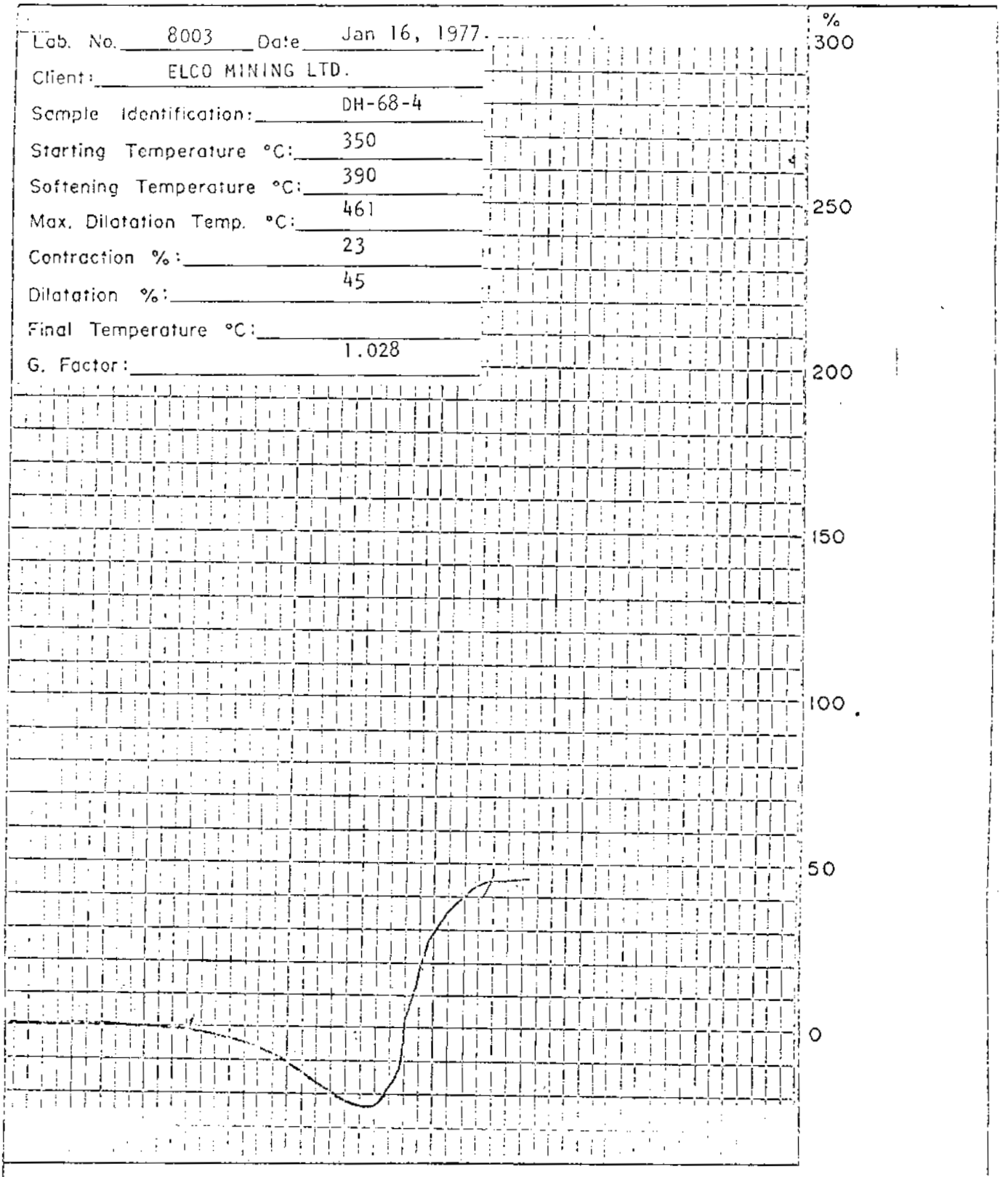
Max. Dilatation Temp. °C: 461

Contraction %: 23

Dilatation %: 45

Final Temperature °C:

G. Factor: 1.028



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 8004 Date Jan 16, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-68-5

Starting Temperature °C: 350

Softening Temperature °C: 411

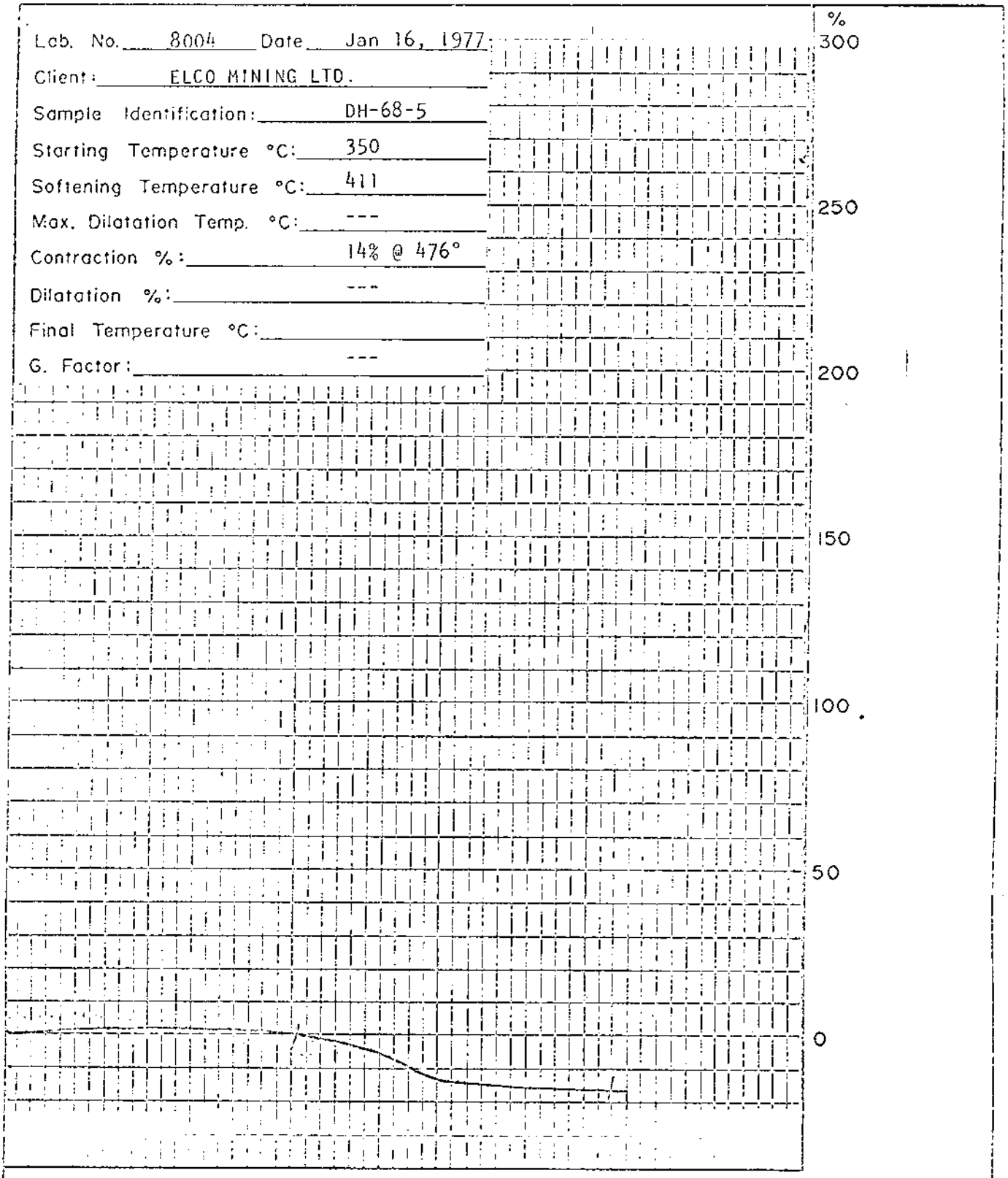
Max. Dilatation Temp. °C: ---

Contraction %: 14% @ 476°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BARTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 8005 Date Jan 16, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-68-6

Starting Temperature °C: 350

Softening Temperature °C: 402

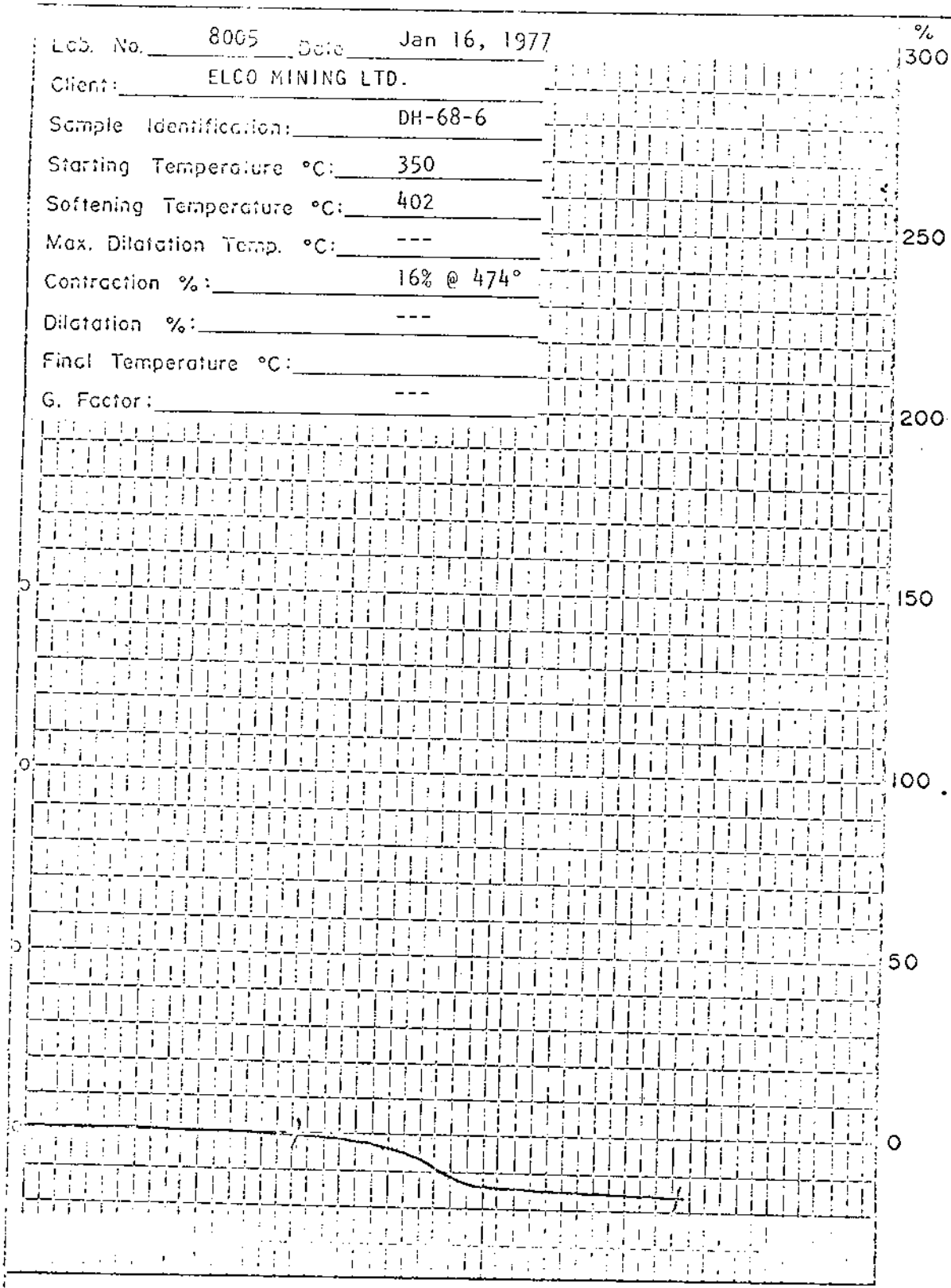
Max. Dilatation Temp. °C: ---

Contraction %: 16% @ 474°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BAILEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 69 - 1 Warnock Hersey Lab. No.: 76 - 11327

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.9	9.4	26.9	62.8	0.59	105.1	9.5	27.2	63.3	0.60

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	82.2	0.7	9.9	0.62	10.0	0.63
65 x 0	17.8	0.8	6.2	0.59	6.2	0.60
TOTAL	100.0	- -	- -	- -	9.3	0.62

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	83.4	0.8	3.4	31.3	64.5	0.70	3.4	31.5	65.1	0.71
1.40	1.50	3.2	0.7	20.3	27.1	51.9	0.64	20.4	25.3	54.3	0.65
1.50	1.60	1.3	0.7	23.2	24.6	51.5	0.60	23.4	24.8	51.8	0.61
1.60		12.1	- -	- -	- -	- -	- -	52.2	- -	- -	- -
TOTAL		100.0	- -	- -	- -	- -	- -	10.4	- -	- -	- -

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"C" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.022						

Lab. No. 8116 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11327

Starting Temperature °C: 350

Softening Temperature °C: 368

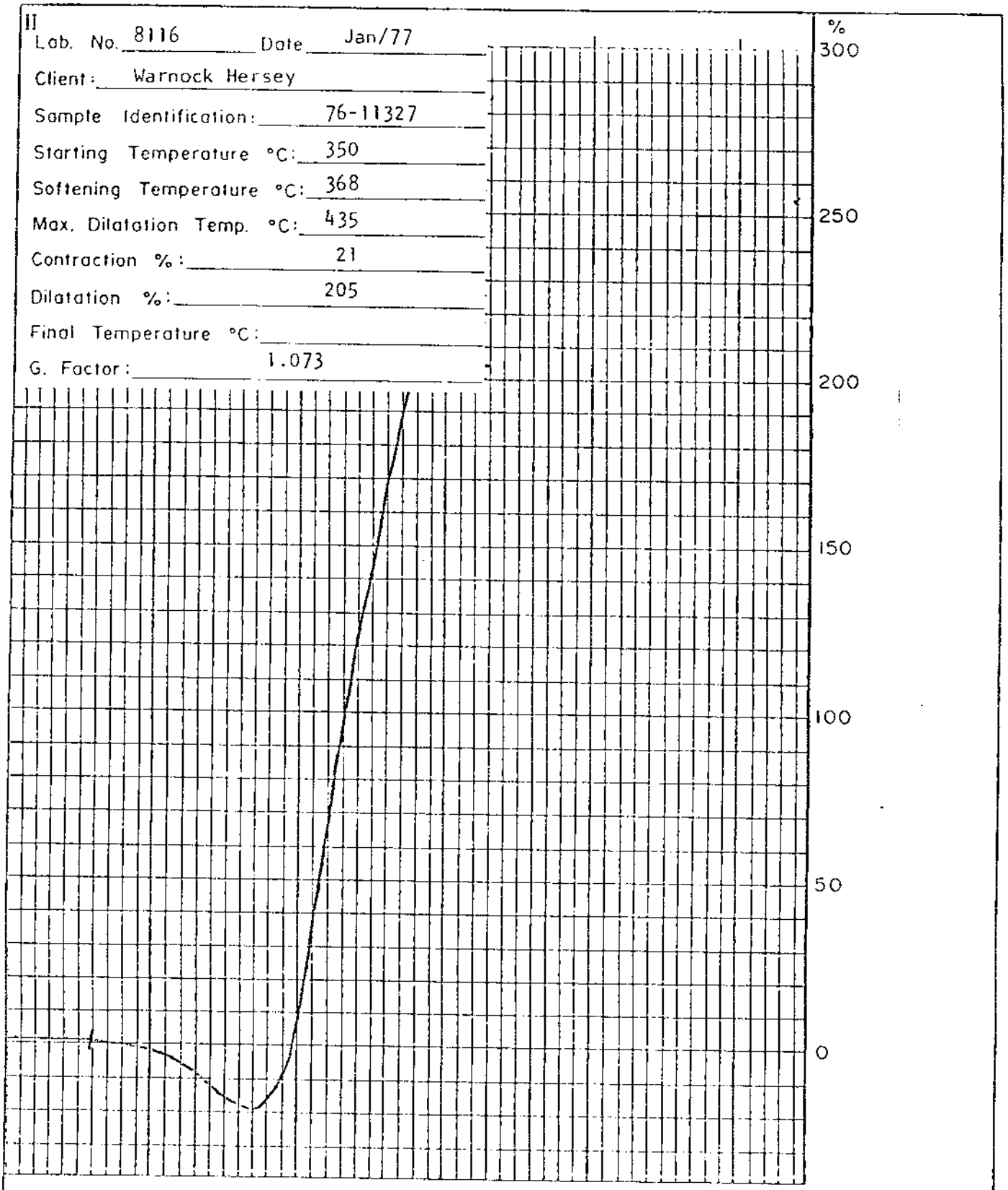
Max. Dilatation Temp. °C: 435

Contraction %: 21

Dilatation %: 205

Final Temperature °C:

G. Factor: 1.073



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 69-2 Warnock Hersey Lab. No.: 76 - 11328

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.7	23.4	23.2	52.7	0.61	100.3	23.6	23.4	53.0	0.62

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.3	0.7	27.2	0.64	27.4	0.65
65 x 0	19.7	0.7	14.3	0.88	14.4	0.89
TOTAL	100.0	--	--	--	24.8	0.70

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	64.5	0.8	4.1	29.6	65.5	0.72	4.1	29.8	66.1	0.73
1.40	1.50	2.5	0.8	20.4	24.6	54.2	0.69	20.6	24.8	54.6	0.70
1.50	1.60	2.5	0.7	28.0	22.0	49.3	0.62	28.2	22.1	49.7	0.63
1.60		30.5	--	--	--	--	--	76.0	--	--	--
TOTAL		100.0	--	--	--	--	--	27.0	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.017						

Lab. No. 8117 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11328

Starting Temperature °C: 350

Softening Temperature °C: 366

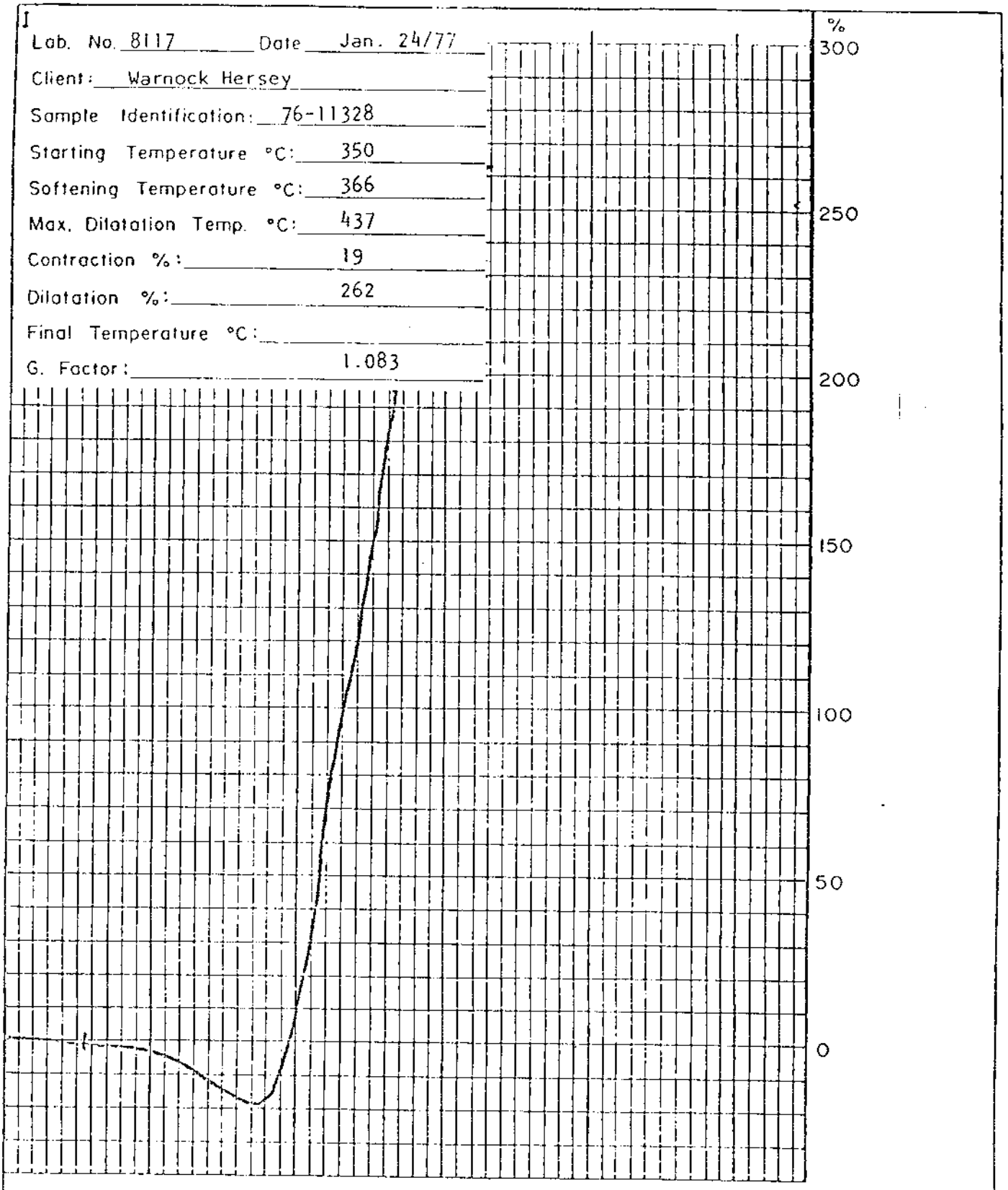
Max. Dilatation Temp. °C: 437

Contraction %: 19

Dilatation %: 262

Final Temperature °C:

G. Factor: 1.083



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 69 - 3 Warnock Hersey Lab. No.: 76 - 11329

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.7	28.9	22.1	48.3	0.90	92.7	29.1	22.2	48.7	0.91

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	85.6	0.6	30.0	0.92	30.2	0.93
65 x 0	14.4	0.7	18.8	1.02	19.0	1.03
TOTAL	100.0	--	--	--	28.6	0.94

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	52.9	0.7	6.6	28.8	63.9	0.99	6.6	29.0	64.4	1.00
1.40	1.50	6.0	0.6	16.0	26.3	57.1	0.93	16.1	26.5	57.4	0.94
1.50	1.60	3.5	0.7	27.7	22.7	48.9	0.91	27.9	22.8	50.7	0.92
1.60		37.6	--	--	--	--	--	66.8	--	--	--
TOTAL		100.0	--	--	--	--	--	30.5	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.025						

Lab. No. 8118 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11329

Starting Temperature °C: 350

Softening Temperature °C: 367

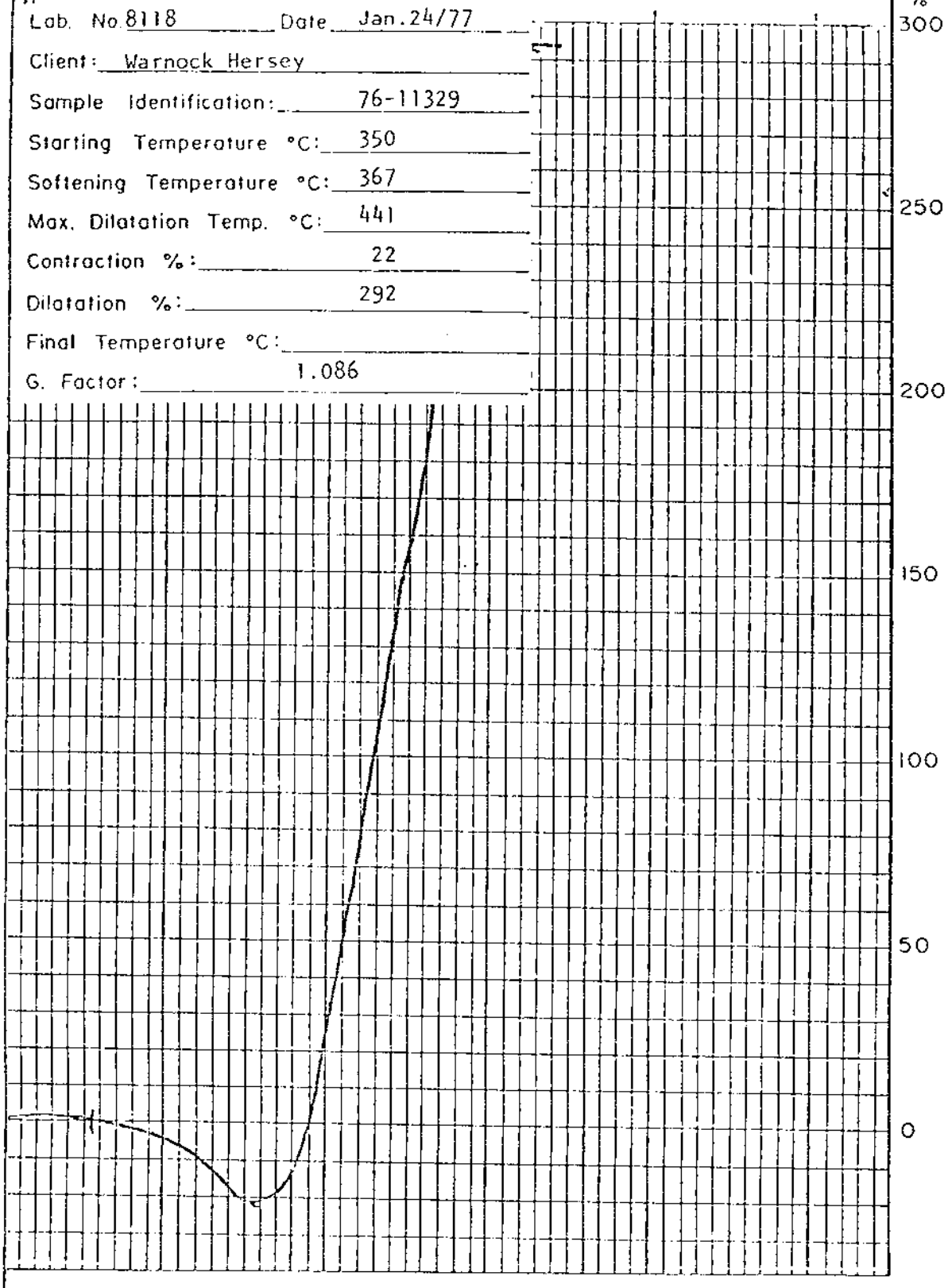
Max. Dilatation Temp. °C: 441

Contraction %: 22

Dilatation %: 292

Final Temperature °C:

G. Factor: 1.086



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 69 - 4 Warnock Hersey Lab. No.: 76 - 11330

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G. I.	Ash	V. M.	F.C.	Sulphur
0.7	16.9	23.5	58.9	0.63	140.8	17.0	23 7	59.3	0.64

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	76.7	0.6	19.8	0.64	20.0	0.64
65 x 0	23.3	0.7	8.2	0.77	8.3	0.78
TOTAL	100.0	--	--	--	17.3	0.67

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	68.7	0.7	4.9	27.4	67.0	0.70	4.9	27.6	67.5	0.71
1.40	1.50	5.1	0.6	13.7	22.2	63.5	0.66	13.8	22.4	63.8	0.66
1.50	1.60	4.4	0.6	25.1	19.5	54.8	0.62	25.3	19.6	55.1	0.62
1.60		21.8	--	--	--	--	--	64.6	--	--	--
TOTAL		100.0	--	--	--	--	--	19.3	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.027						

I

Lab. No. 8119 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11330

Starting Temperature °C: 350

Softening Temperature °C: 382

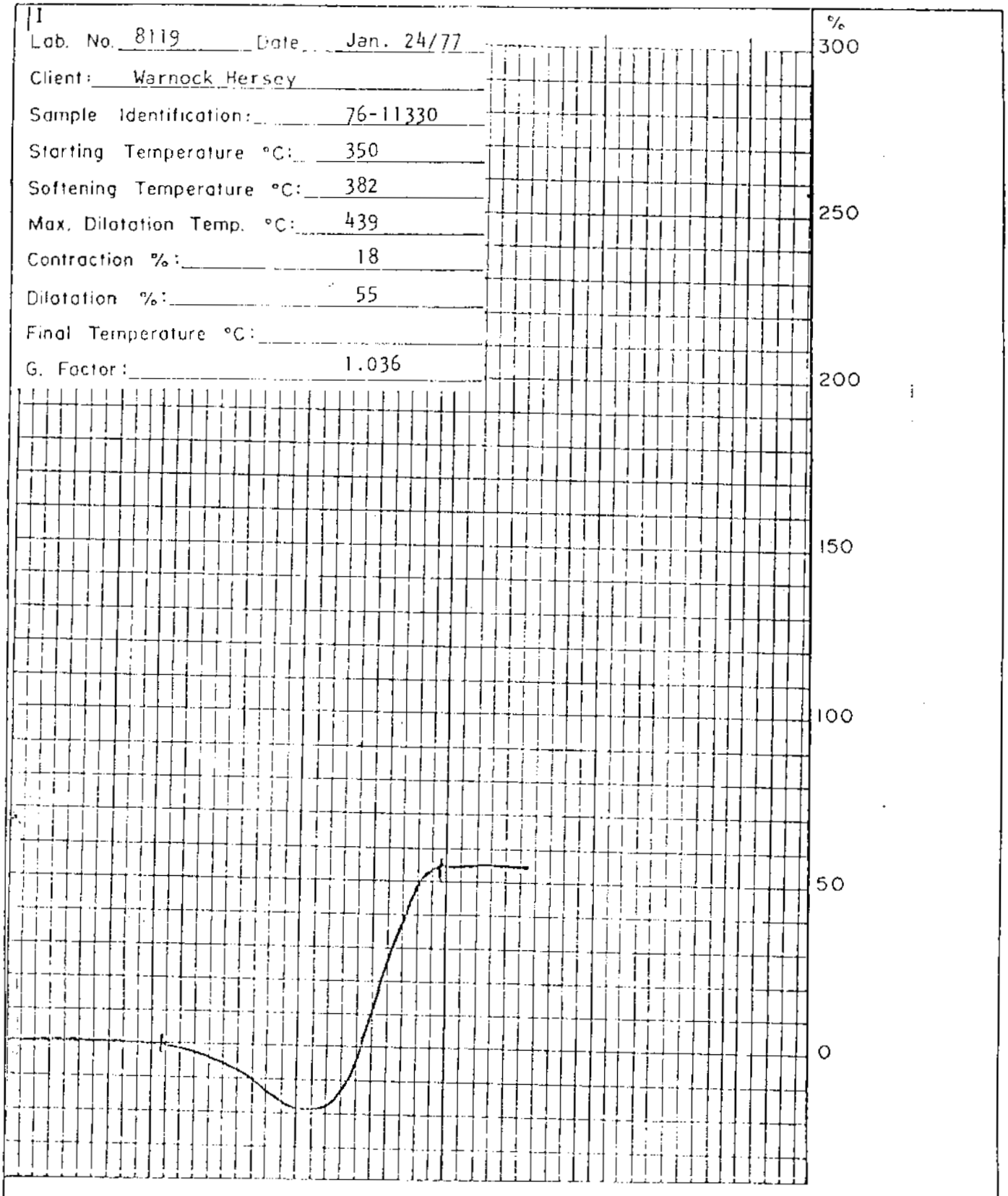
Max. Dilatation Temp. °C: 439

Contraction %: 18

Dilatation %: 55

Final Temperature °C:

G. Factor: 1.036



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 69 - 5 Warnock Hersey Lab. No.: 76 - 11331

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.7	10.8	22.7	65.8	0.61	129.4	10.9	22.9	66.2	0.61

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	65.3	0.6	12.8	0.62	12.8	0.62
65 x 0	34.7	0.7	6.6	0.78	6.6	0.78
TOTAL	100.0	--	--	--	10.6	0.68

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	73.9	0.6	4.4	23.1	71.9	0.71	4.4	23.2	72.4	0.71
1.40	1.50	10.6	0.6	13.7	23.0	62.7	0.68	13.8	23.2	63.0	0.68
1.50	1.60	4.3	0.6	21.5	21.1	56.8	0.63	21.6	21.2	57.2	0.63
1.60		11.2	--	--	--	--	--	53.2	--	--	--
TOTAL		100.0	--	--	--	--	--	11.6	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
6½	0.042						

Lab. No. 8120 Date Jan. 24/77

Client: Warnock Hersey

Sample Identification: 76-11331

Starting Temperature °C: 350

Softening Temperature °C: 377

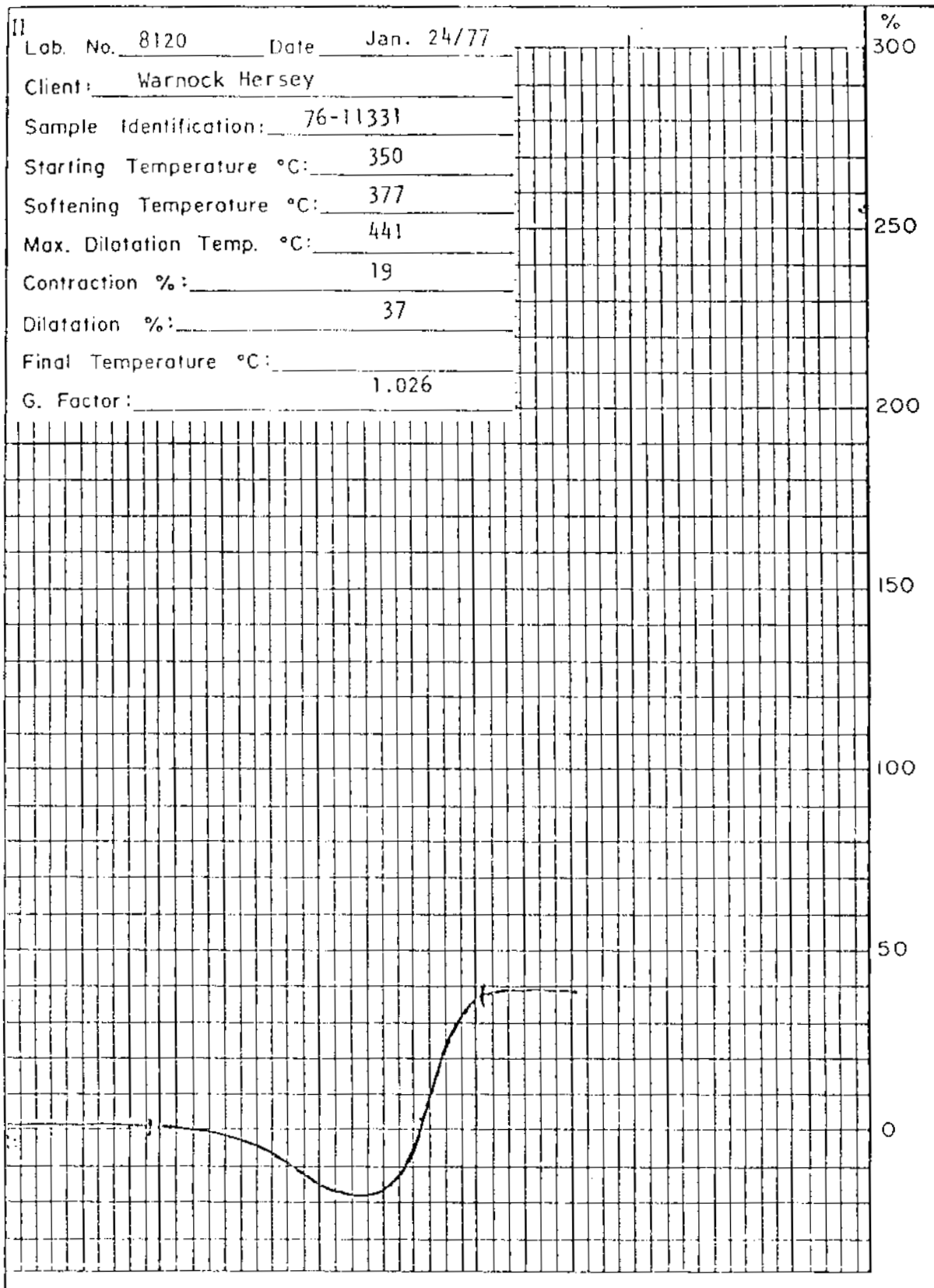
Max. Dilatation Temp. °C: 441

Contraction %: 19

Dilatation %: 37

Final Temperature °C:

G. Factor: 1.026



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 70 - 1

Warnock Hersey Lab. No.: 76 - 11230

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.9	12.8	29.7	56.6	0.45	70.3	12.9	30.0	57.1	0.45

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	77.5	1.0	13.7	0.44	13.8	0.44
65 x 0	22.5	1.0	10.8	0.45	10.9	0.45
TOTAL	100.0	--	--	--	13.1	0.44

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	80.5	1.0	2.9	31.2	64.9	0.43	2.9	31.7	64.4	0.43
1.40	1.50	3.2	1.0	13.8	28.0	57.2	0.44	13.9	28.3	57.8	0.44
1.50	1.60	2.3	0.9	23.7	25.3	50.1	0.42	23.9	25.5	50.6	0.42
1.60		14.0	--	--	--	--	--	68.2	--	--	--
TOTAL		100.0	--	--	--	--	--	12.9	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.014						

Lab. No. 8055 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11230 Comp. 8×65

Starting Temperature °C: 350

Softening Temperature °C: 368

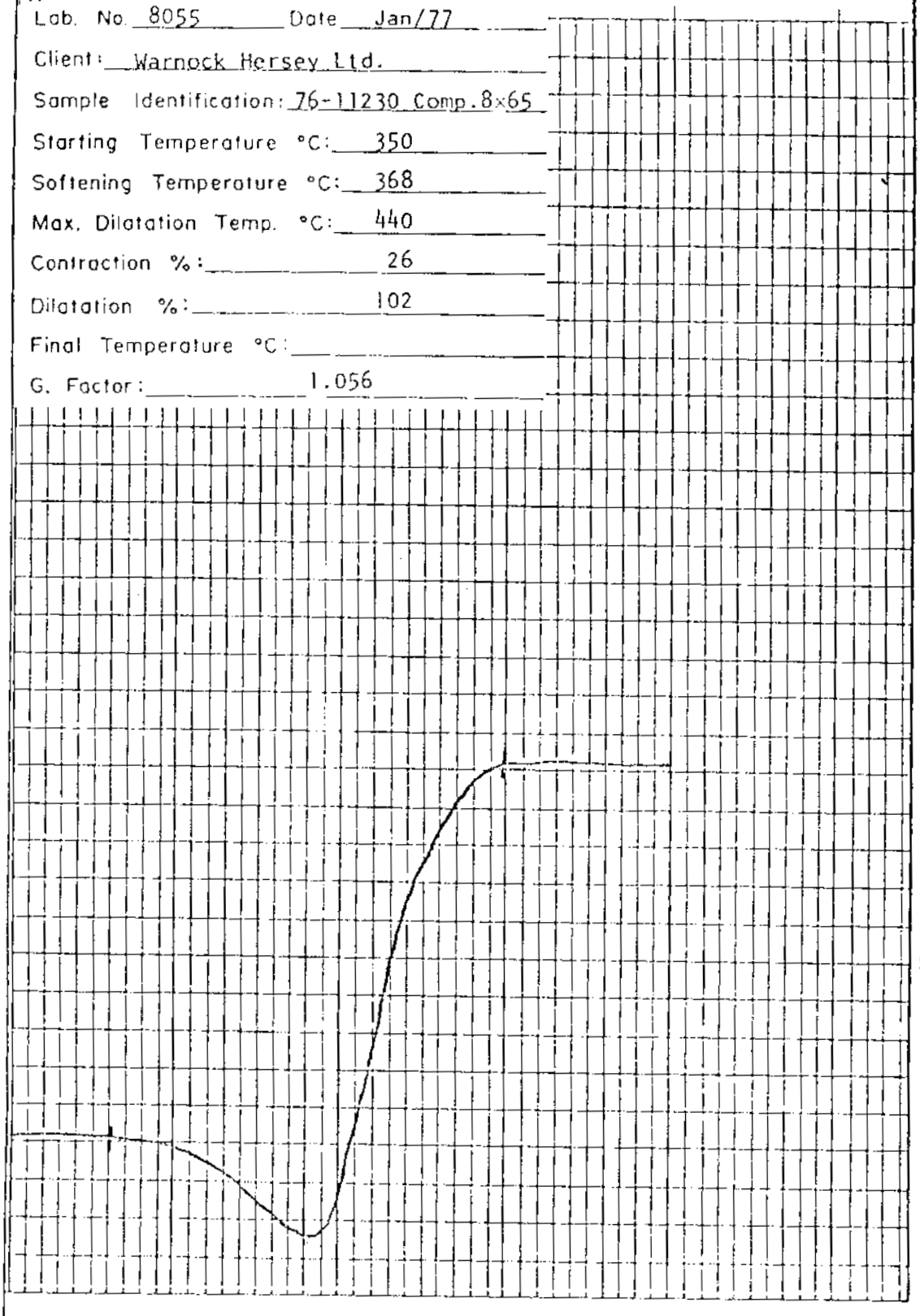
Max. Dilatation Temp. °C: 440

Contraction %: 26

Dilatation %: 102

Final Temperature °C:

G. Factor: 1.056



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 70 - 2 — Warnock Hersey Lab. No.: 76 - 11231

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	12.1	27.7	59.4	0.56	103.1	12.2	27.9	59.9	0.56

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	73.0	1.0	12.8	0.60	13.0	0.61
65 x 0	27.0	0.9	13.2	0.58	13.3	0.59
TOTAL	100.0	--	--	--	13.1	0.60

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	80.3	1.0	2.6	31.0	65.4	0.59	2.6	31.3	66.1	0.60
1.40	1.50	3.0	0.8	11.0	28.2	60.0	0.55	11.1	28.4	60.5	0.55
1.50	1.60	2.2	0.8	17.8	26.3	55.1	0.49	17.9	26.5	55.6	0.49
1.60		14.5	--	--	--	--	--	69.3	--	--	--
TOTAL		100.0	--	--	--	--	--	12.9	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.014						

Lab. No. 8056 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11231 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 369

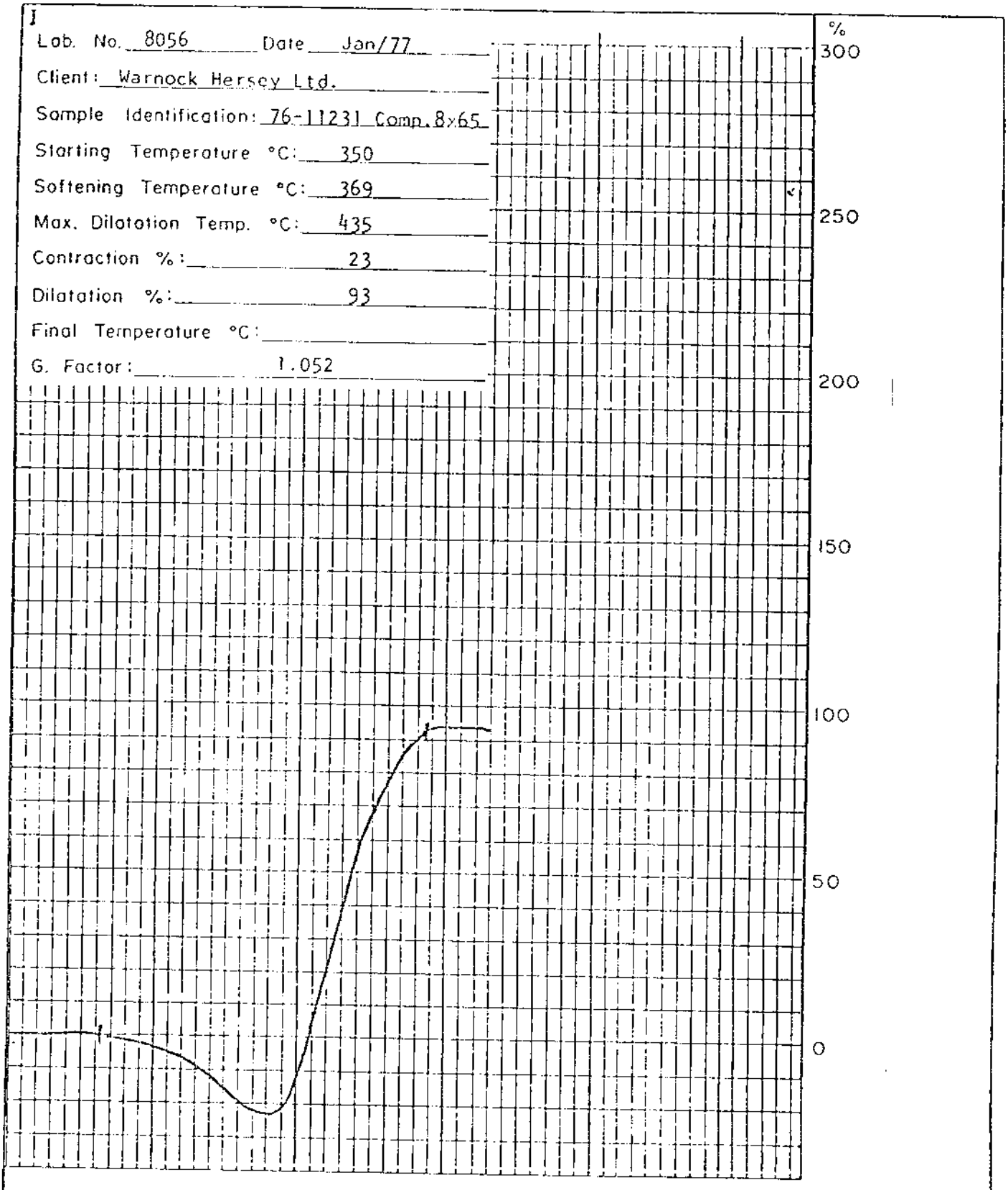
Max. Dilatation Temp. °C: 435

Contraction %: 23

Dilatation %: 93

Final Temperature °C:

G. Factor: 1.052



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 70 - 3 — Warnock Hersey Lab. No.: 76 - 11232

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	18.1	25.2	55.9	0.74	103.1	18.2	25.4	56.4	0.75

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	76.5	0.9	18.9	0.79	19.0	0.80
65 x 0	23.5	0.8	12.7	0.78	12.8	0.79
TOTAL	100.0	--	--	--	17.5	0.80

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS,						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	61.2	0.9	3.4	30.0	65.7	0.78	3.4	30.3	66.3	0.79
1.40	1.50	5.6	0.8	9.7	28.4	60.9	0.76	9.8	28.6	61.6	0.77
1.50	1.60	4.4	0.8	16.9	26.5	55.8	0.73	17.0	26.7	56.3	0.74
1.60		28.8	--	--	--	--	--	58.1	--	--	--
TOTAL		100.0	--	--	--	--	--	20.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8½	0.020						

II

Lab. No. 8057 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11232 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 367

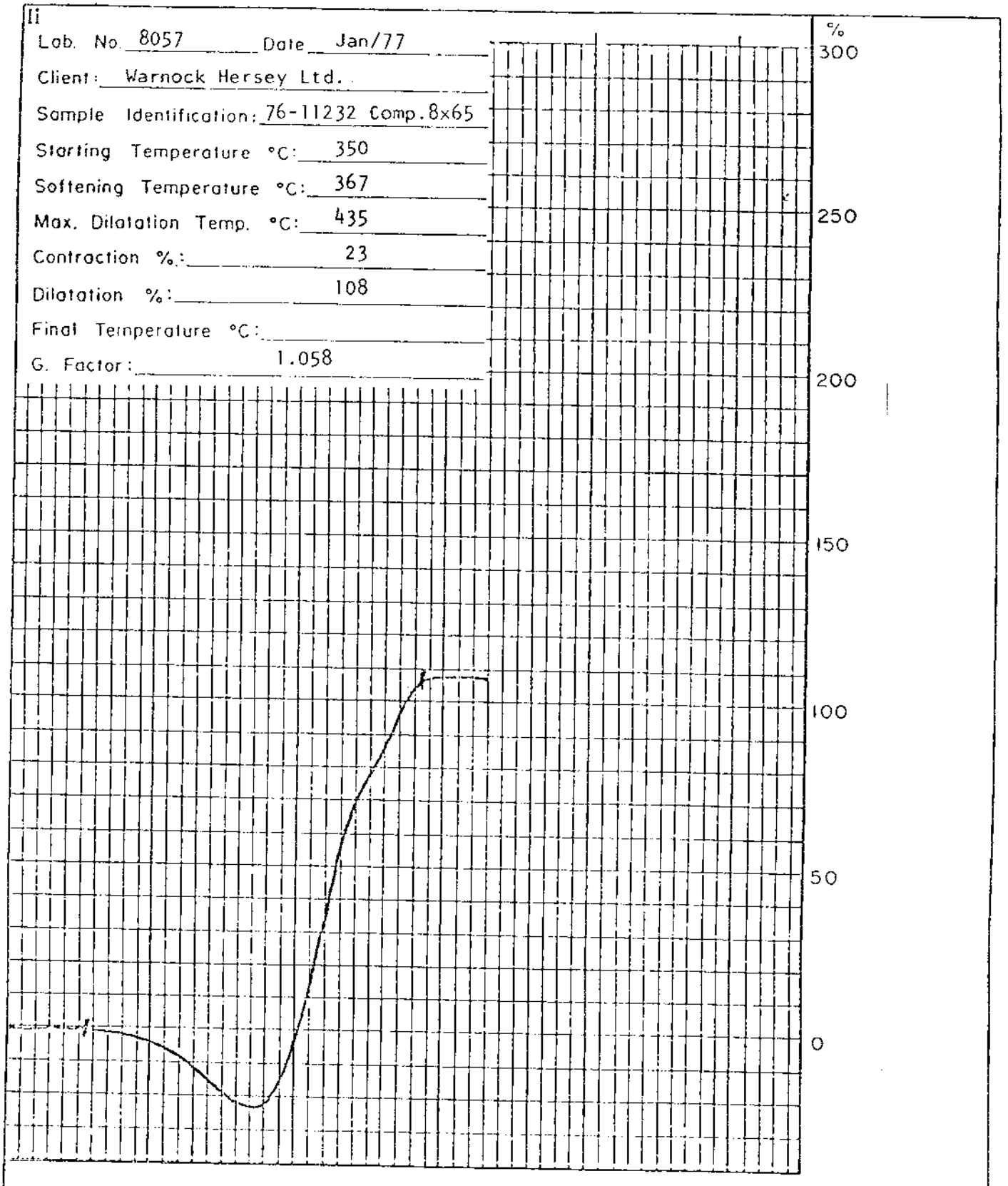
Max. Dilatation Temp. °C: 435

Contraction %: 23

Dilatation %: 108

Final Temperature °C:

G. Factor: 1.058



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 70 - 4 Warnock Hersey Lab. No.: 76 - 11233

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.7	11.1	26.1	62.1	0.70	123.9	11.2	26.3	62.5	0.70

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	75.0	0.8	11.3	0.75	11.4	0.76
65 x 0	25.0	0.8	8.7	0.82	8.8	0.83
TOTAL	100.0	--	--	--	10.7	0.78

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	54.5	0.8	3.0	30.2	66.0	0.83	3.0	30.4	66.6	0.78
1.40	1.50	21.9	0.8	6.0	29.2	64.0	0.76	6.0	29.4	64.6	0.77
1.50	1.60	5.6	0.8	9.5	28.9	60.8	I. S.*	9.6	29.1	61.3	I. S.*
1.60		18.0	--	--	--	--	--	50.3	--	--	--
TOTAL		100.0	--	--	--	--	--	12.6	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.015						

* refers to Insufficient sample

Lab. No. 8058 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11233 Comp. 8×65

Starting Temperature °C: 350

Softening Temperature °C: 366

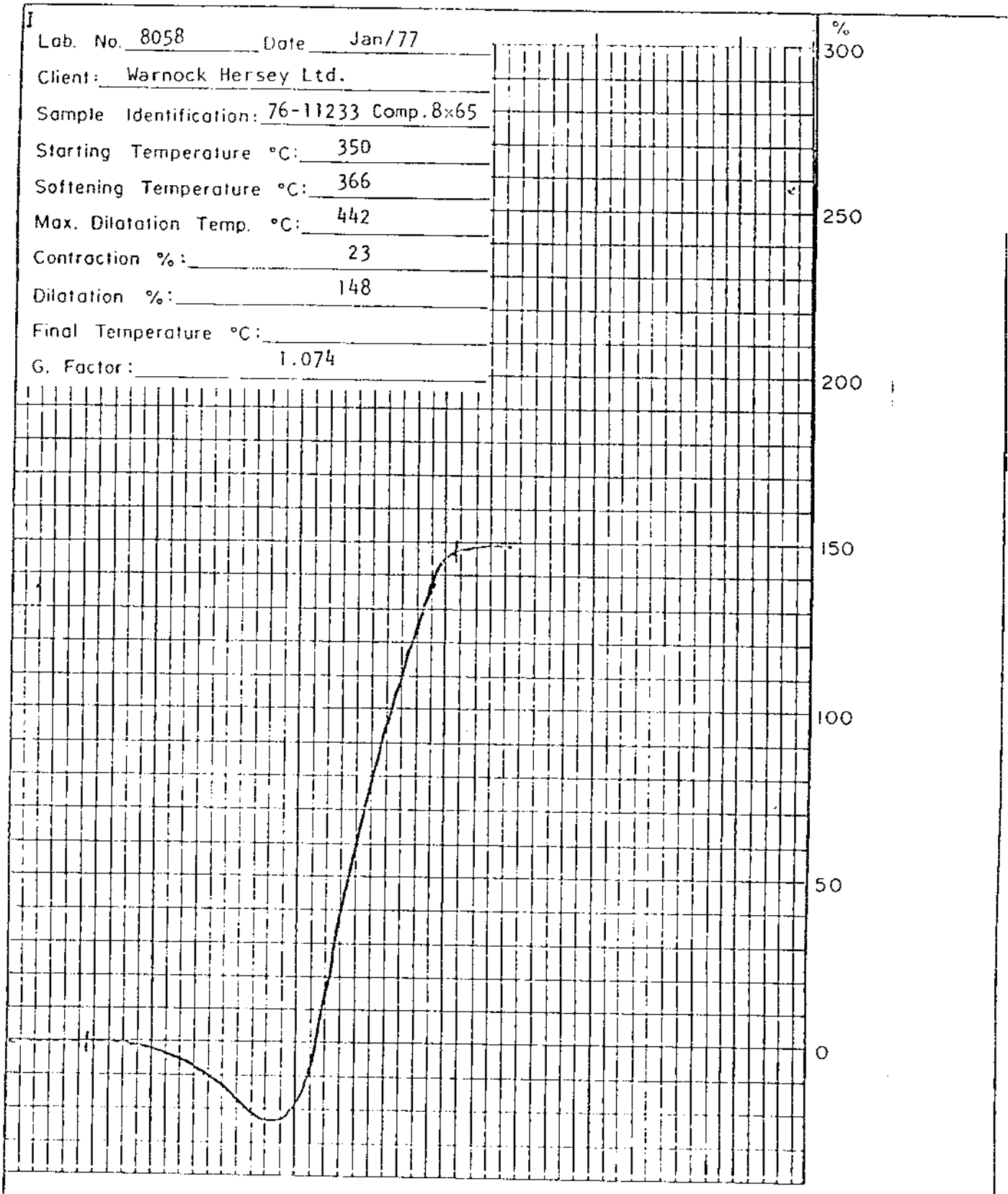
Max. Dilatation Temp. °C: 442

Contraction %: 23

Dilatation %: 148

Final Temperature °C:

G. Factor: 1.074



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7904 Date Nov. 24, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-71-1

Starting Temperature °C: 360

Softening Temperature °C: 362

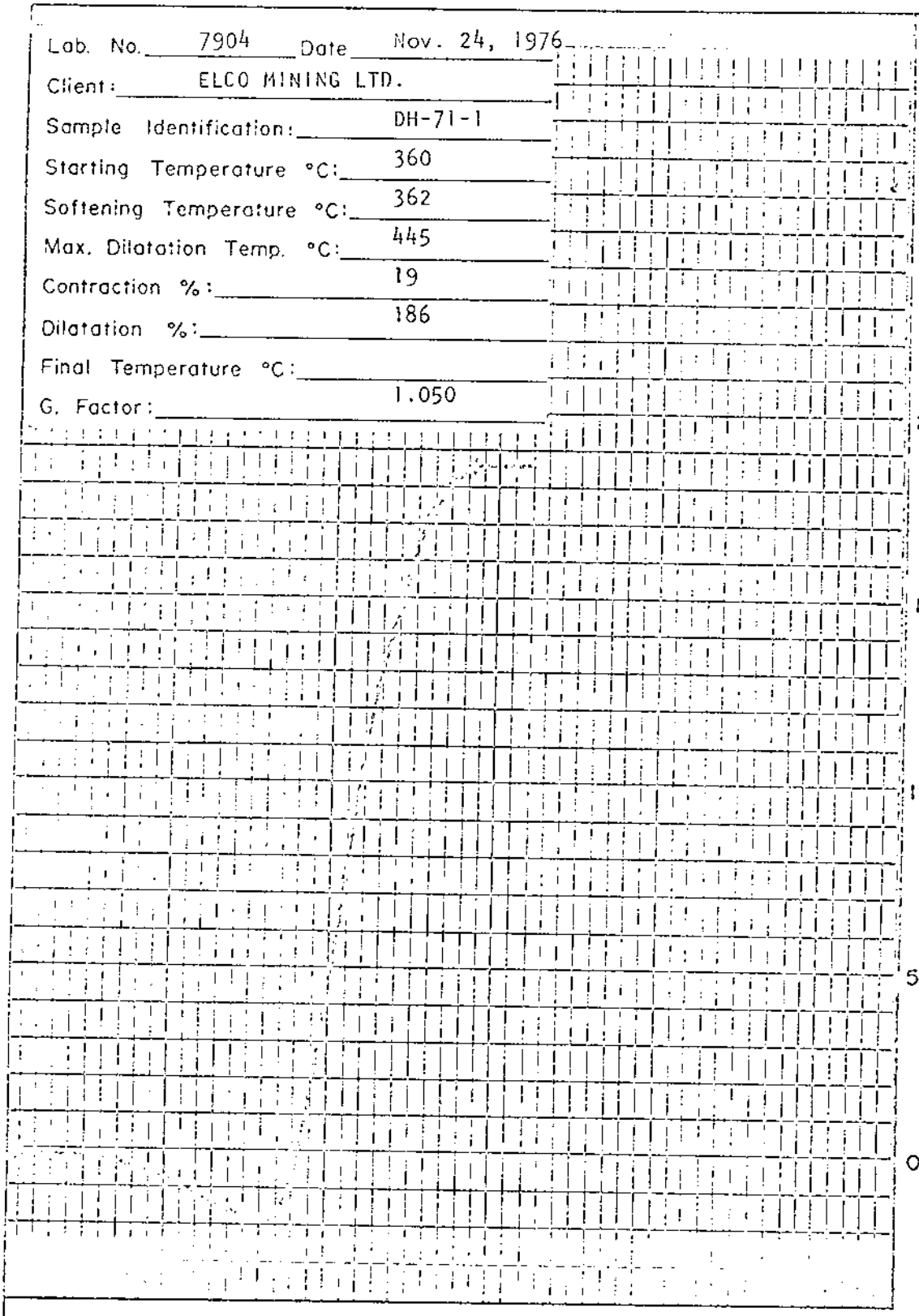
Max. Dilatation Temp. °C: 445

Contraction %: 19

Dilatation %: 186

Final Temperature °C:

G. Factor: 1.050



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7905 Date Nov. 24, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-71-2

Starting Temperature °C: 360

Softening Temperature °C: 367

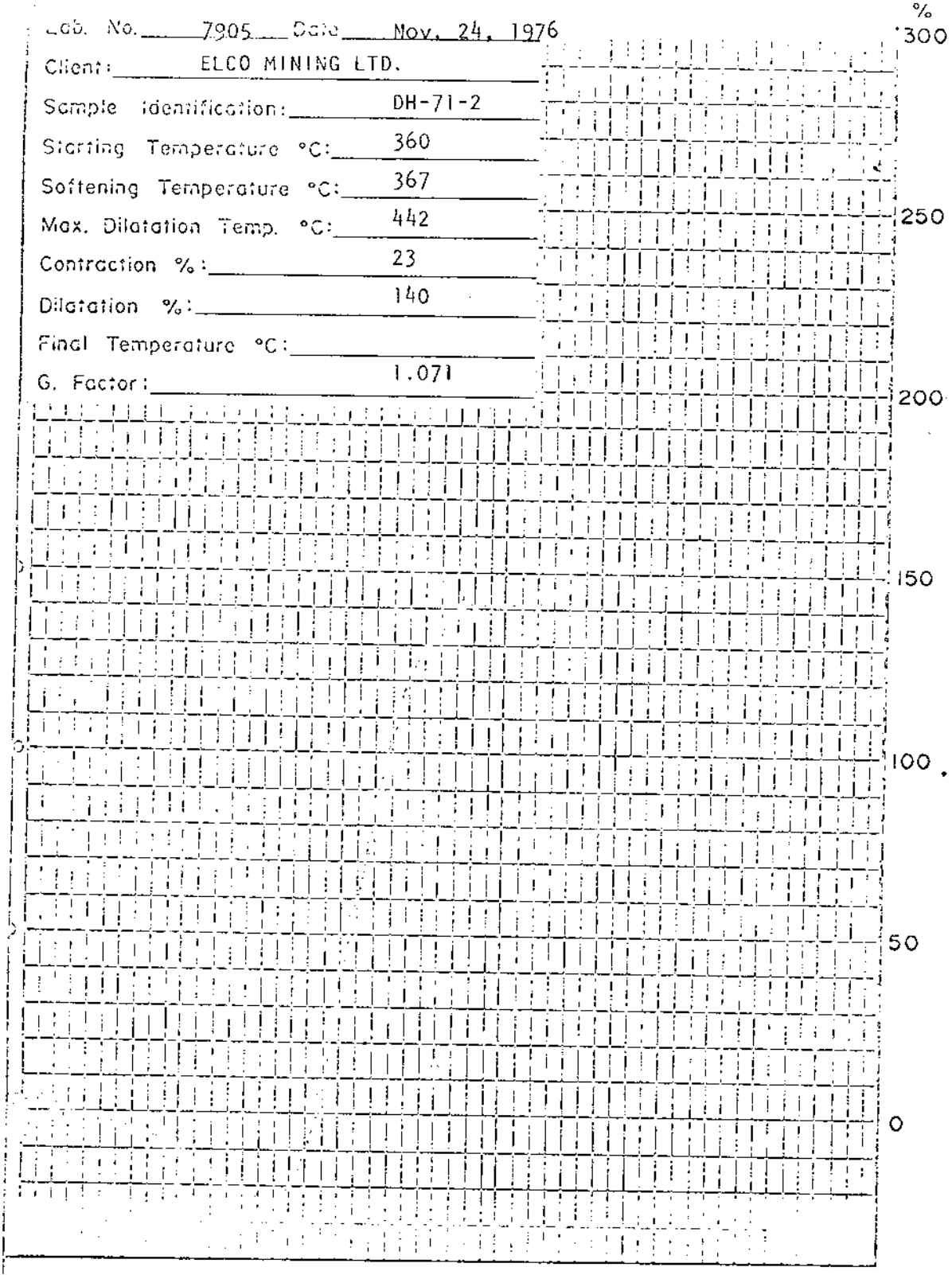
Max. Dilatation Temp. °C: 442

Contraction %: 23

Dilatation %: 140

Final Temperature °C:

G. Factor: 1.071



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7906 Date Dec. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-71-3

Starting Temperature °C: 360

Softening Temperature °C: 371

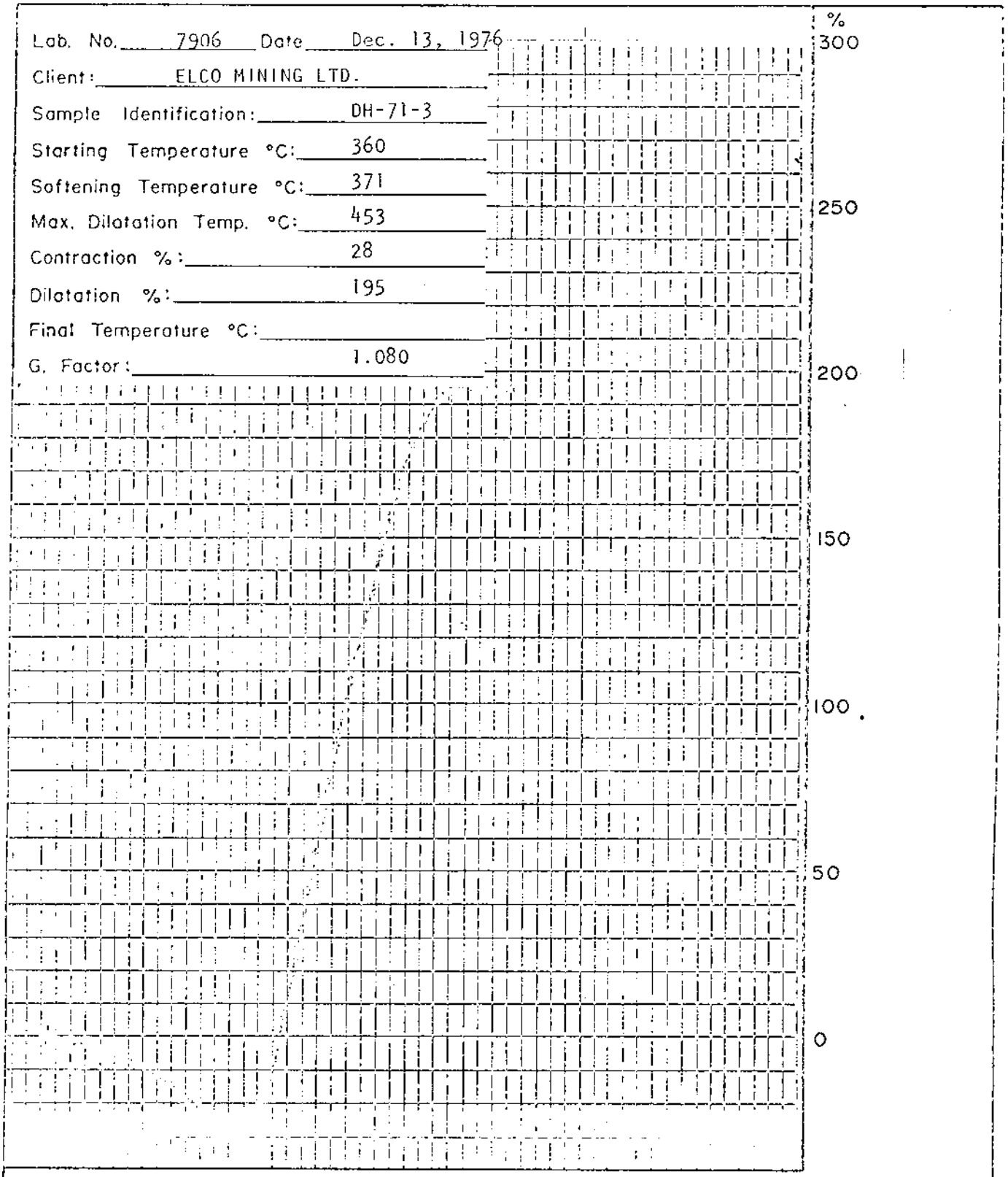
Max. Dilatation Temp. °C: 453

Contraction %: 28

Dilatation %: 195

Final Temperature °C:

G. Factor: 1.080



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7907 Date Dec. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-71-4

Starting Temperature °C: 360

Softening Temperature °C: 378

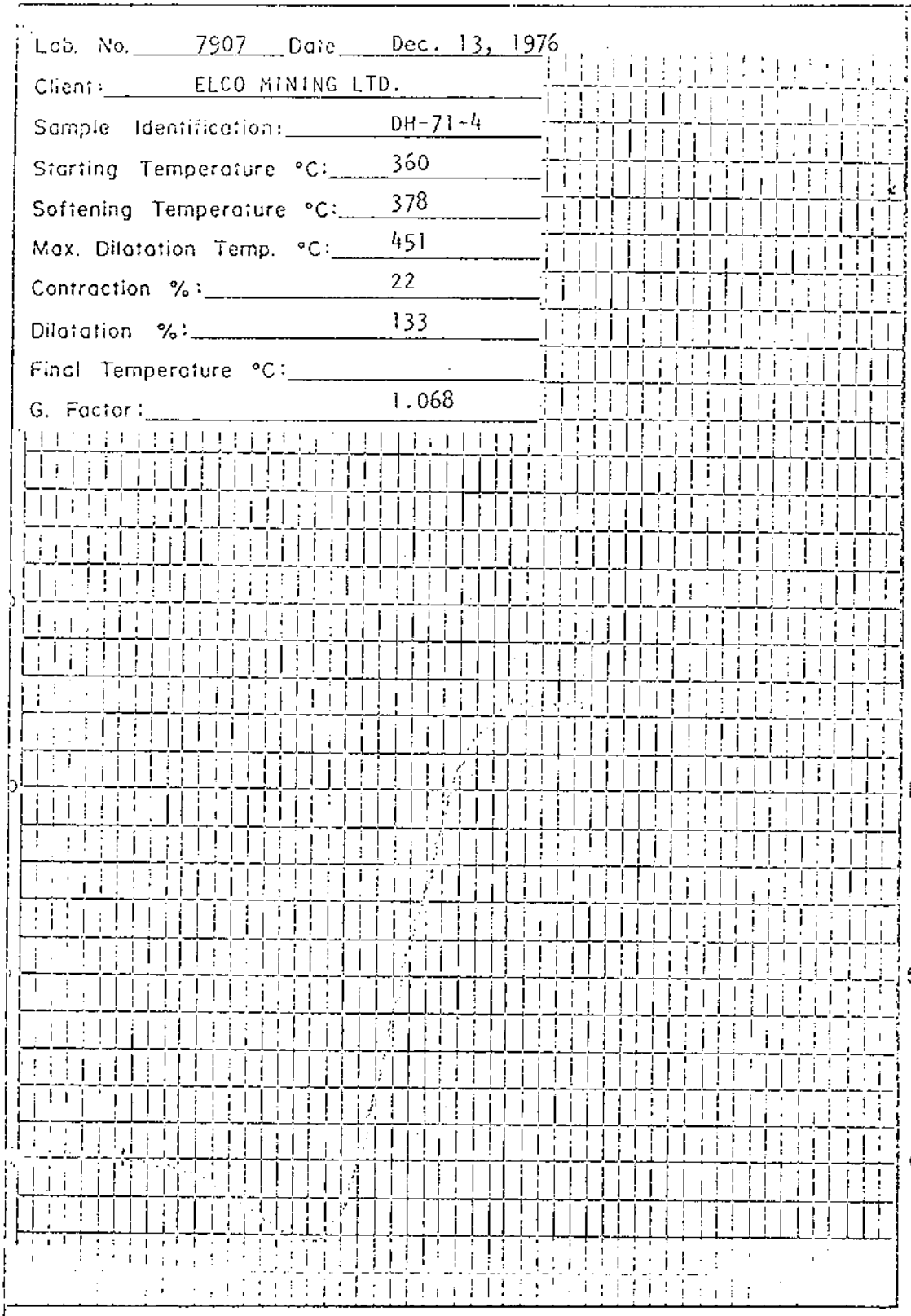
Max. Dilatation Temp. °C: 451

Contraction %: 22

Dilatation %: 133

Final Temperature °C:

G. Factor: 1.068



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7908 Date Dec. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-71-5

Starting Temperature °C: 360

Softening Temperature °C: 364

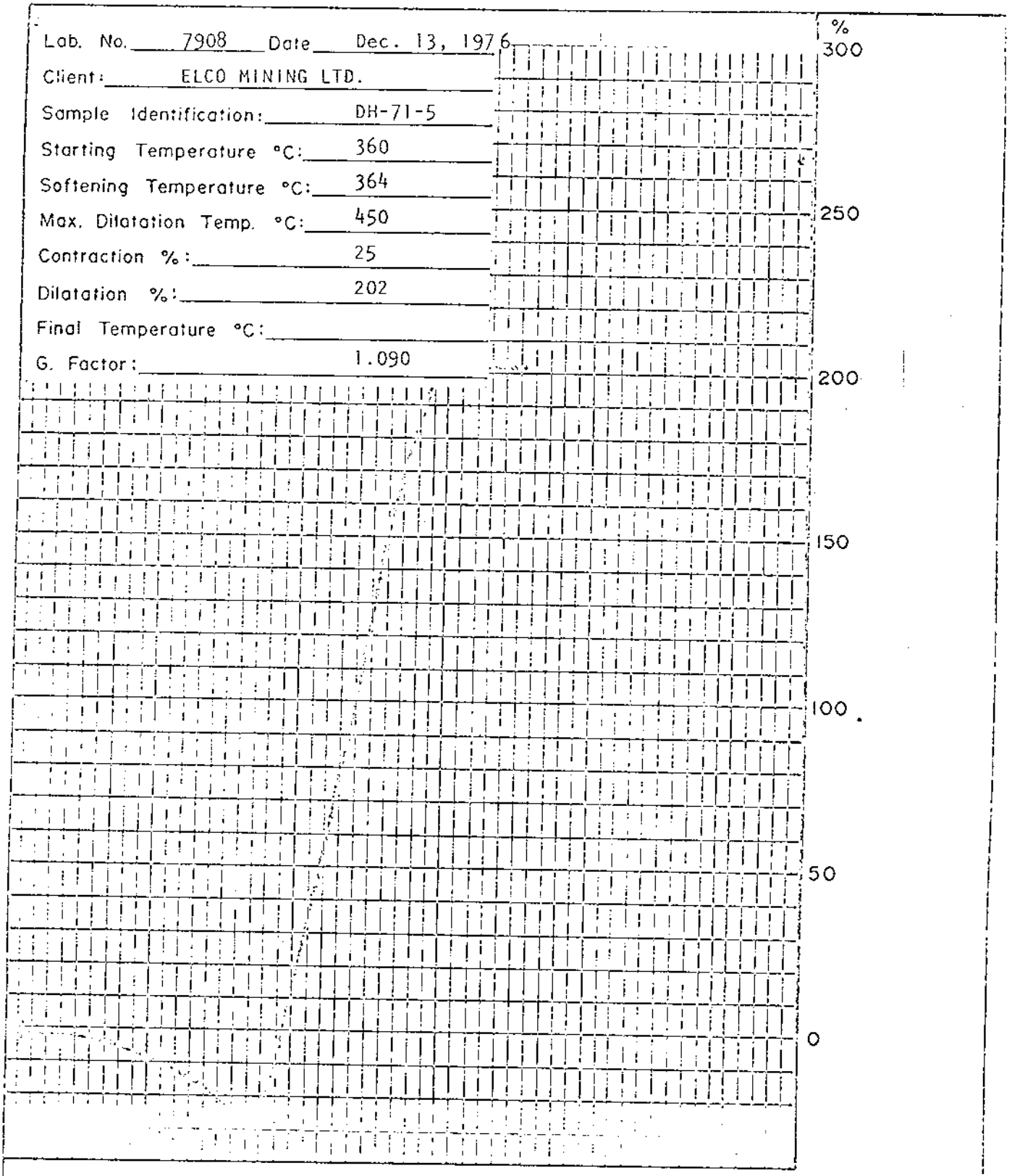
Max. Dilatation Temp. °C: 450

Contraction %: 25

Dilatation %: 202

Final Temperature °C:

G. Factor: 1.090



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7909 Date Dec. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-71-6

Starting Temperature °C: 360

Softening Temperature °C: 367

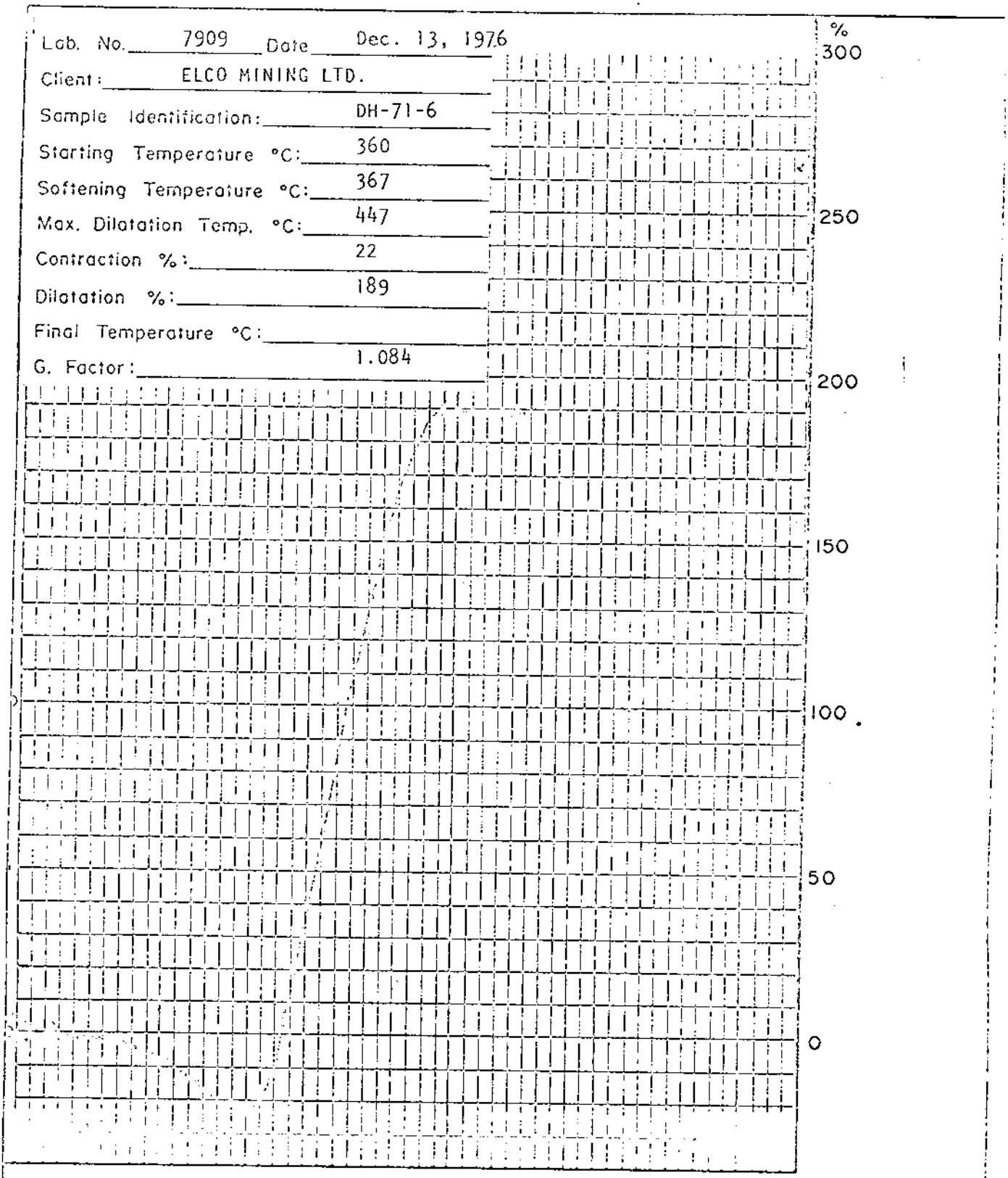
Max. Dilatation Temp. °C: 447

Contraction %: 22

Dilatation %: 189

Final Temperature °C:

G. Factor: 1.084



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7910 Date Dec. 14, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-71-7

Starting Temperature °C: 360

Softening Temperature °C: 375

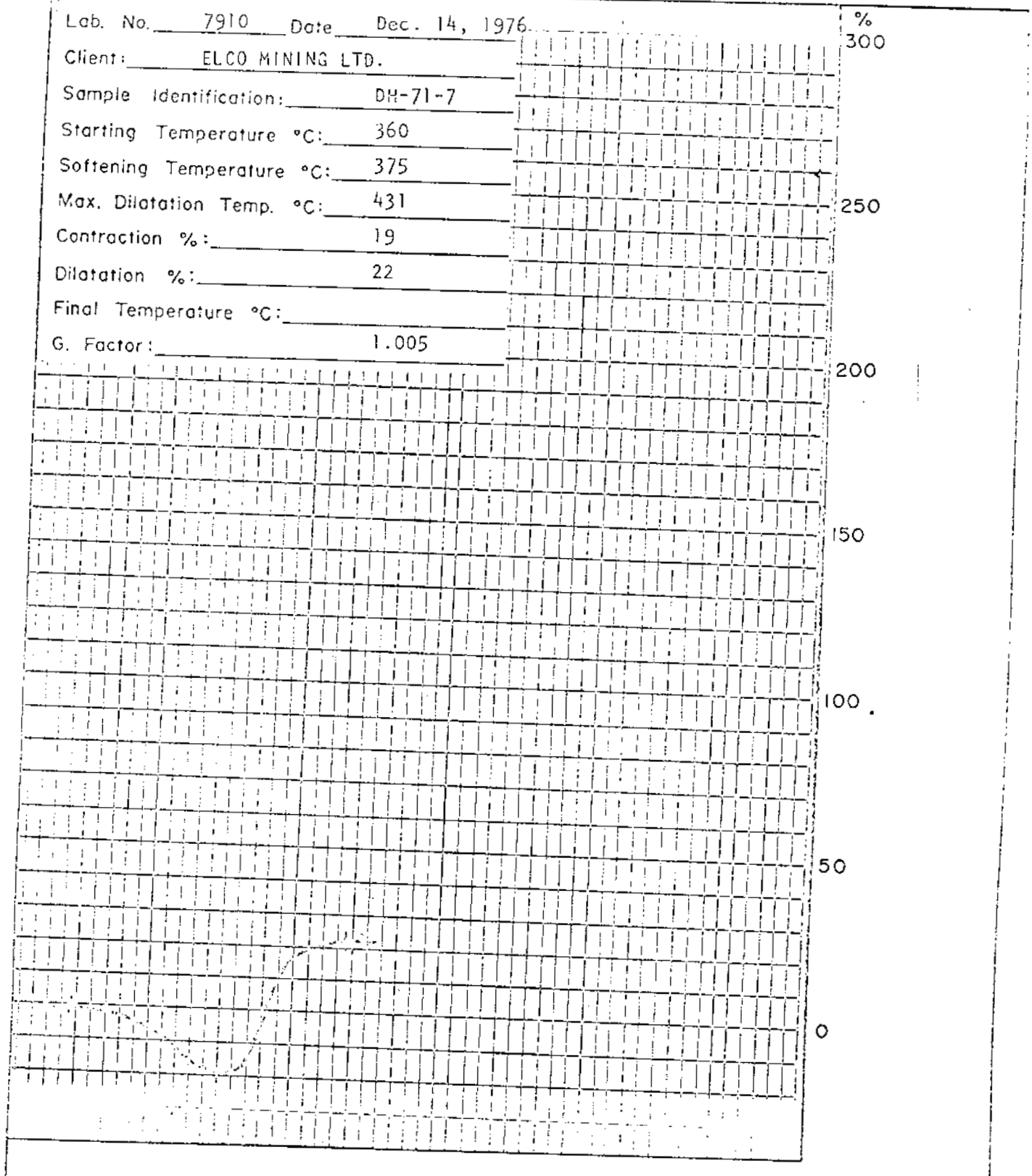
Max. Dilatation Temp. °C: 431

Contraction %: 19

Dilatation %: 22

Final Temperature °C:

G. Factor: 1.005



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7914 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-72-1

Starting Temperature °C: 350

Softening Temperature °C: 353

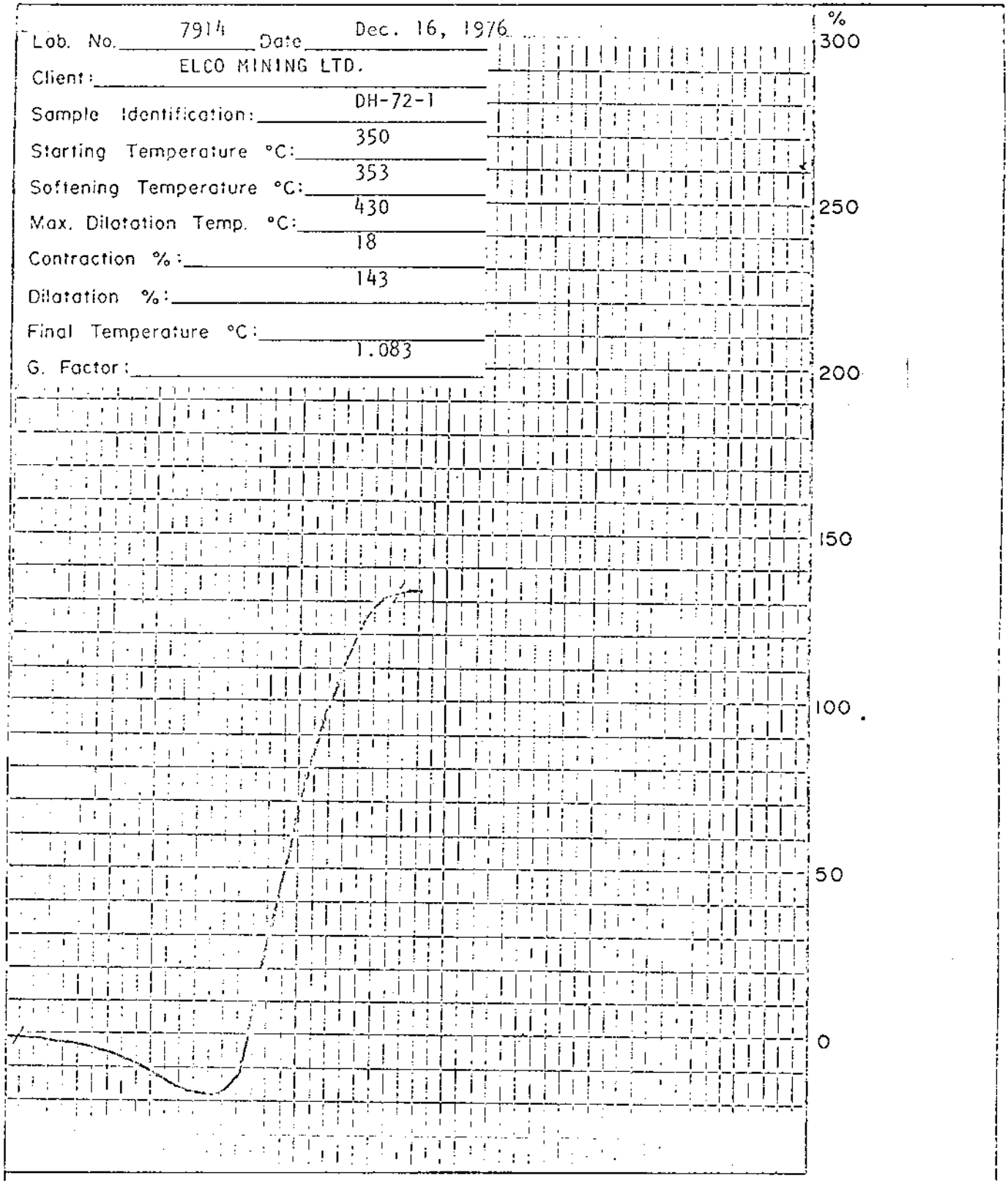
Max. Dilatation Temp. °C: 430

Contraction %: 18

Dilatation %: 143

Final Temperature °C:

G. Factor: 1.083



BARTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7915 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-72-2

Starting Temperature °C: 350

Softening Temperature °C: 360

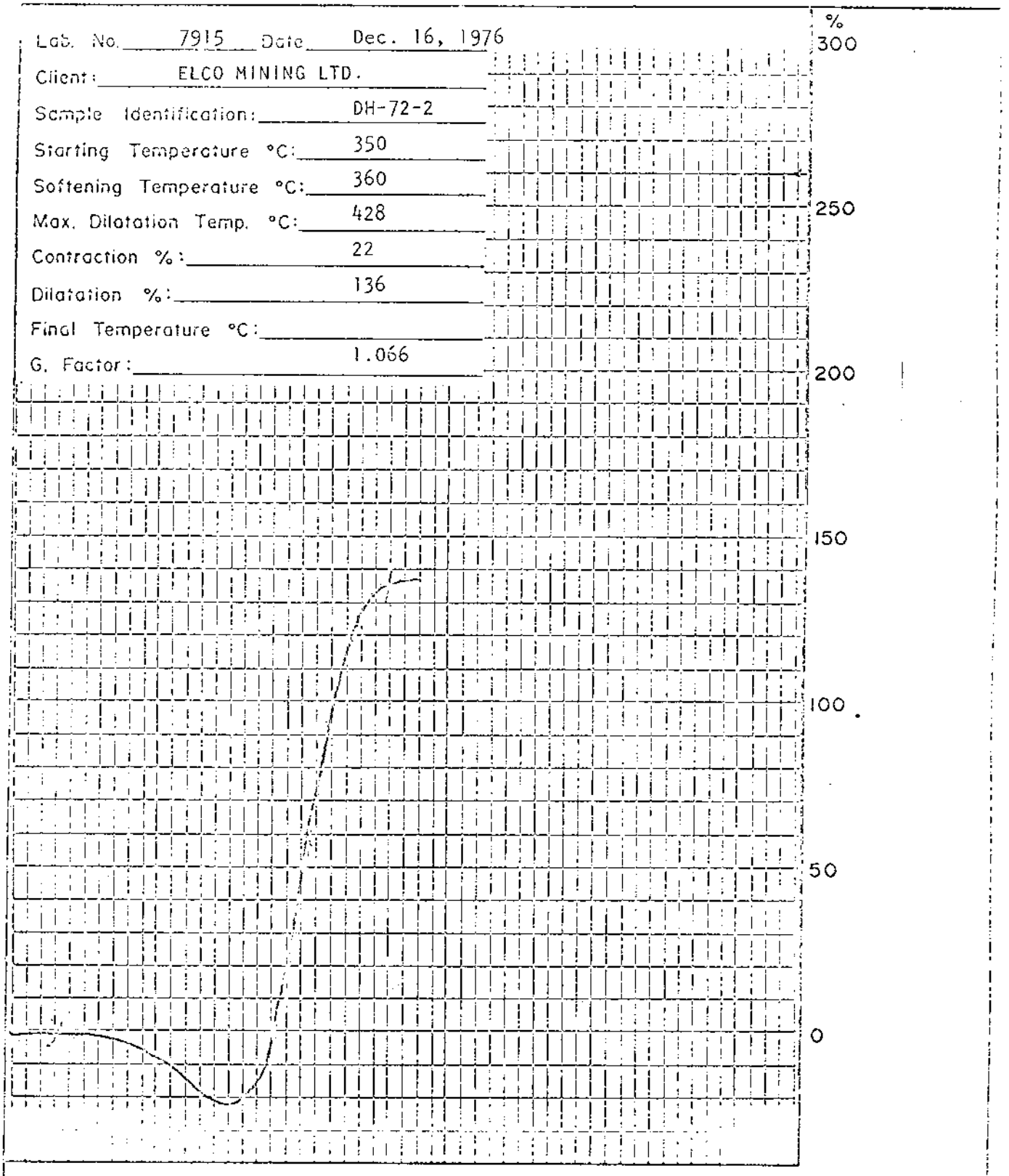
Max. Dilatation Temp. °C: 428

Contraction %: 22

Dilatation %: 136

Final Temperature °C:

G. Factor: 1.066



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7916 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-72-3

Starting Temperature °C: 350

Softening Temperature °C: 354

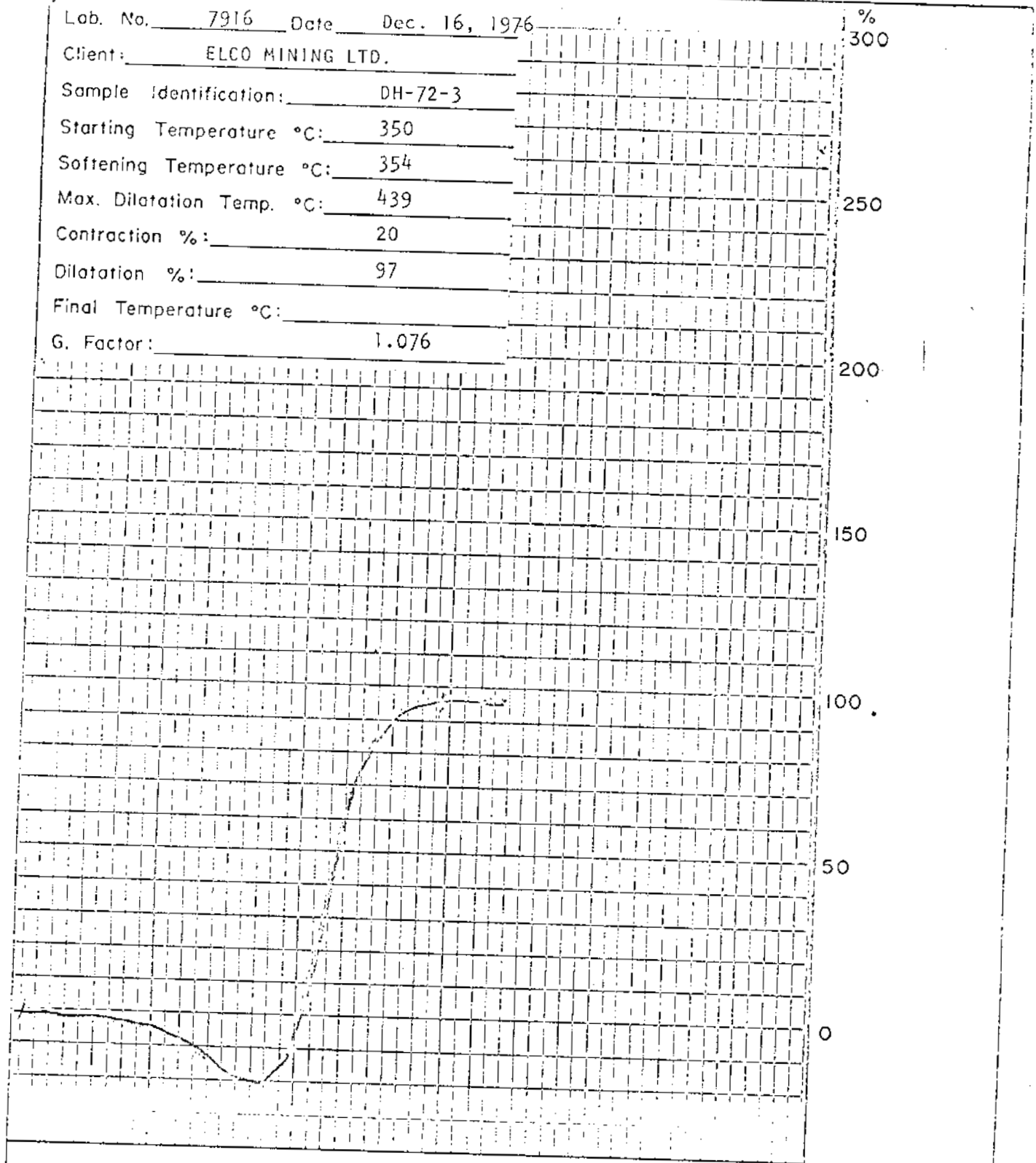
Max. Dilatation Temp. °C: 439

Contraction %: 20

Dilatation %: 97

Final Temperature °C:

G. Factor: 1.076



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7917 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-72-4

Starting Temperature °C: 350

Softening Temperature °C: 372

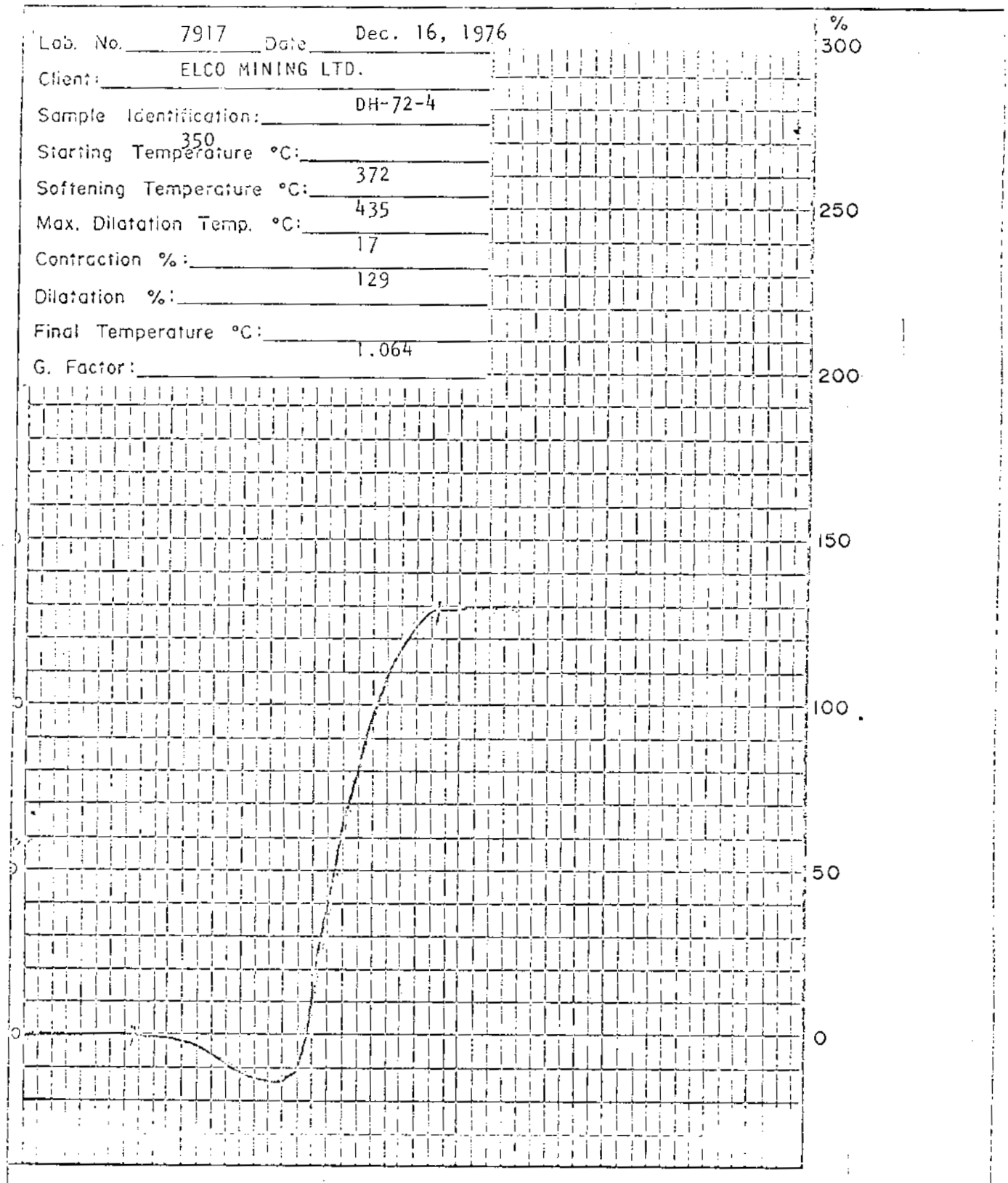
Max. Dilatation Temp. °C: 435

Contraction %: 17

Dilatation %: 129

Final Temperature °C:

G. Factor: 1.064



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7918 Date Dec. 16, 1976.

Client: ELCO MINING LTD.

Sample Identification: DH-72- 5

Starting Temperature °C: 350

Softening Temperature °C: 350

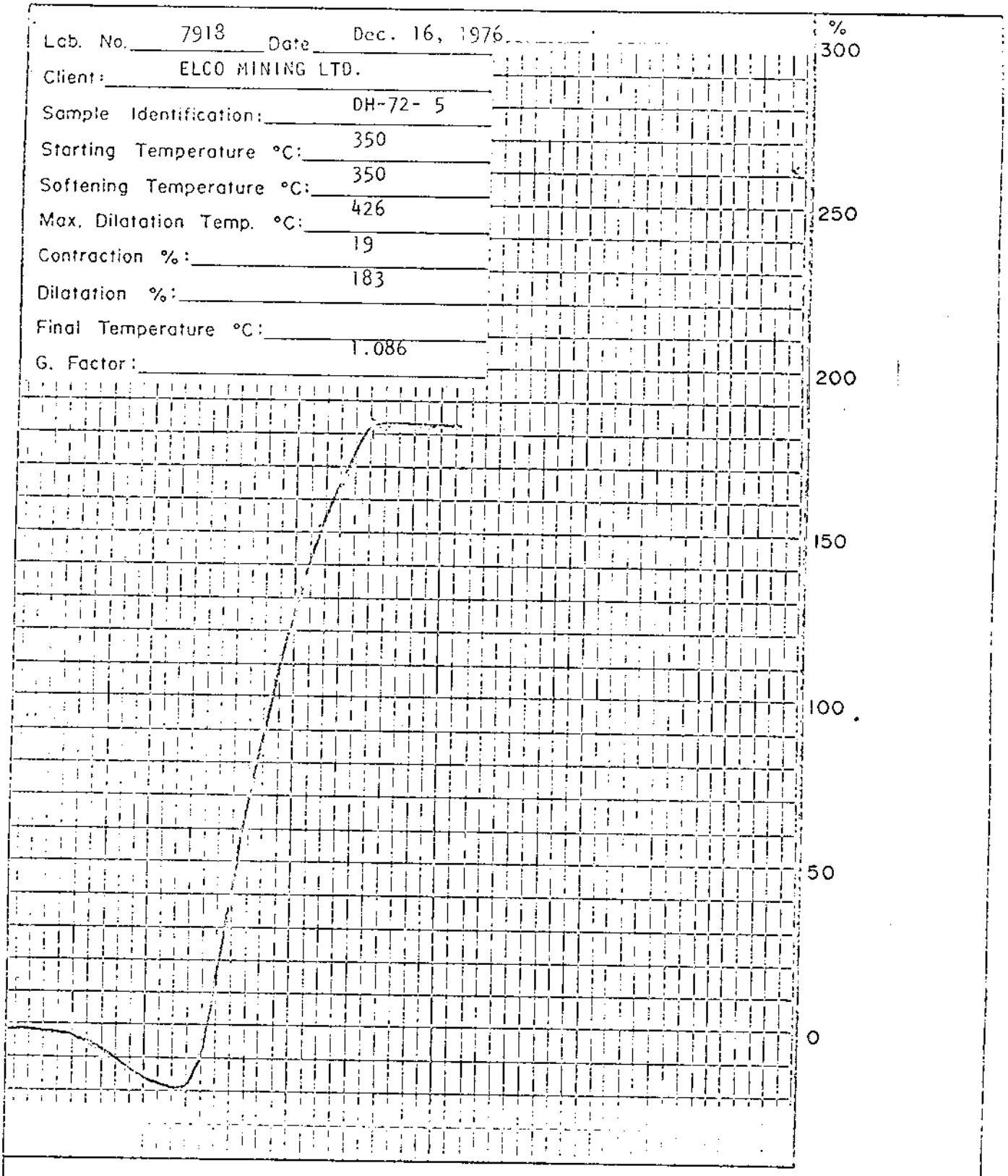
Max. Dilatation Temp. °C: 426

Contraction %: 19

Dilatation %: 183

Final Temperature °C:

G. Factor: 1.086



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7919 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-73-1

Starting Temperature °C: 350

Softening Temperature °C: 369

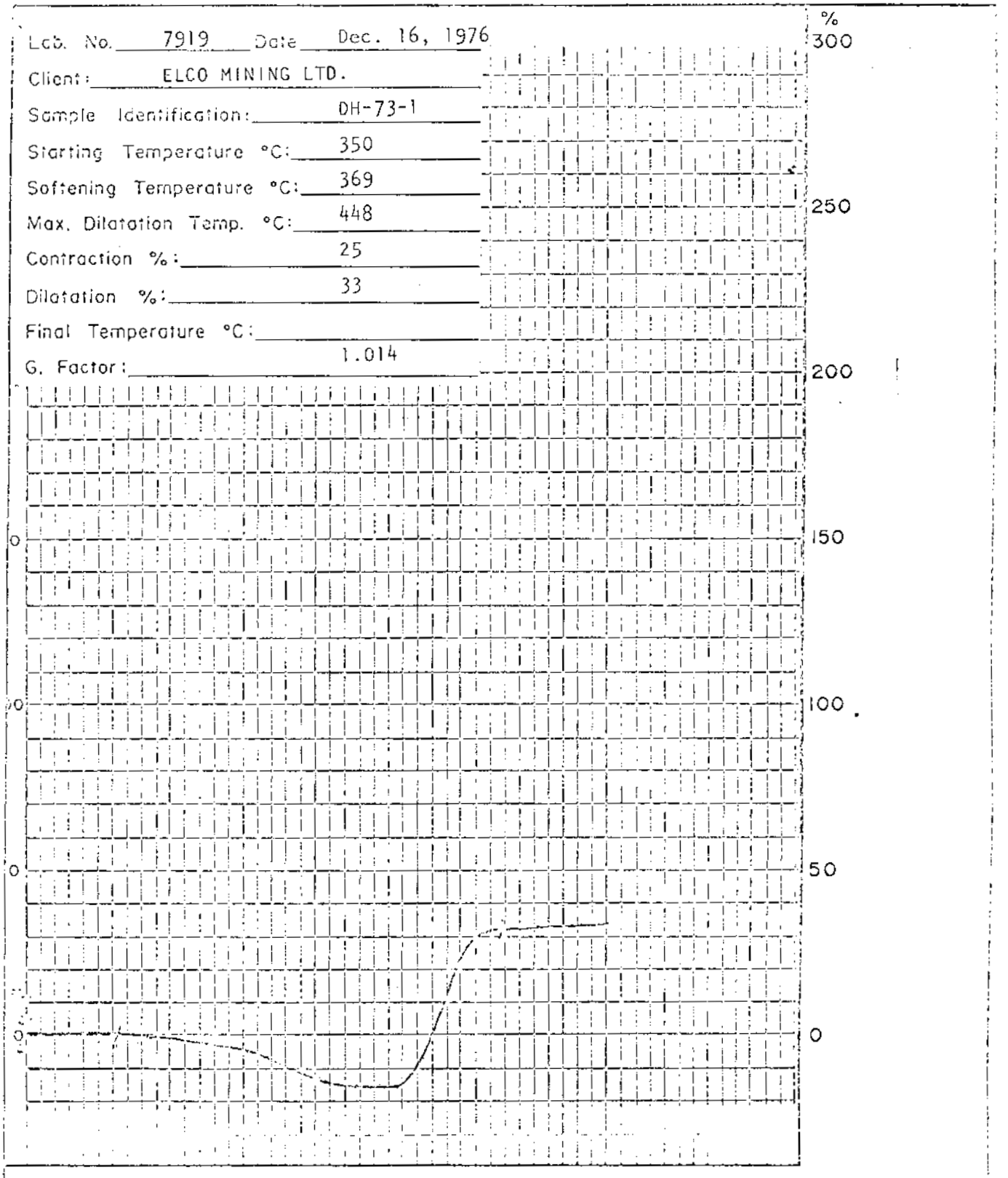
Max. Dilatation Temp. °C: 448

Contraction %: 25

Dilatation %: 33

Final Temperature °C:

G. Factor: 1.014



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7920 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-73-2

Starting Temperature °C: 350

Softening Temperature °C: 393

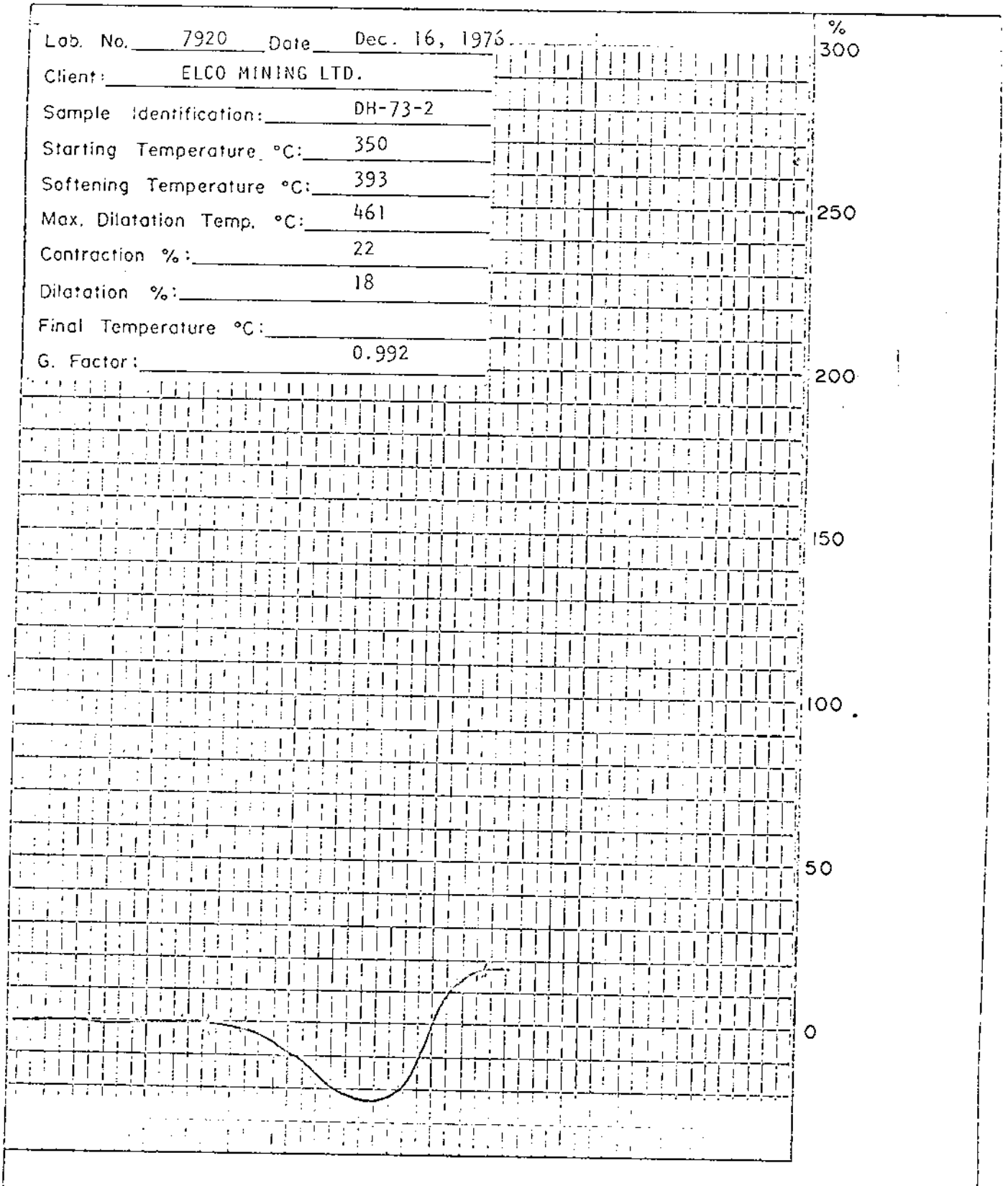
Max. Dilatation Temp. °C: 461

Contraction %: 22

Dilatation %: 18

Final Temperature °C:

G. Factor: 0.992



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7921 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-73-3

Starting Temperature °C: 350

Softening Temperature °C: 388

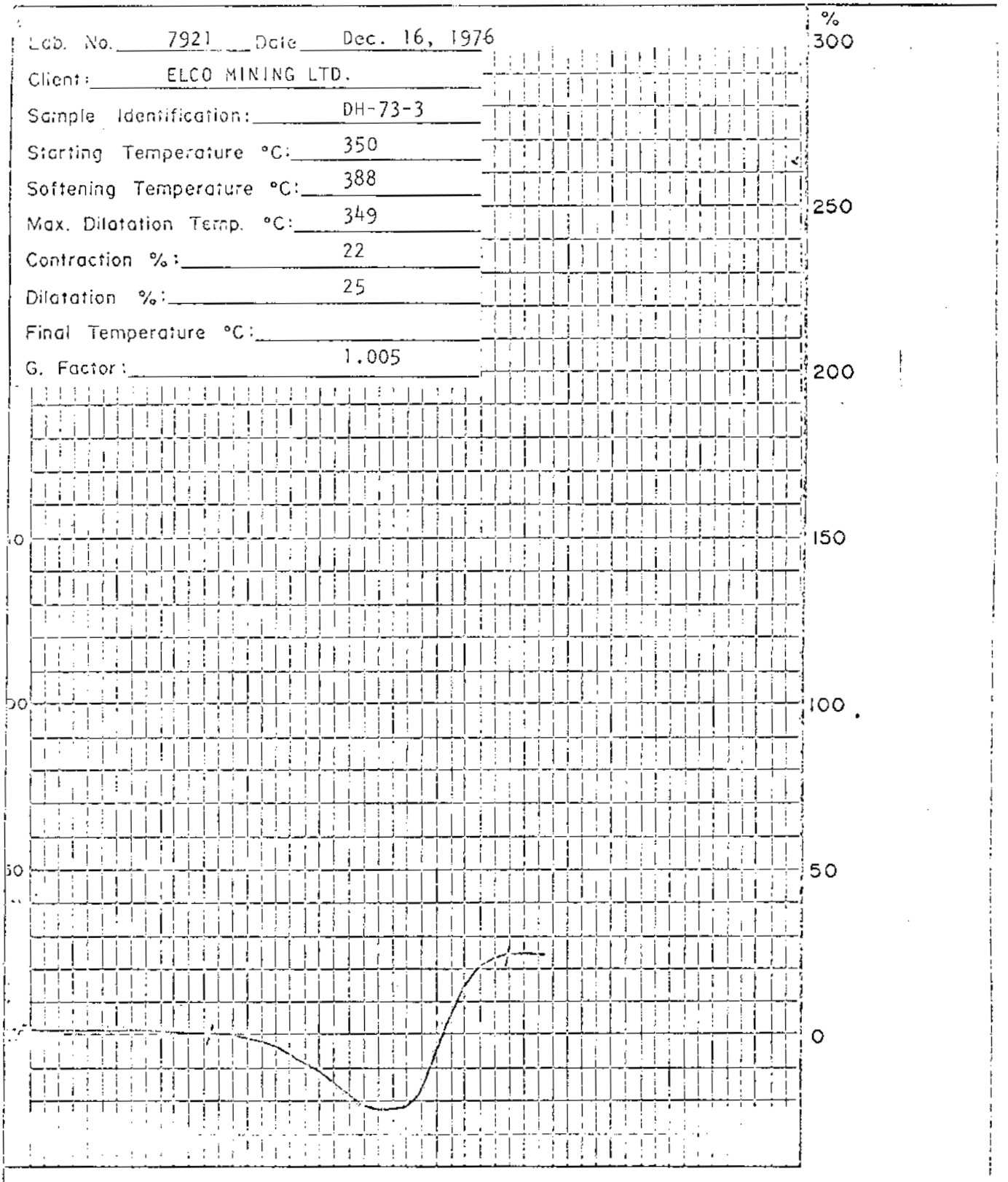
Max. Dilatation Temp. °C: 349

Contraction %: 22

Dilatation %: 25

Final Temperature °C:

G. Factor: 1.005



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7923 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-73-5

Starting Temperature °C: 360

Softening Temperature °C: 383

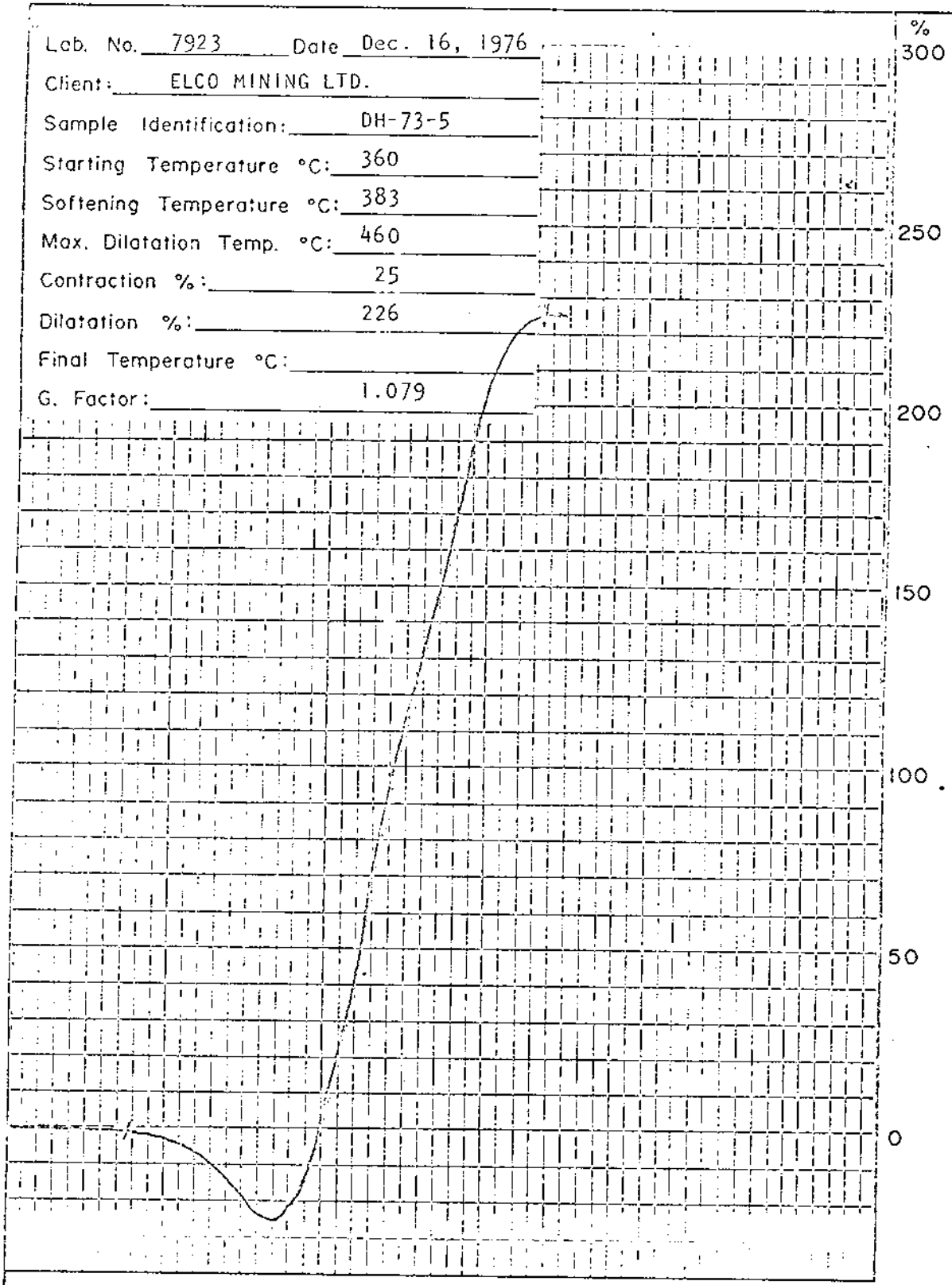
Max. Dilatation Temp. °C: 460

Contraction %: 25

Dilatation %: 226

Final Temperature °C:

G. Factor: 1.079



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7924 Date Dec. 16, 197

Client: ELCO MINING LTD.

Sample Identification: DH-73-6

Starting Temperature °C: 360

Softening Temperature °C: 390

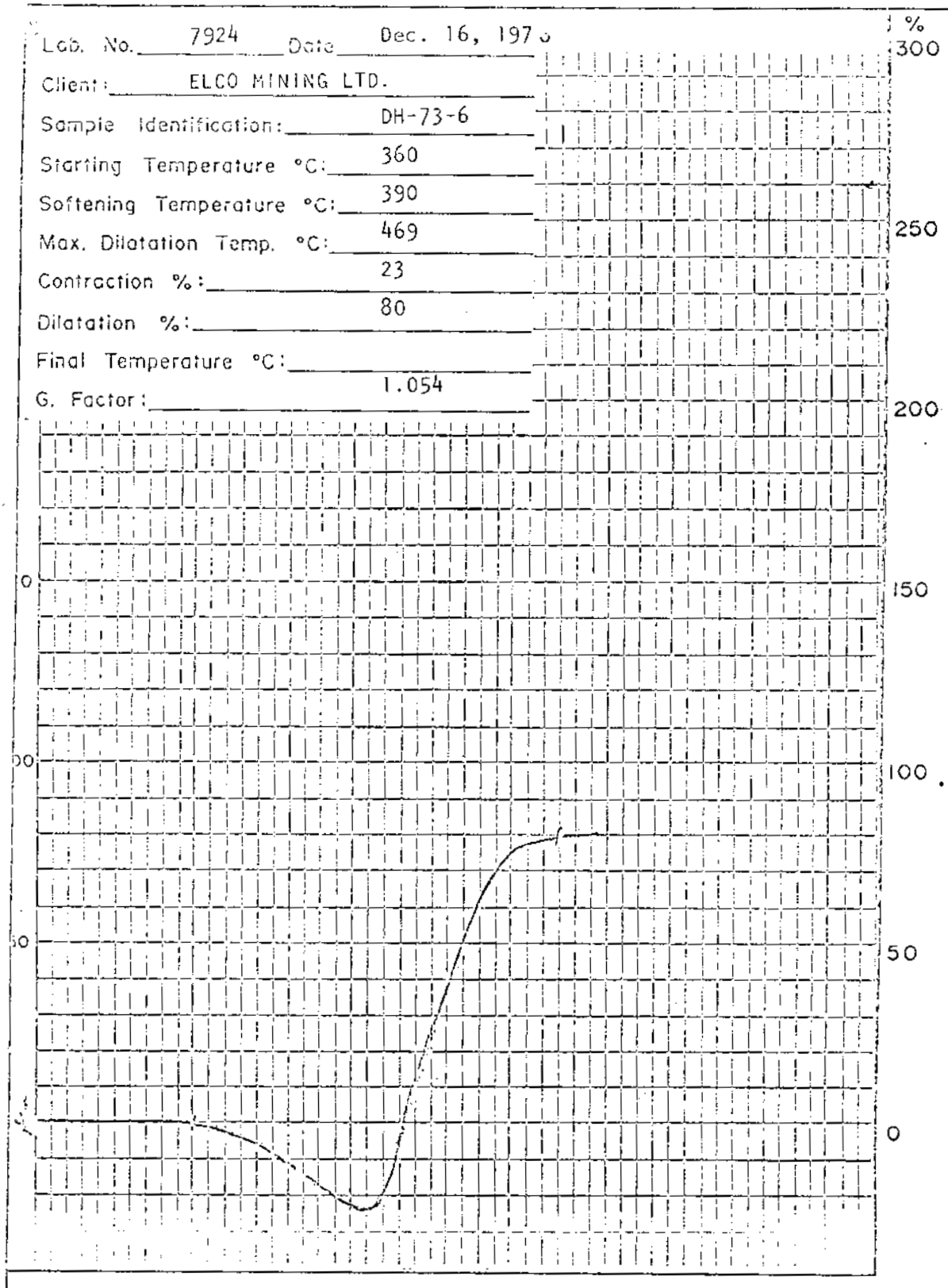
Max. Dilatation Temp. °C: 469

Contraction %: 23

Dilatation %: 80

Final Temperature °C:

G. Factor: 1.054



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7925 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-73-7

Starting Temperature °C: 350

Softening Temperature °C: 369

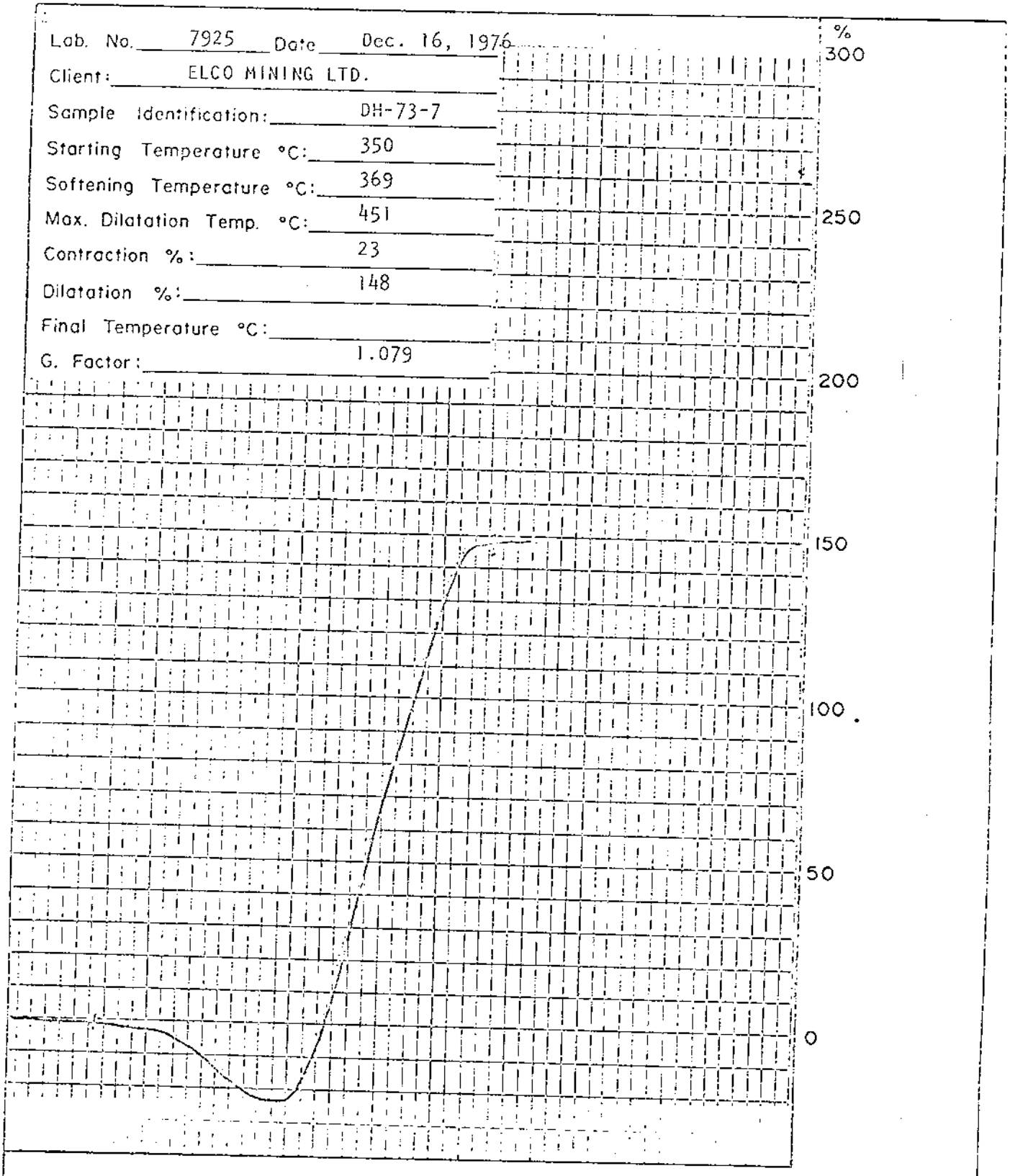
Max. Dilatation Temp. °C: 451

Contraction %: 23

Dilatation %: 148

Final Temperature °C:

G. Factor: 1.079



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7882 Date Nov. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-74-1

Starting Temperature °C: 360

Softening Temperature °C: 414

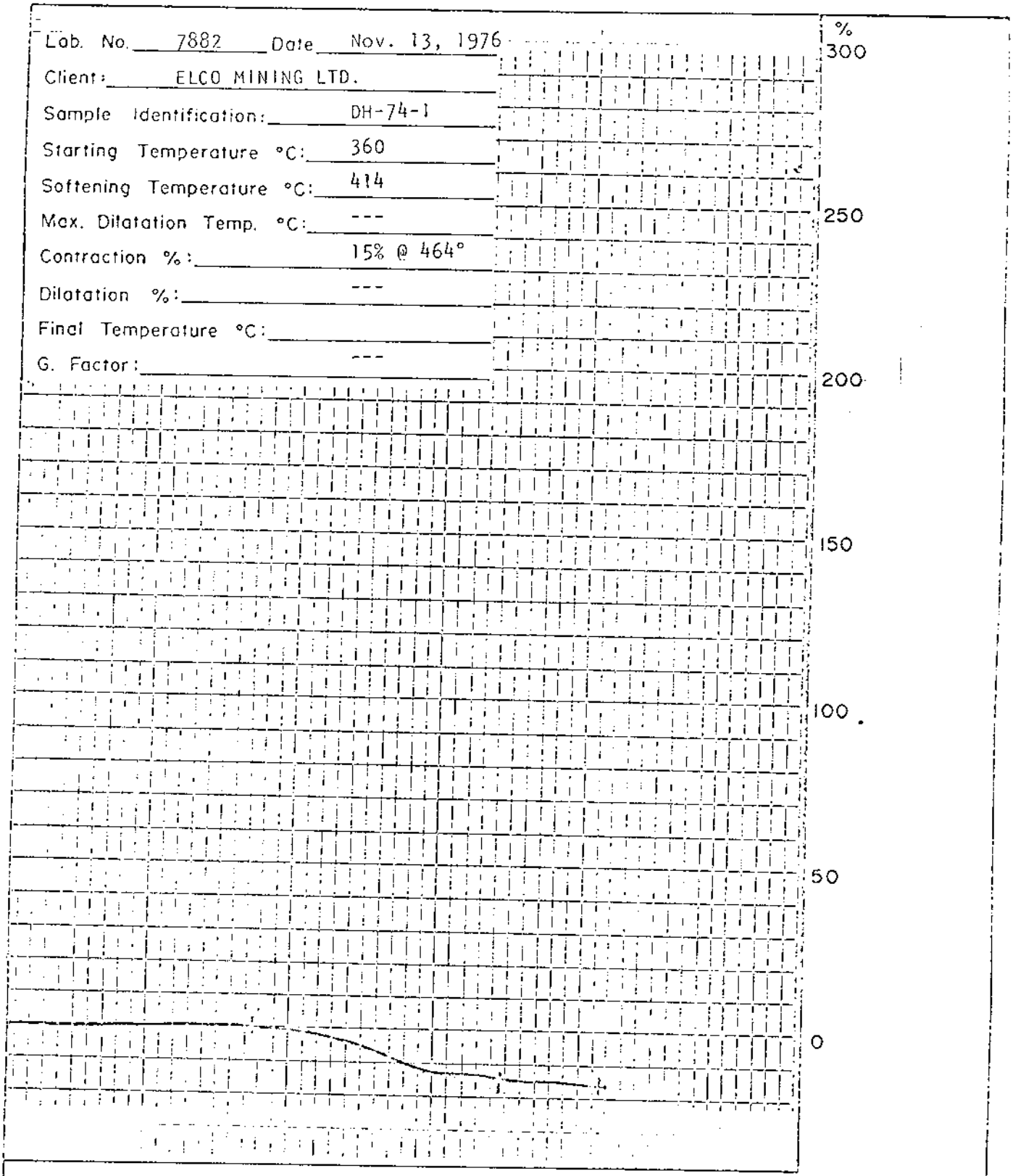
Max. Dilatation Temp. °C: ---

Contraction %: 15% @ 464°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BARTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7883 Date Nov. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-74-2

Starting Temperature °C: 360

Softening Temperature °C: 409

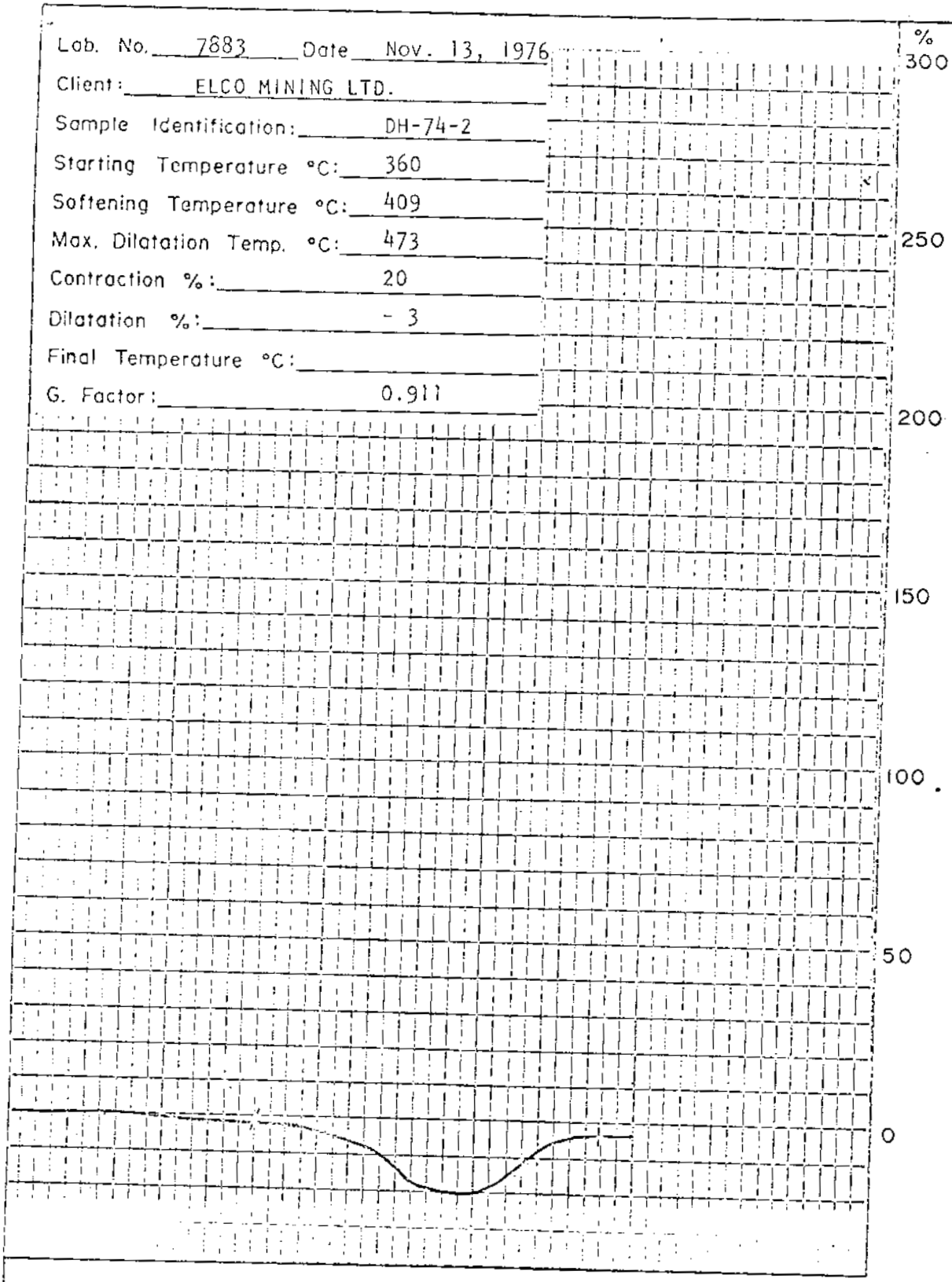
Max. Dilatation Temp. °C: 473

Contraction %: 20

Dilatation %: - 3

Final Temperature °C:

G. Factor: 0.911



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7884 Date Nov. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-74-3

Starting Temperature °C: 360

Softening Temperature °C: 395

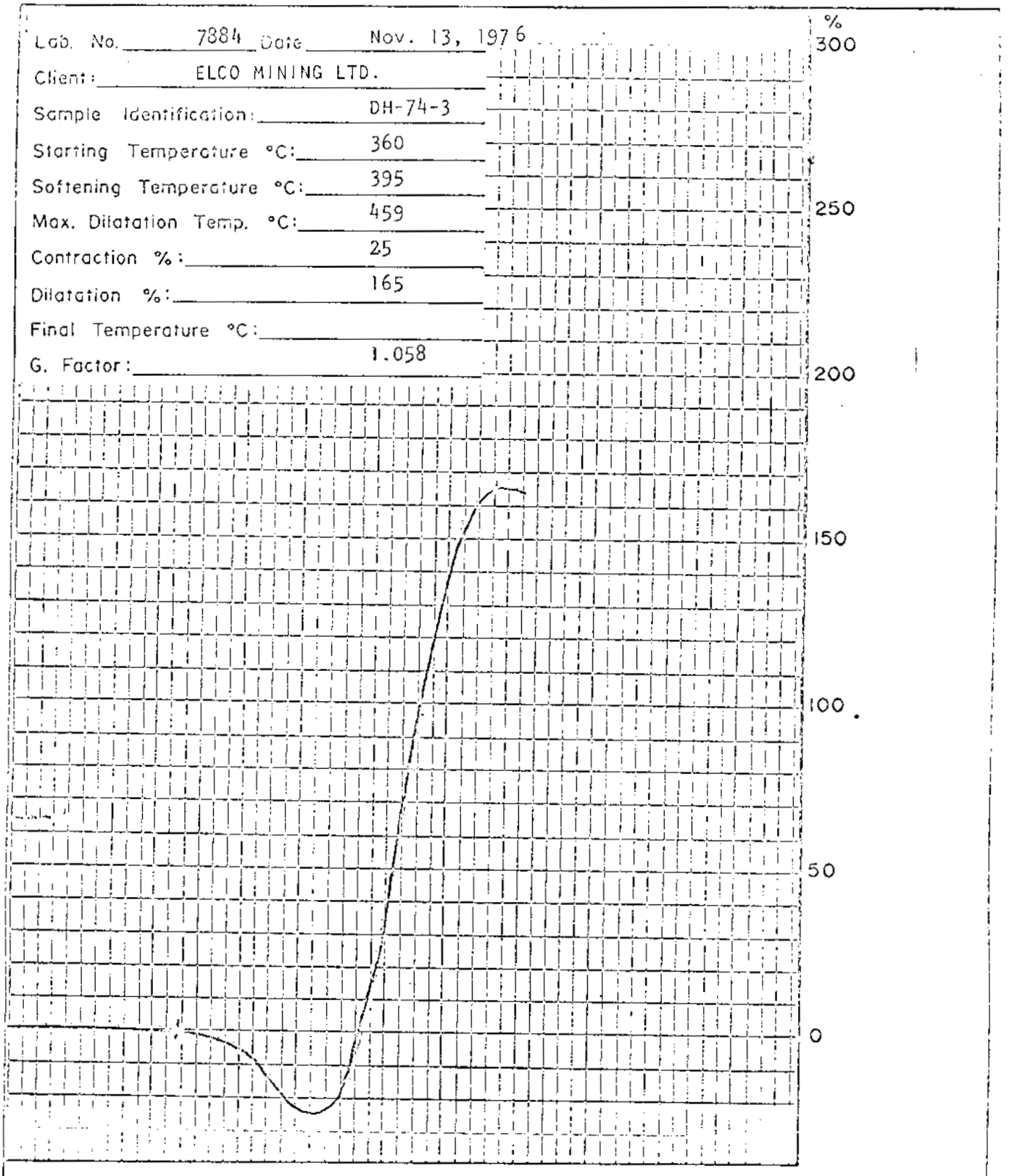
Max. Dilatation Temp. °C: 459

Contraction %: 25

Dilatation %: 165

Final Temperature °C:

G. Factor: 1.058



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7885 Date Nov. 13, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-74-4

Starting Temperature °C: 360

Softening Temperature °C: 418

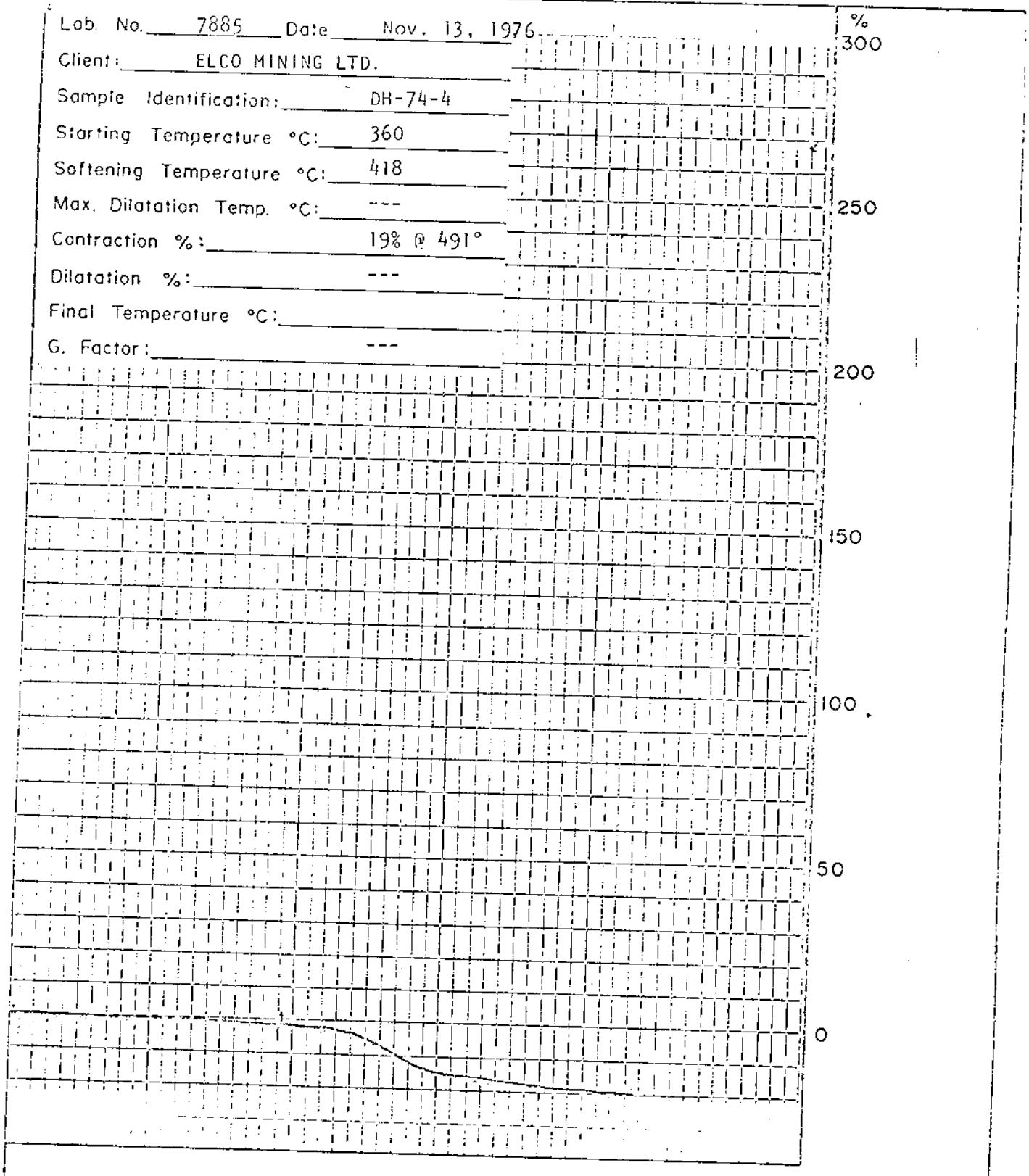
Max. Dilatation Temp. °C: ---

Contraction %: 19% @ 491°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 1

Warnock Hersey Lab. No.: 76 - 11288

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	36.2	20.4	42.6	0.46	112.1	36.5	20.5	43.0	0.46

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	79.1	0.6	41.1	0.47	41.4	0.47
65 x 0	20.9	0.8	21.9	0.56	22.1	0.56
TOTAL	100.0	- -	- -	- -	37.4	0.49

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	35.5	1.2	4.9	27.2	66.7	0.63	5.0	27.5	67.5	0.64
1.40	1.50	10.5	1.0	12.4	24.0	62.6	0.58	12.5	24.3	63.2	0.59
1.50	1.60	8.3	0.9	21.1	21.2	56.8	0.52	21.3	21.4	57.3	0.52
1.60		45.7	- -	- -	- -	- -	- -	73.6	- -	- -	- -
TOTAL		100.0	- -	- -	- -	- -	- -	38.5	- -	- -	- -

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.028						

J

Lab. No 8076 Date Jan. 21/77

Client: Warnock Hersey

Sample Identification: 76-11288

Starting Temperature °C: 350

Softening Temperature °C: 376

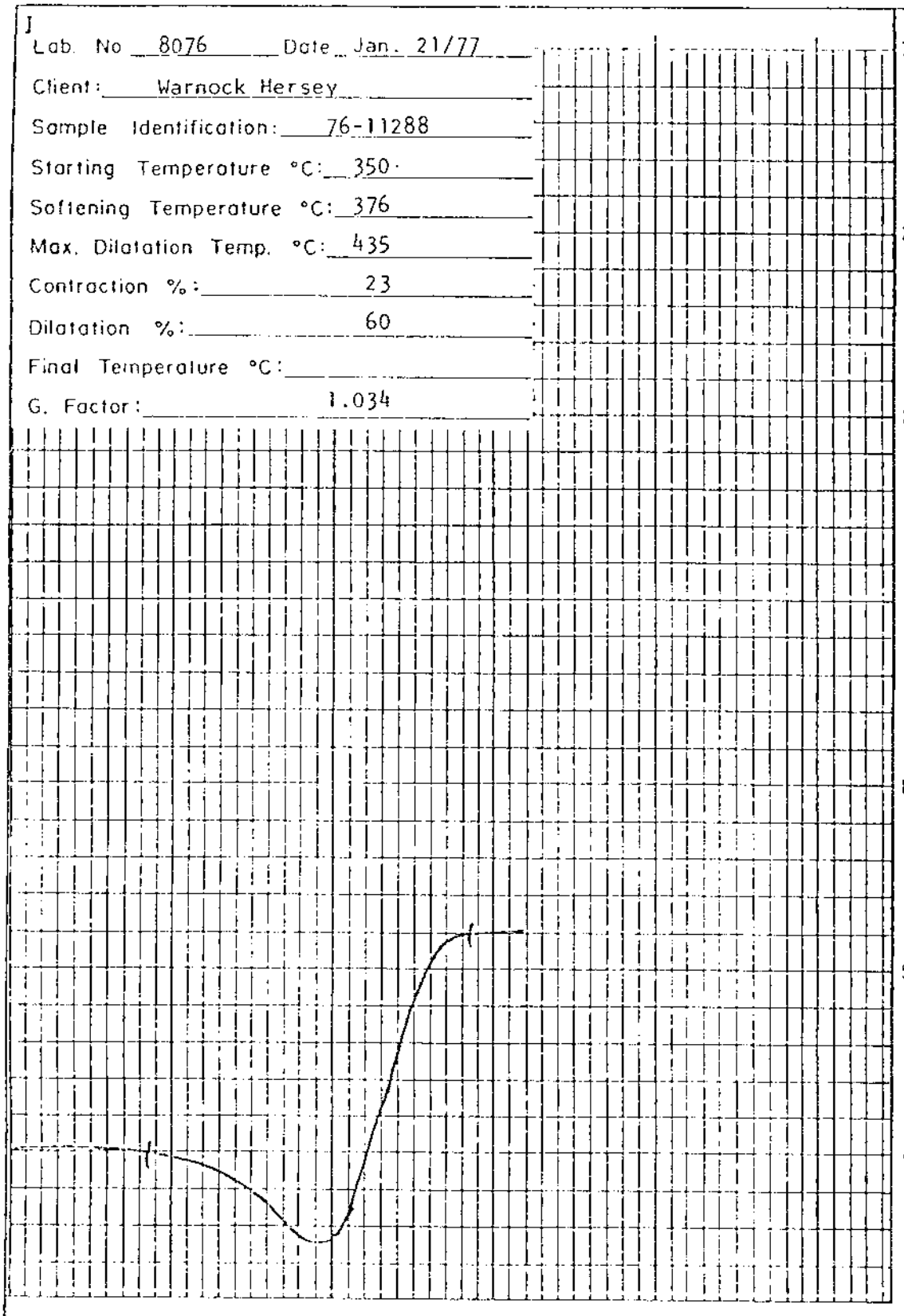
Max. Dilatation Temp. °C: 435

Contraction %: 23

Dilatation %: 60

Final Temperature °C:

G. Factor: 1.034



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 2 Warnock Hersey Lab. No.: 76 - 11289

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.C.I.	Ash	V.M.	F.C.	Sulphur
0.6	70.0	15.3	14.1	0.53	76.1	70.5	15.4	14.1	0.53

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	82.8	0.5	75.7	0.49	76.0	0.49
65 x 0	17.2	0.7	52.4	0.66	52.8	0.67
TOTAL	100.0	--	--	--	72.0	0.52

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	7.4	0.9	5.2	27.6	66.3	0.64	5.3	27.8	66.9	0.65
1.40	1.50	1.9	0.9	12.1	24.9	62.1	0.65	12.2	25.1	62.7	0.66
1.50	1.60	1.0	0.8	25.0	21.0	53.2	0.62	25.2	21.2	53.6	0.62
1.60		89.7	--	--	--	--	--	82.1	--	--	--
TOTAL		100.0	--	--	--	--	--	74.5	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.013						

Lab. No. 8077 Date Jan. 21/77

Client: Warnock Hersey

Sample Identification: 76-11289

Starting Temperature °C: 350

Softening Temperature °C: 366

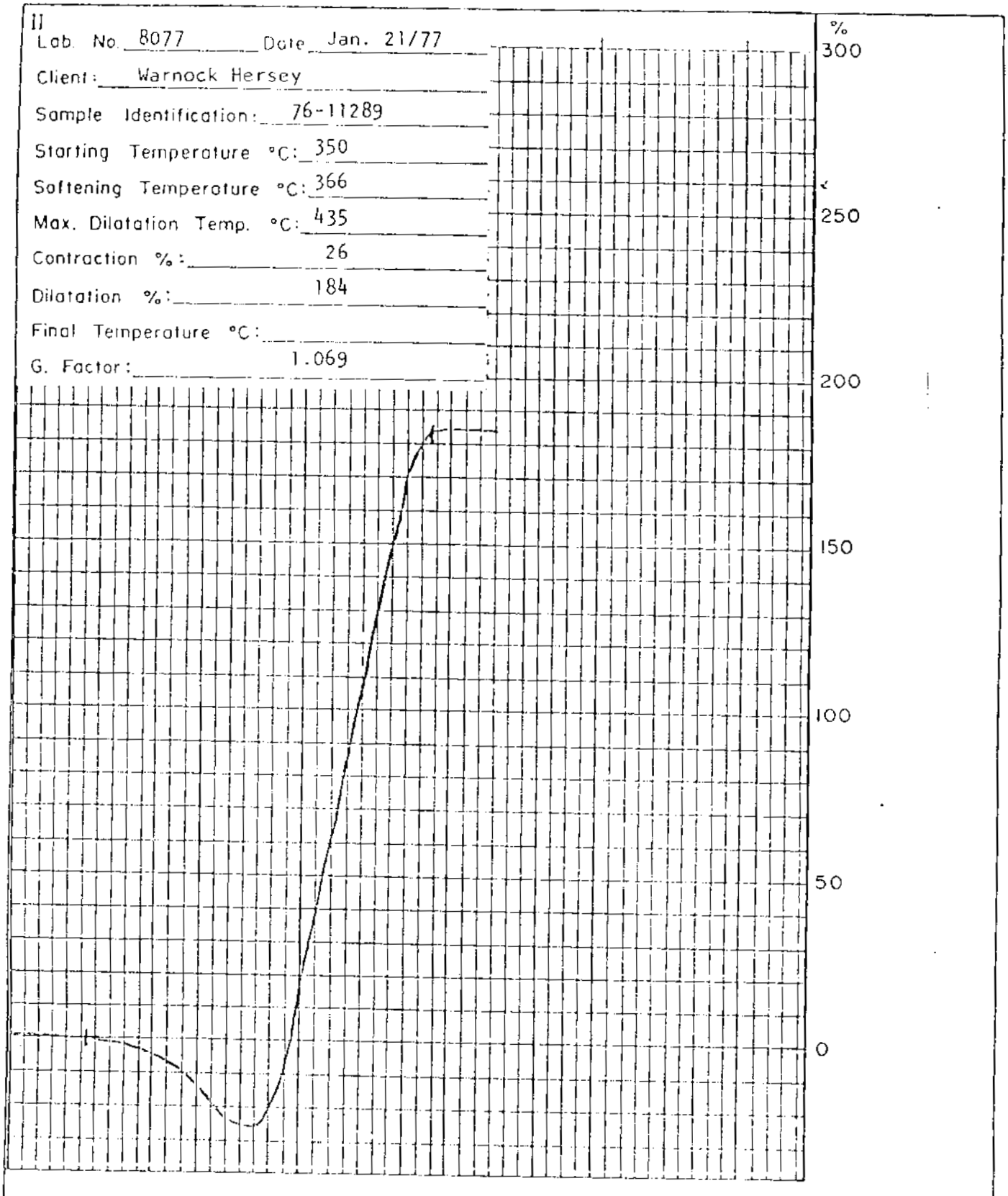
Max. Dilatation Temp. °C: 435

Contraction %: 26

Dilatation %: 184

Final Temperature °C:

G. Factor: 1.069



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 3 Warnock Hersey Lab. No.: 76 - 11290

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.8	73.4	17.1	8.7	0.28	80.2	74.0	17.2	8.8	0.28

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	88.1	0.4	82.0	0.27	82.4	0.27
65 x 0	11.9	0.8	81.5	0.22	82.2	0.22
TOTAL	100.0	-	-	-	82.4	0.26

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	Nil	-	-	-	-	-				
1.40	1.50	Nil	-	-	-	-	-				
1.50	1.60	Nil	-	-	-	-	-				
1.60		100.0						83.6			
TOTAL		100.0						83.6			

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
-	-						

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 4 — Warnock Hersey Lab. No.: 76 - 11291

TABLE I — Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
1.2	9.8	23.0	66.0	0.30	180.0	9.9	23.3	66.8	0.30

TABLE II — Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	63.5	0.6	10.3	0.36	10.3	0.36
65 x 0	36.5	0.9	7.1	0.25	7.2	0.26
TOTAL	100.0	--	--	--	9.2	0.32

TABLE III — Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	75.6	1.2	4.3	24.1	70.4	0.51	4.4	24.4	71.2	0.52
1.40	1.50	13.4	0.7	11.4	22.6	65.3	0.53	11.4	22.7	65.9	0.53
1.50	1.60	4.2	1.2	23.5	19.1	56.2	0.44	23.8	19.3	56.9	0.44
1.60		6.8	--	--	--	--	--	75.1	--	--	--
TOTAL		100.0	--	--	--	--	--	11.0	--	--	--

TABLE IV — Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
2½	0.010						

Lab. No. 8078 Date Jan 21/77

Client: Warnock Hersey

Sample Identification: 76-11291

Starting Temperature °C: 350

Softening Temperature °C: 398

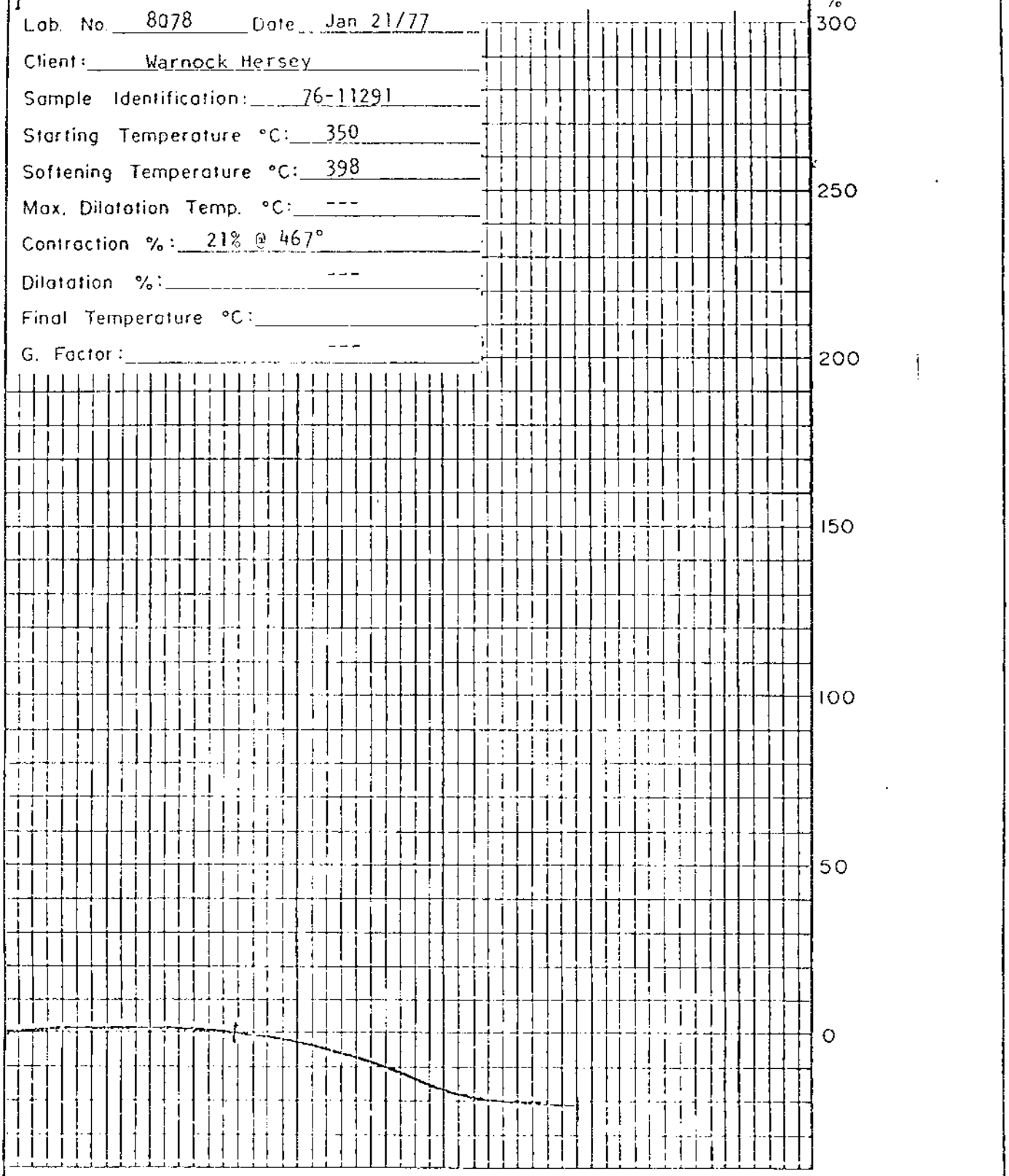
Max. Dilatation Temp. °C: ---

Contraction %: 21% @ 467°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1970-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 5 — Warnock Hersey Lab. No.: 76 - 11292

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.7	32.5	20.5	46.3	0.47	120.4	32.7	20.6	46.7	0.47

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	74.7	0.7	38.1	0.44	38.4	0.45
65 x 0	25.3	0.8	19.9	0.53	20.0	0.54
TOTAL	100.0	--	--	--	33.7%	0.47

TABLE III Float/Sink ¼" x 0 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	42.3	0.9	4.9	27.0	67.2	0.54	4.9	27.2	67.9	0.54
1.40	1.50	10.5	1.0	12.2	24.2	62.6	0.52	12.3	24.4	63.3	0.52
1.50	1.60	4.5	0.8	24.2	20.6	54.4	0.42	24.4	20.8	54.8	0.42
1.60		42.7	--	--	--	--	--	83.5	--	--	--
TOTAL		100.0	--	--	--	--	--	40.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosph-orus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.037						

II

Lab. No. 8079 Date Jan. 21/77

Client: Warnock Hersey

Sample Identification: 76 – 11252

Starting Temperature °C: 350

Softening Temperature °C: 378

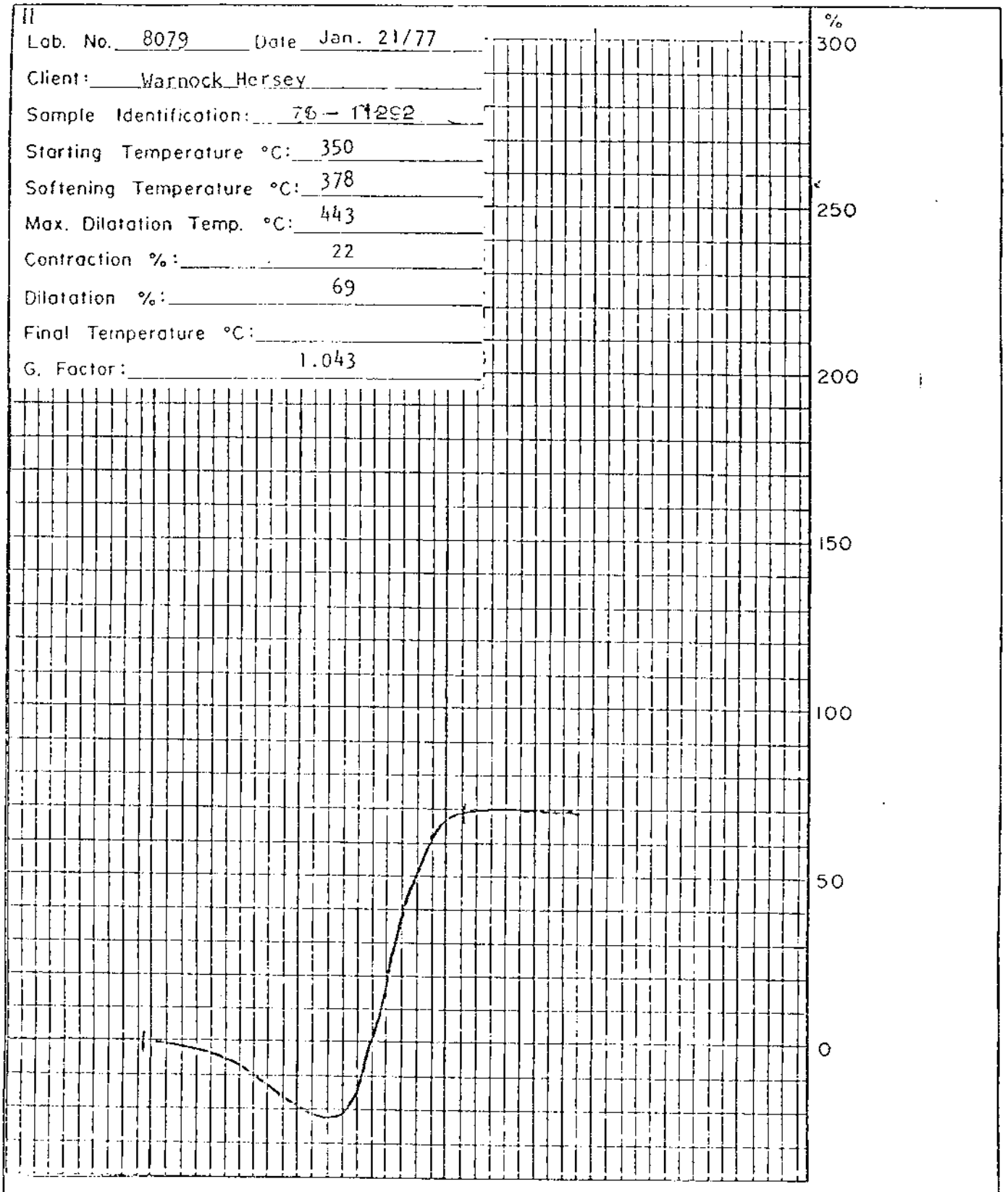
Max. Dilatation Temp. °C: 443

Contraction %: 22

Dilatation %: 69

Final Temperature °C:

G. Factor: 1.043



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.: Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 6 Warnock Hersey Lab. No.: 76 - 11293

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.6	66.9	15.7	16.8	0.56	93.4	67.3	15.8	16.9	0.56

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	78.1	0.4	71.4	0.42	71.7	0.42
65 x 0	21.9	0.7	38.7	0.52	39.0	0.52
TOTAL	100.0	--	--	--	64.5	0.44

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	9.0	1.0	6.2	27.0	65.8	0.61	6.3	27.2	66.5	0.62
1.40	1.50	2.4	0.8	14.8	23.5	60.9	0.67	15.0	23.7	61.3	0.68
1.50	1.60	3.5	0.8	27.5	20.4	51.3	0.54	27.8	20.6	51.6	0.54
1.60		85.1	--	--	--	--	--	85.2	--	--	--
TOTAL		100.0	--	--	--	--	--	74.4	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7	0.038						

Lab. No. 8080 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11293

Starting Temperature °C: 350

Softening Temperature °C: 367

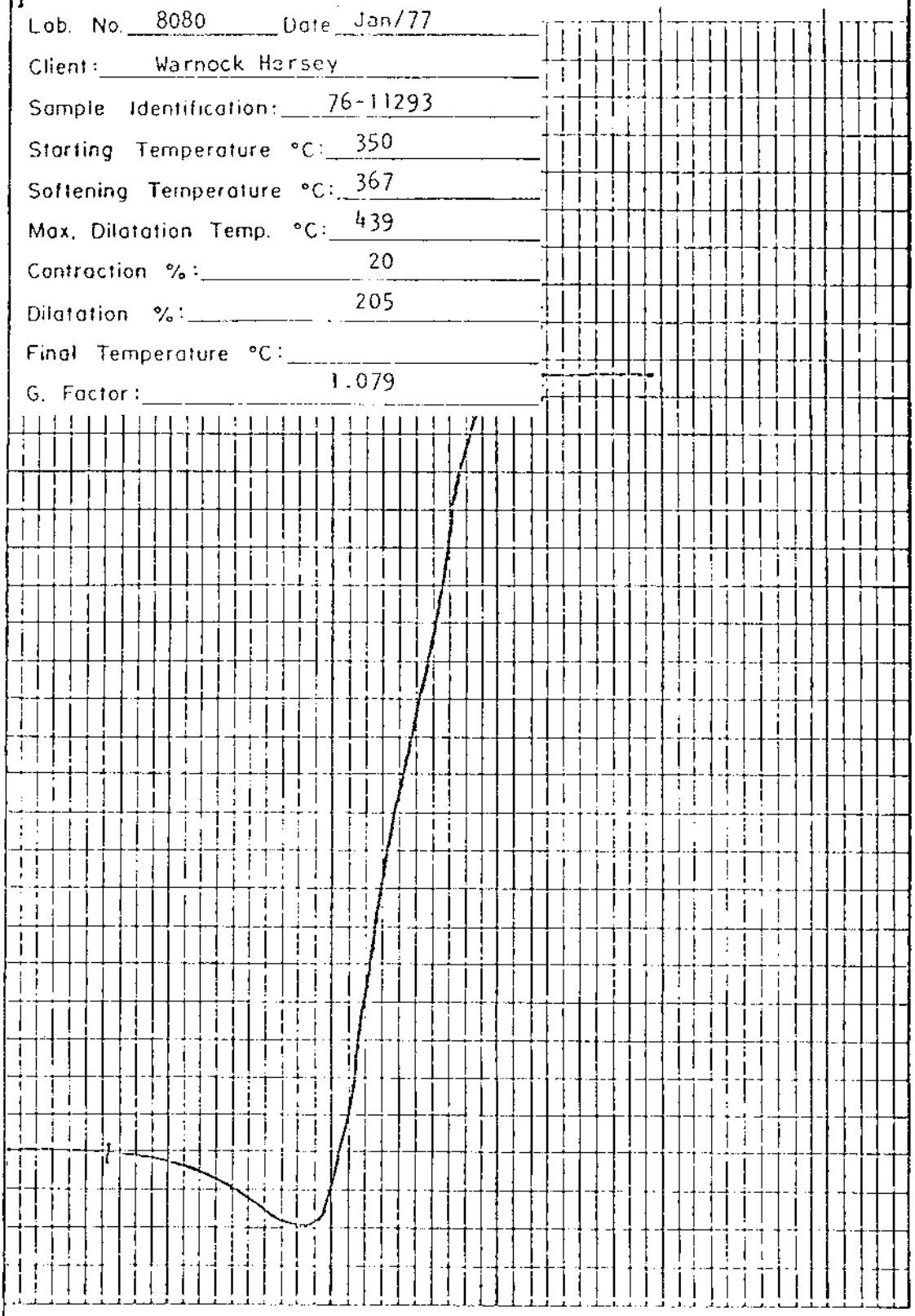
Max. Dilatation Temp. °C: 439

Contraction %: 20

Dilatation %: 205

Final Temperature °C:

G. Factor: 1.079



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCC MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 7 Warnock Hersey Lab. No.: 76 - 11294

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.7	37.5	18.6	43.2	0.41	144.7	37.8	18.7	43.5	0.41

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	72.4	0.6	48.9	0.29	49.2	0.29
65 x 0	27.6	0.8	22.4	0.61	22.6	0.62
TOTAL	100.0	--	--	--	41.9	0.38

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	39.5	0.9	4.4	26.0	68.7	0.55	4.4	26.2	69.4	0.56
1.40	1.50	6.7	0.9	14.6	22.4	62.1	0.61	14.8	22.6	62.6	0.62
1.50	1.60	2.8	1.1	26.3	18.9	53.7	0.57	26.6	19.1	54.3	0.58
1.60		51.0	--	--	--	--	--	85.5	--	--	--
TOTAL		100.0	--	--	--	--	--	47.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.011						

Lab. No. 8081 Date Jan. 22/77

Client: Warnock Hersey

Sample Identification: 76-11294

Starting Temperature °C: 350

Softening Temperature °C: 377

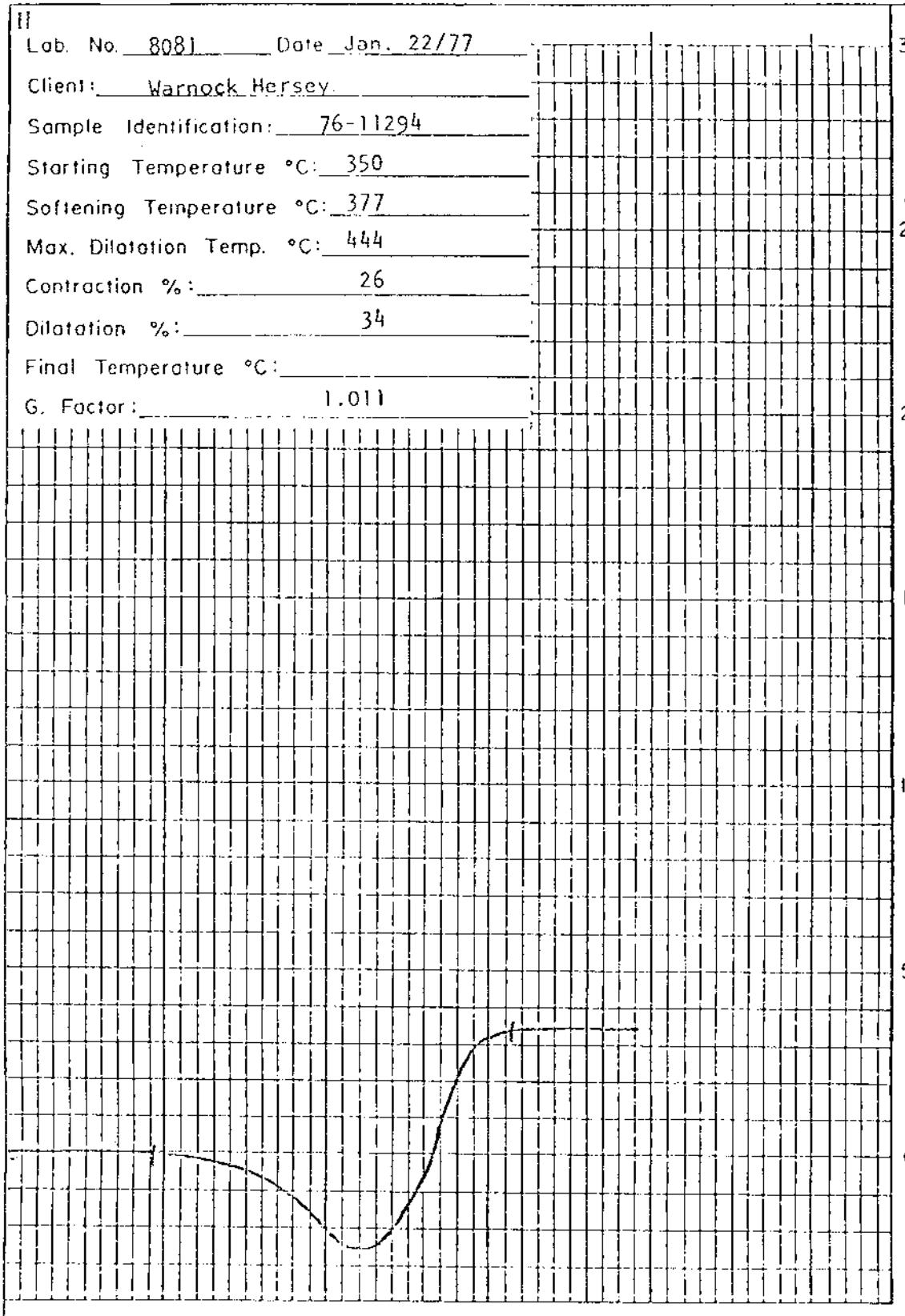
Max. Dilatation Temp. °C: 444

Contraction %: 26

Dilatation %: 34

Final Temperature °C:

G. Factor: 1.011



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. [illegible] Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 – 8 Warnock Hersey Lab. No.: 76 – 11295

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.7	47.2	17.4	34.7	0.46	99.6	47.5	17.5	35.0	0.46

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	76.6	0.5	53.0	0.35	53.3	0.35
65 x 0	23.4	0.7	30.8	0.58	31.0	0.31
TOTAL	100.0	--	--	--	48.1	0.34

TABLE III Float/Sink ¼" x [illegible] Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	25.2	0.8	5.3	23.0	70.9	0.47	5.3	23.2	71.5	0.47
1.40	1.50	6.3	0.8	14.3	21.0	63.9	0.43	14.4	21.1	64.5	0.43
1.50	1.60	2.1	0.8	25.3	18.1	55.8	0.39	25.5	18.2	56.3	0.39
1.60		66.4	--	--	--	--	--	84.8	--	--	--
TOTAL		100.0	--	--	--	--	--	59.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
4½	0.008						

Lab. No. 8082 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11295

Starting Temperature °C: 350

Softening Temperature °C: 389

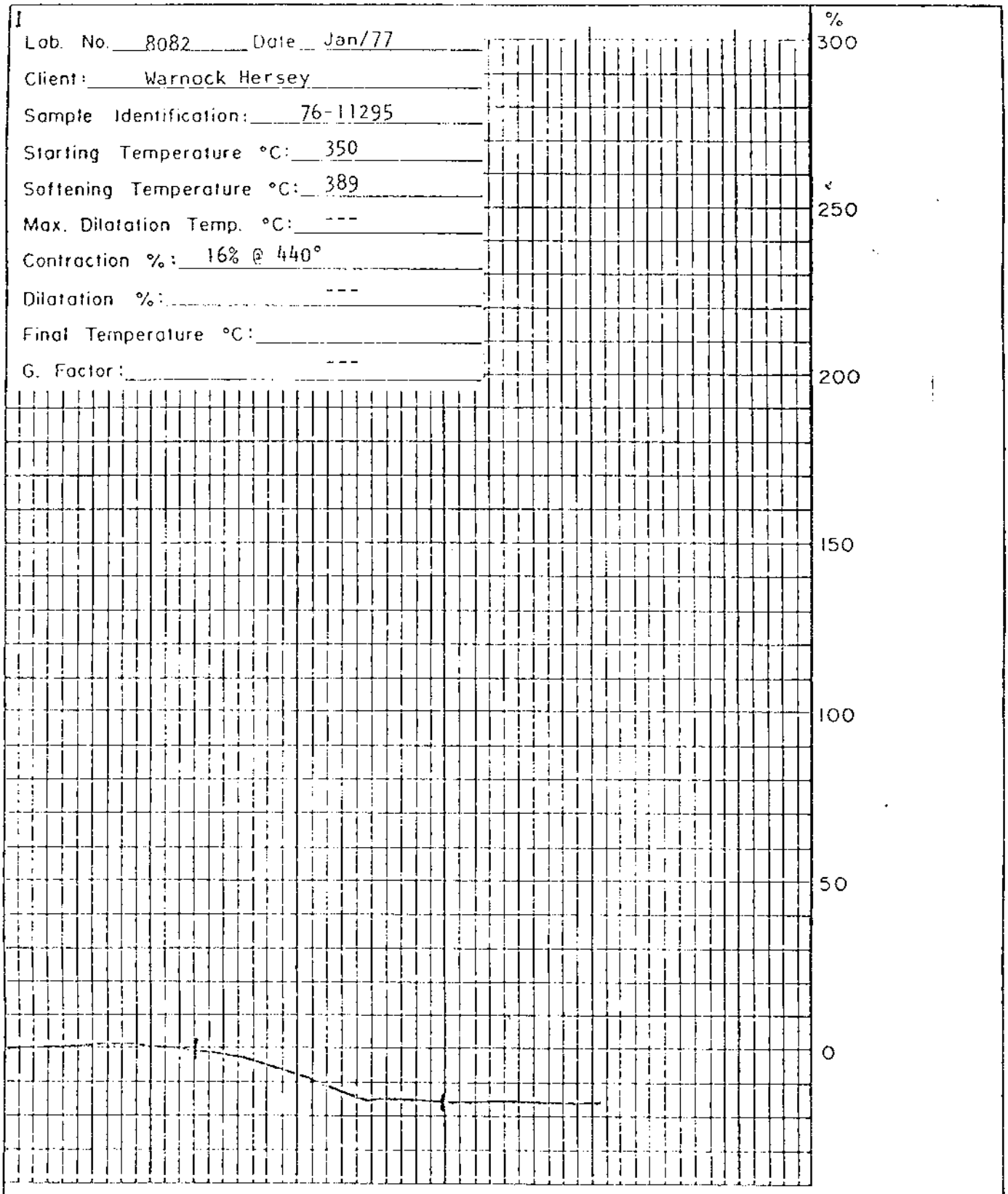
Max. Dilatation Temp. °C: ---

Contraction %: 16% @ 440°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 75 - 9 Warnock Hersey Lab. No.: 76 - 11296

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.7	32.5	17.0	49.8	0.32	93.4	32.7	17.1	50.2	0.32

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	66.8	0.6	43.2	0.27	43.5	0.27
65 x 0	33.2	0.7	19.8	0.44	19.9	0.44
TOTAL	100.0	--	--	--	35.7	0.33

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	39.4	1.1	4.6	24.4	69.9	0.51	4.6	24.7	70.7	0.52
1.40	1.50	9.1	1.1	14.9	21.5	62.5	0.44	15.0	21.8	63.2	0.44
1.50	1.60	4.0	1.1	25.2	18.6	55.1	0.46	25.5	18.8	55.7	0.46
1.60		47.5	--	--	--	--	--	19.6	--	--	--
TOTAL		100.0	--	--	--	--	--	42.0	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PLR CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
6	0.010						

II

Lab. No. 8083 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11296

Starting Temperature °C: 350

Softening Temperature °C: 360

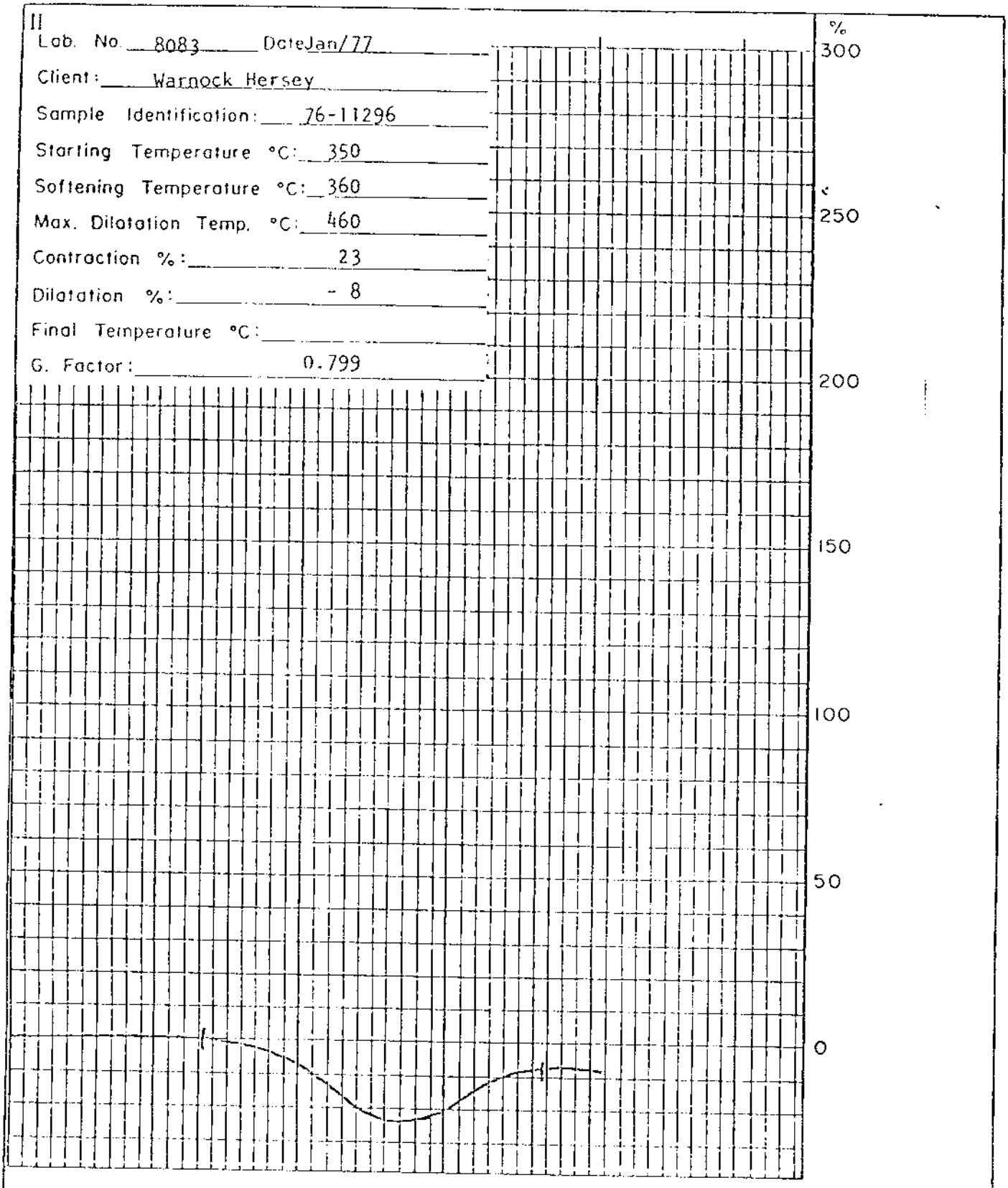
Max. Dilatation Temp. °C: 460

Contraction %: 23

Dilatation %: - 8

Final Temperature °C:

G. Factor: 0.799



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7926 Date Dec. 16, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-1

Starting Temperature °C: 350

Softening Temperature °C: 371

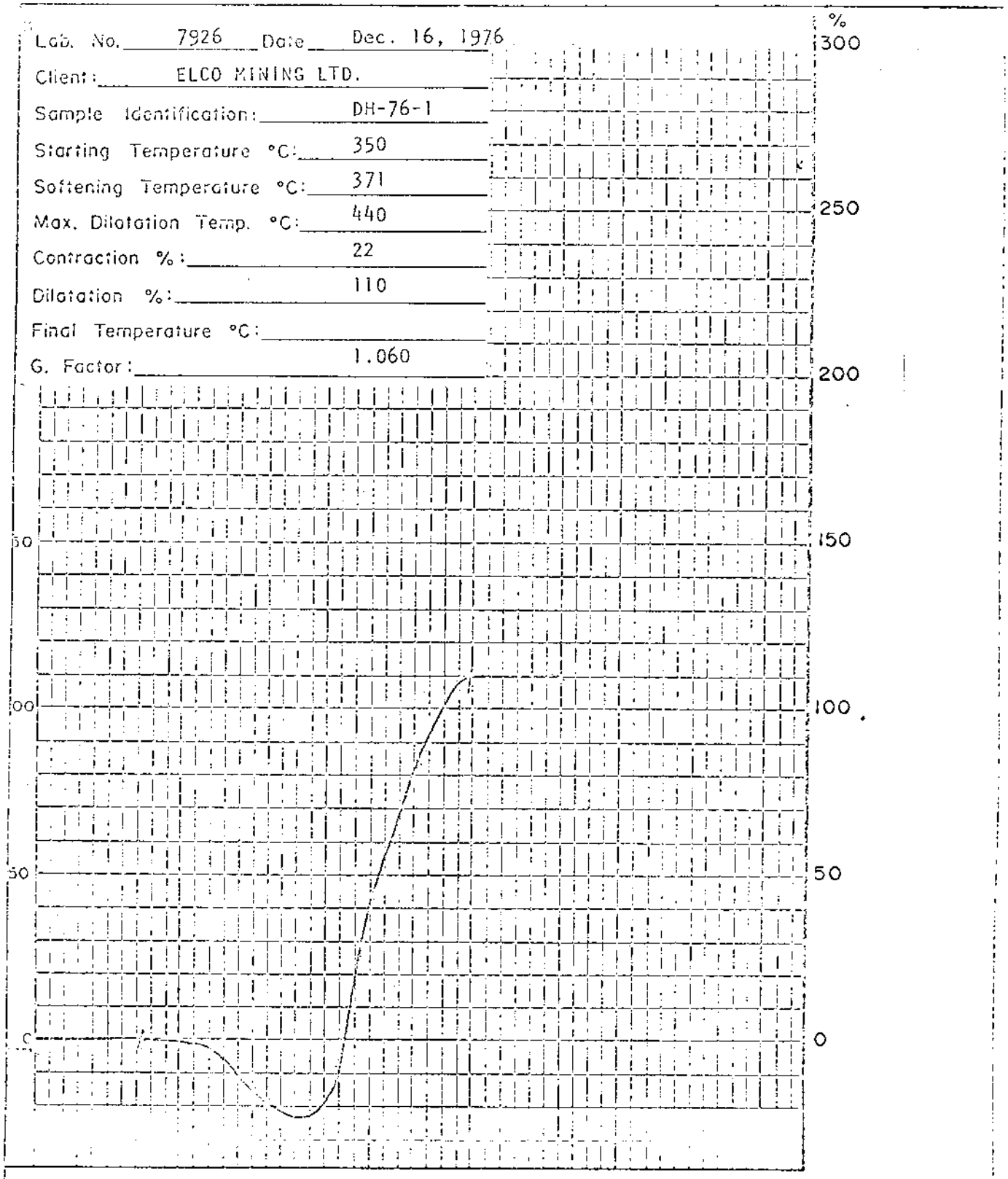
Max. Dilatation Temp. °C: 440

Contraction %: 22

Dilatation %: 110

Final Temperature °C:

G. Factor: 1.060



BARTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7944 Date Jan 10, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-76-1-1

Starting Temperature °C: 350

Softening Temperature °C: 408

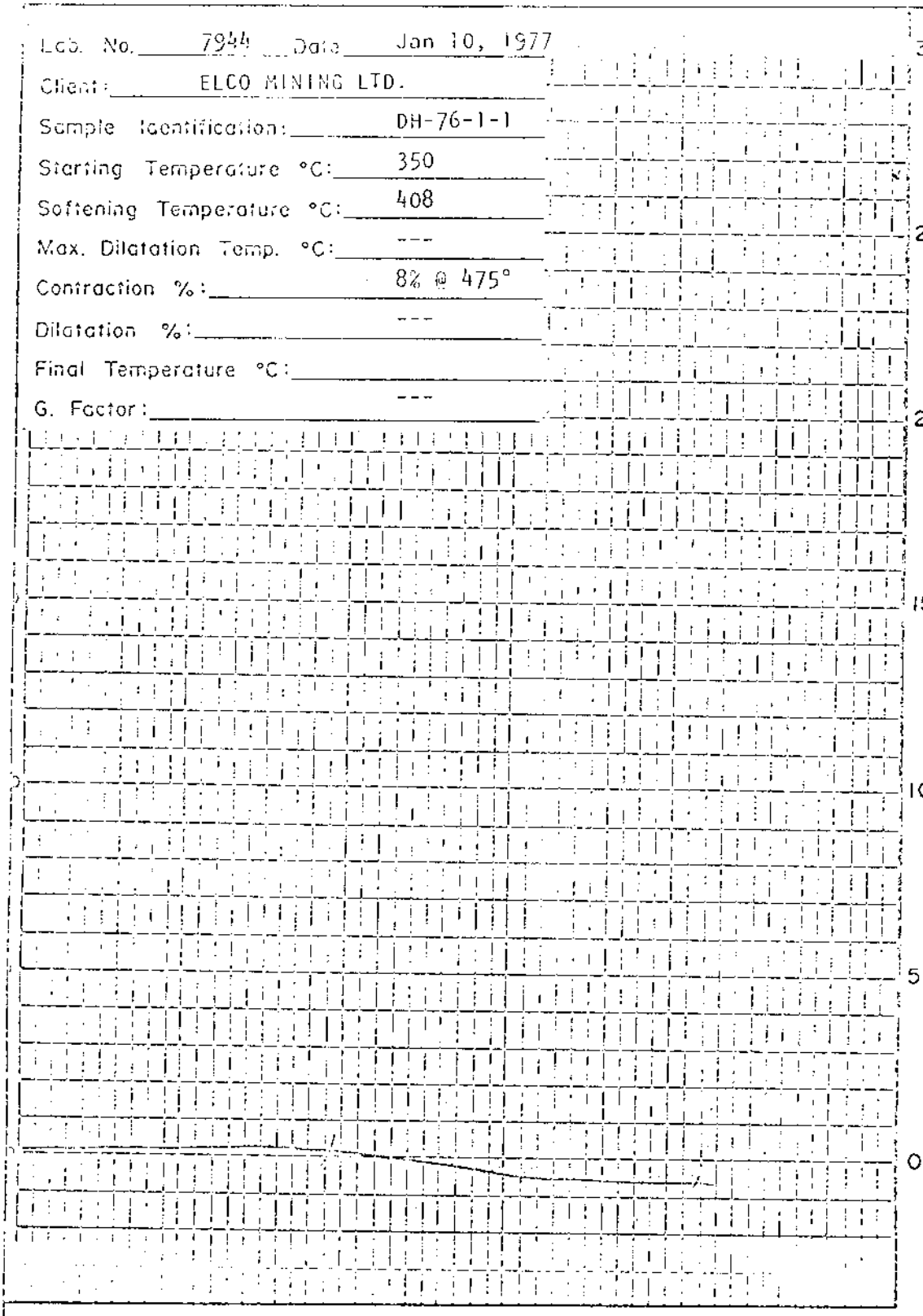
Max. Dilatation Temp. °C: ---

Contraction %: 8% @ 475°

Dilatation %: ---

Final Temperature °C:

G. Factor: ---



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7945 Date Jan 10, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-76-1-2

Starting Temperature °C: 350

Softening Temperature °C: 387

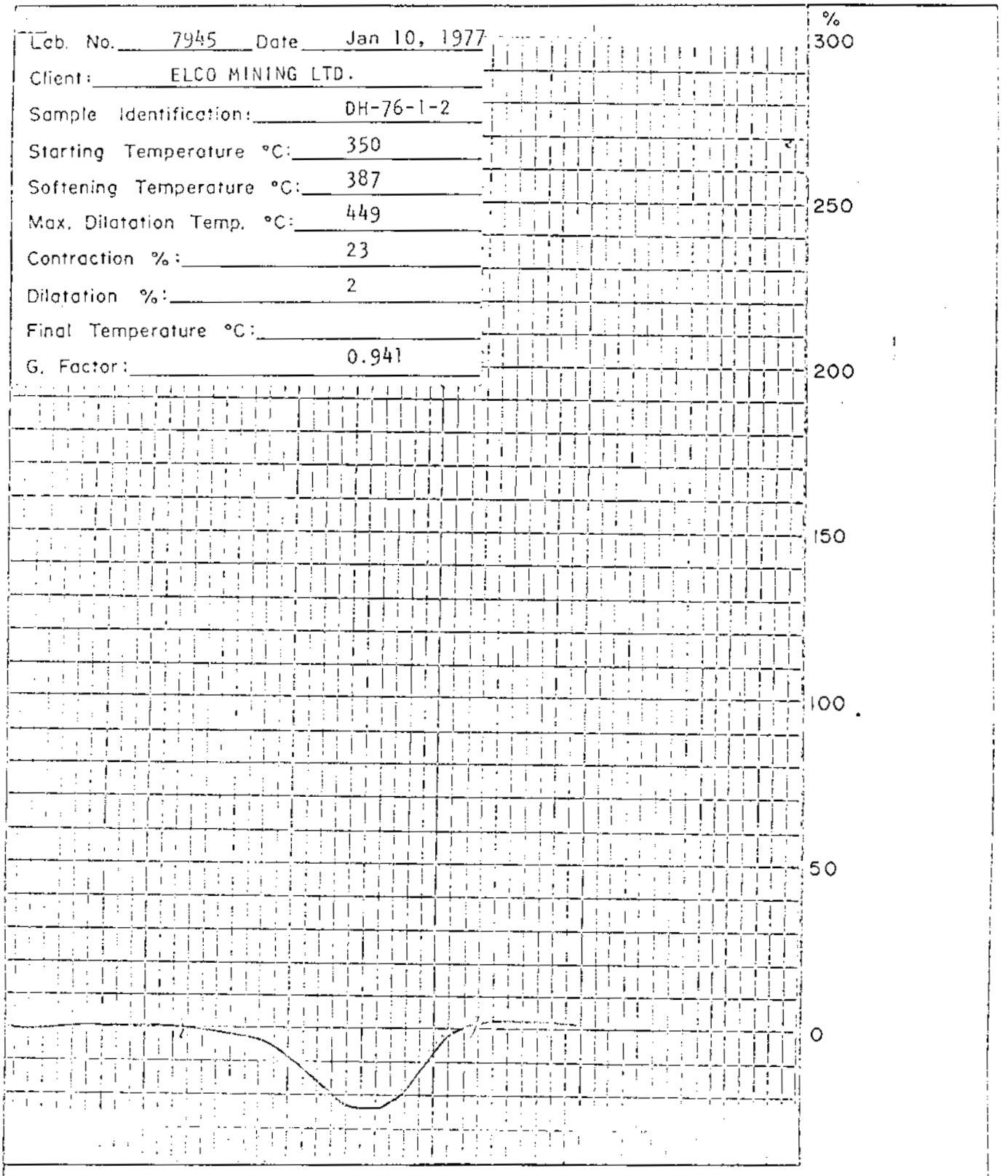
Max. Dilatation Temp. °C: 449

Contraction %: 23

Dilatation %: 2

Final Temperature °C:

G. Factor: 0.941



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7927 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-2

Starting Temperature °C: 350

Softening Temperature °C: 372

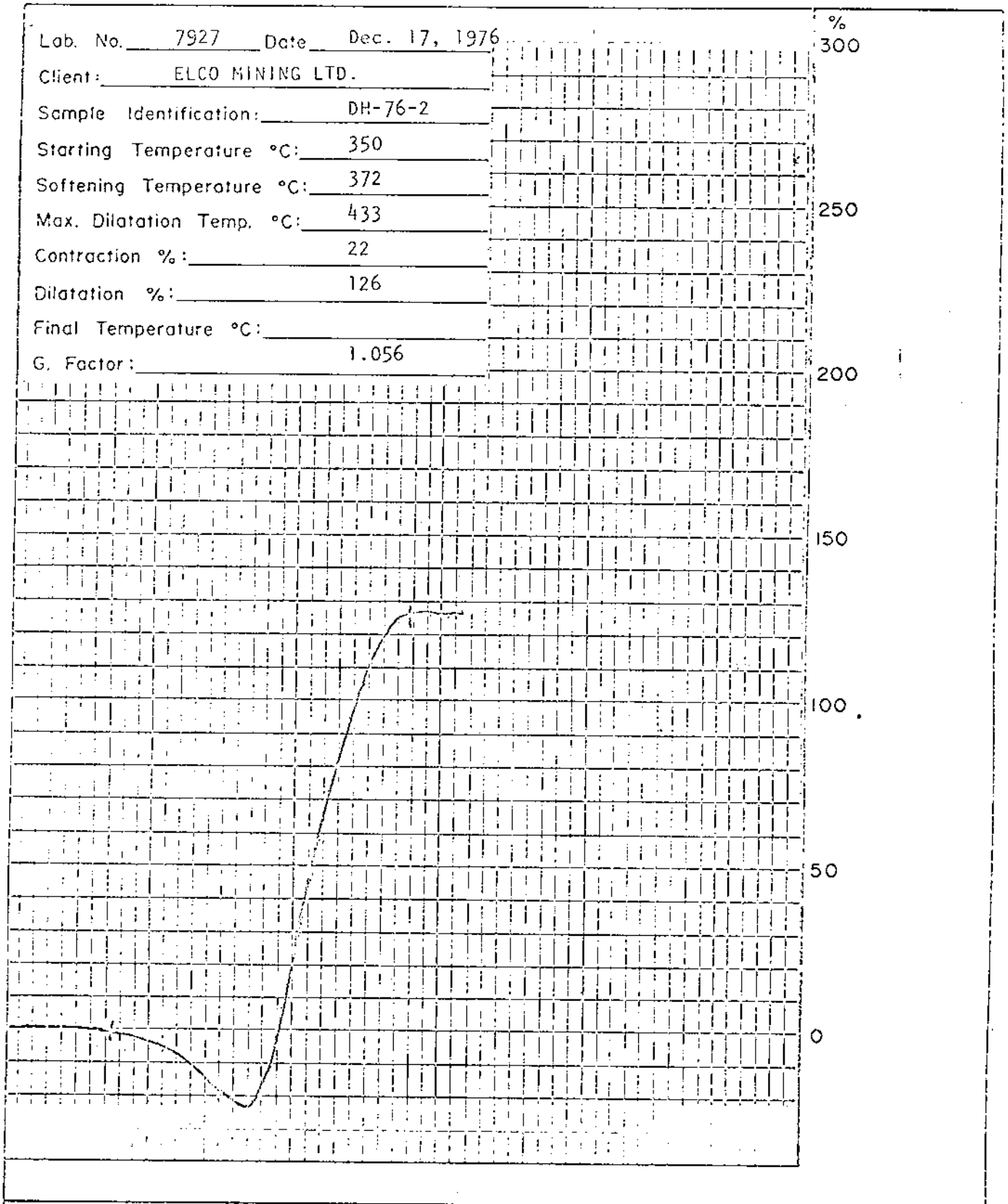
Max. Dilatation Temp. °C: 433

Contraction %: 22

Dilatation %: 126

Final Temperature °C:

G. Factor: 1.056



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7928 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-3

Starting Temperature °C: 350

Softening Temperature °C: 364

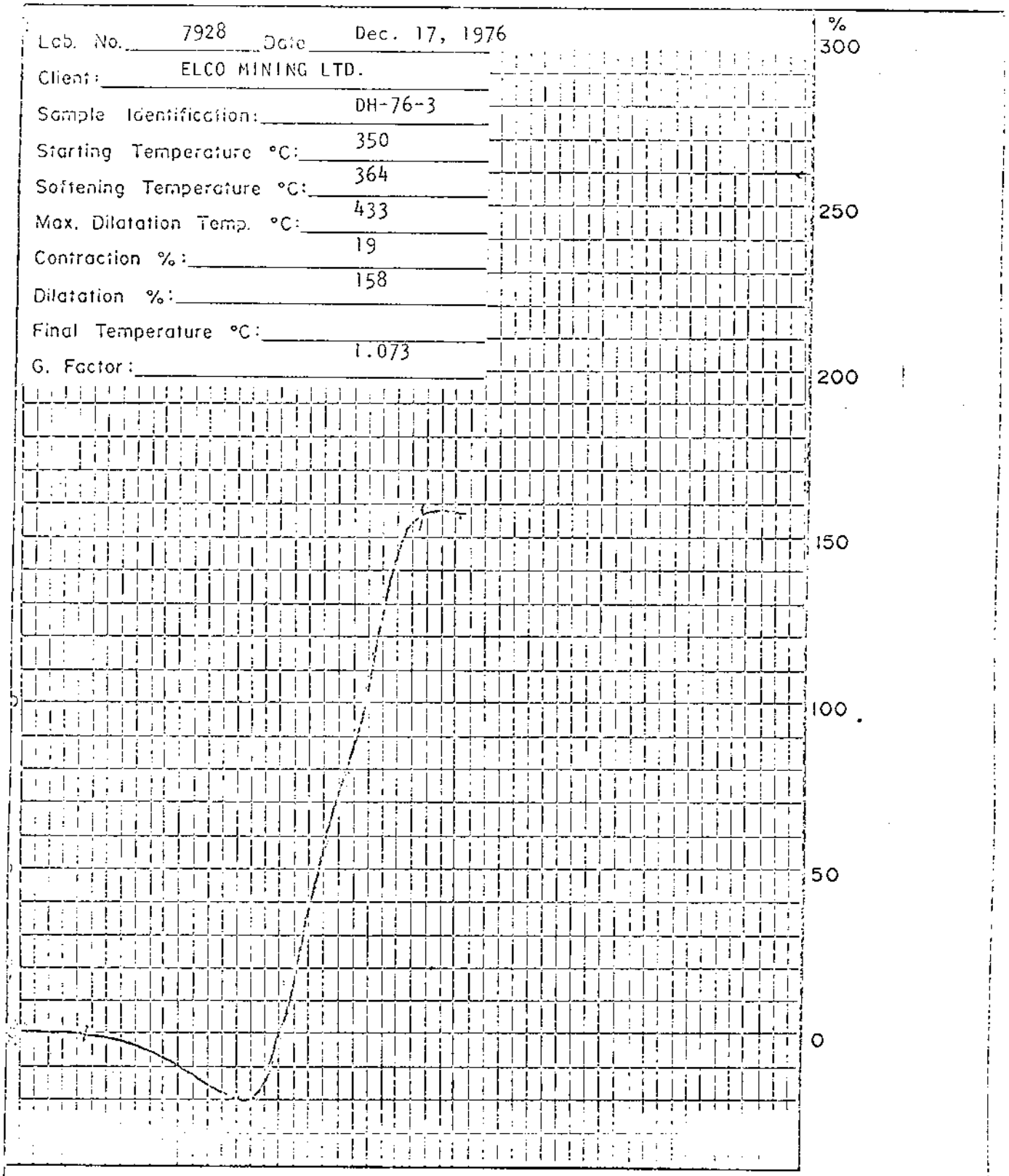
Max. Dilatation Temp. °C: 433

Contraction %: 19

Dilatation %: 158

Final Temperature °C:

G. Factor: 1.073



BARTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7929 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-4

Starting Temperature °C: 350

Softening Temperature °C: 358

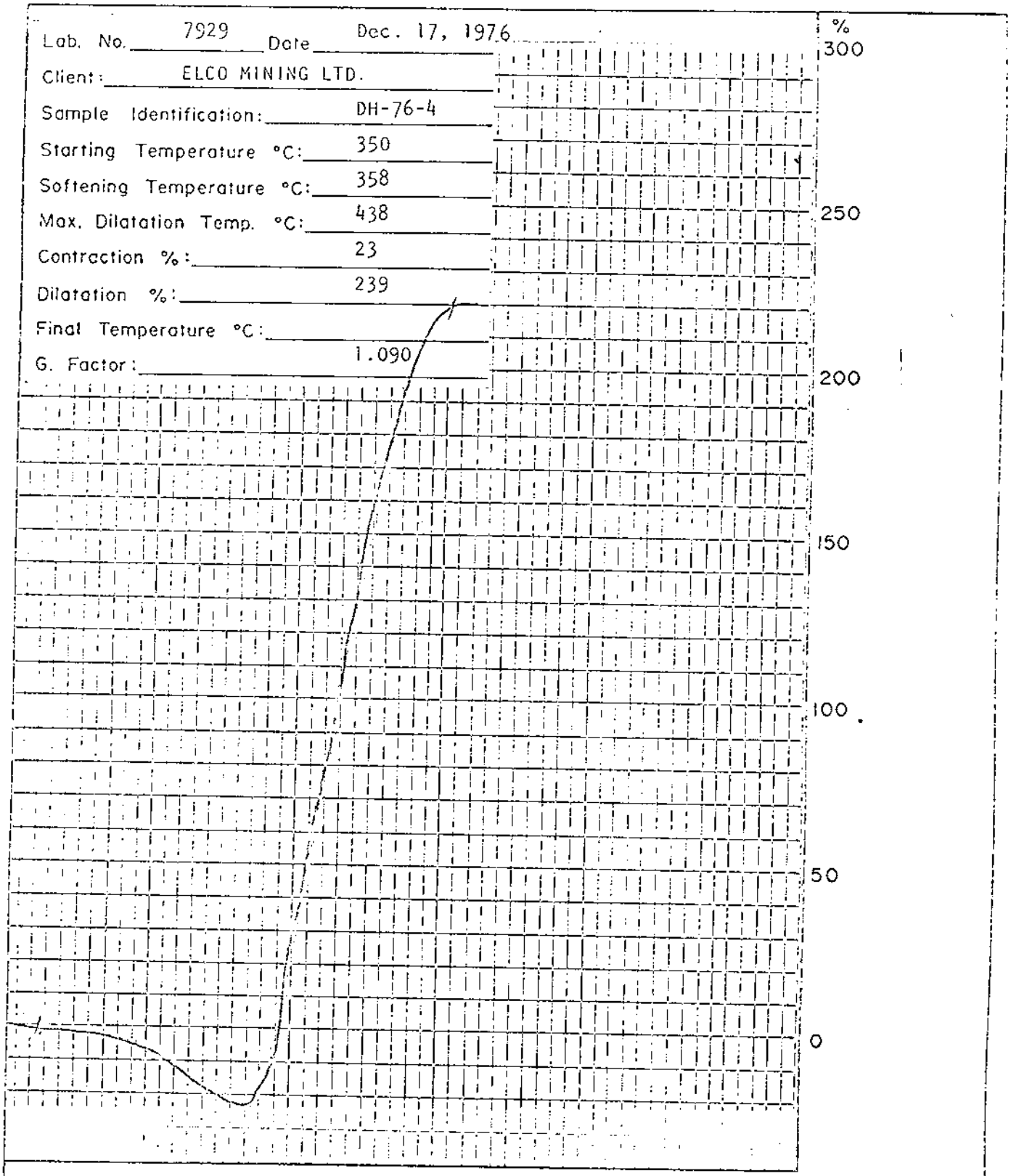
Max. Dilatation Temp. °C: 438

Contraction %: 23

Dilatation %: 239

Final Temperature °C:

G. Factor: 1.090



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7930 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-5

Starting Temperature °C: 350

Softening Temperature °C: 363

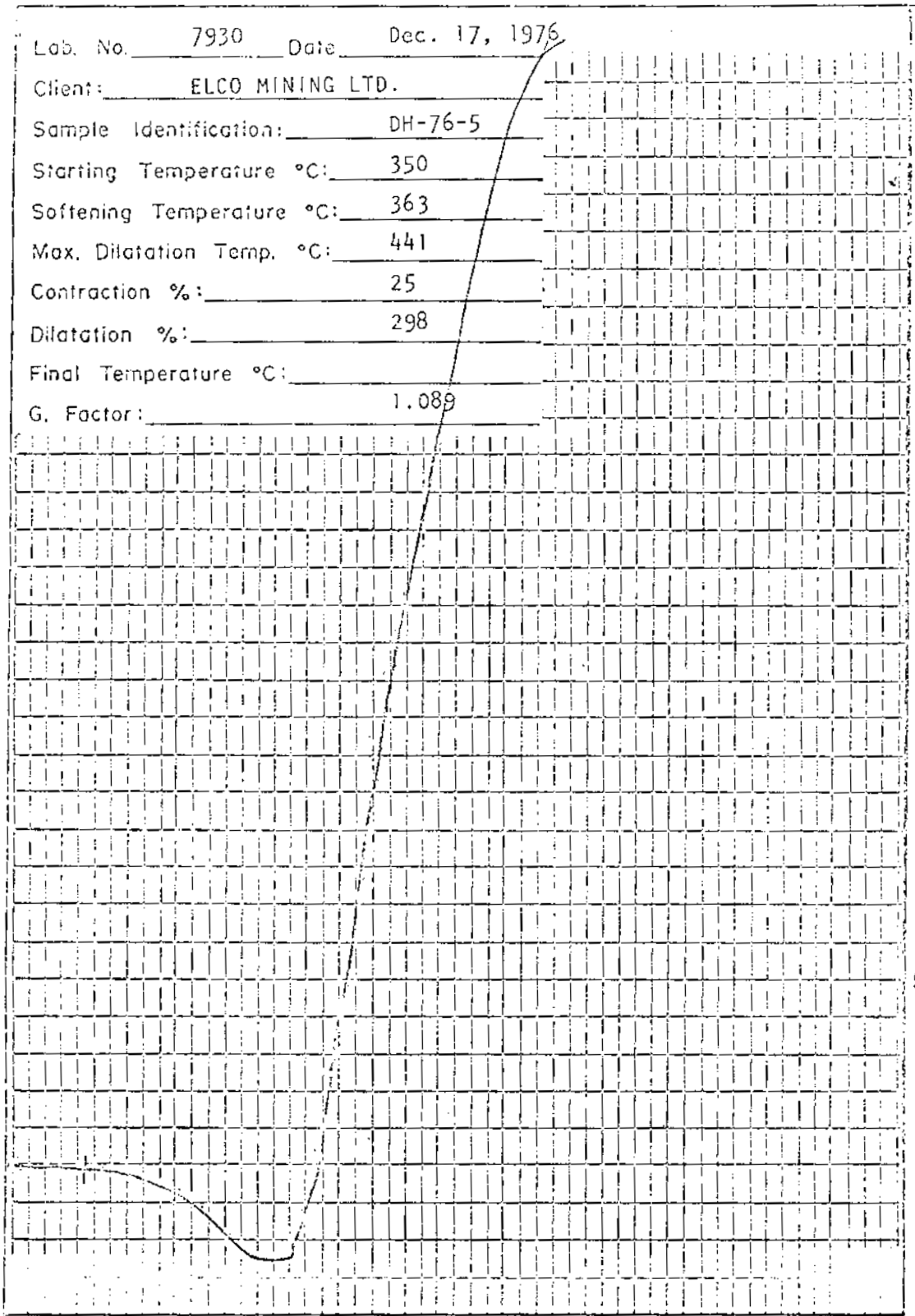
Max. Dilatation Temp. °C: 441

Contraction %: 25

Dilatation %: 298

Final Temperature °C:

G. Factor: 1.089



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7931 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-6

Starting Temperature °C: 350

Softening Temperature °C: 354

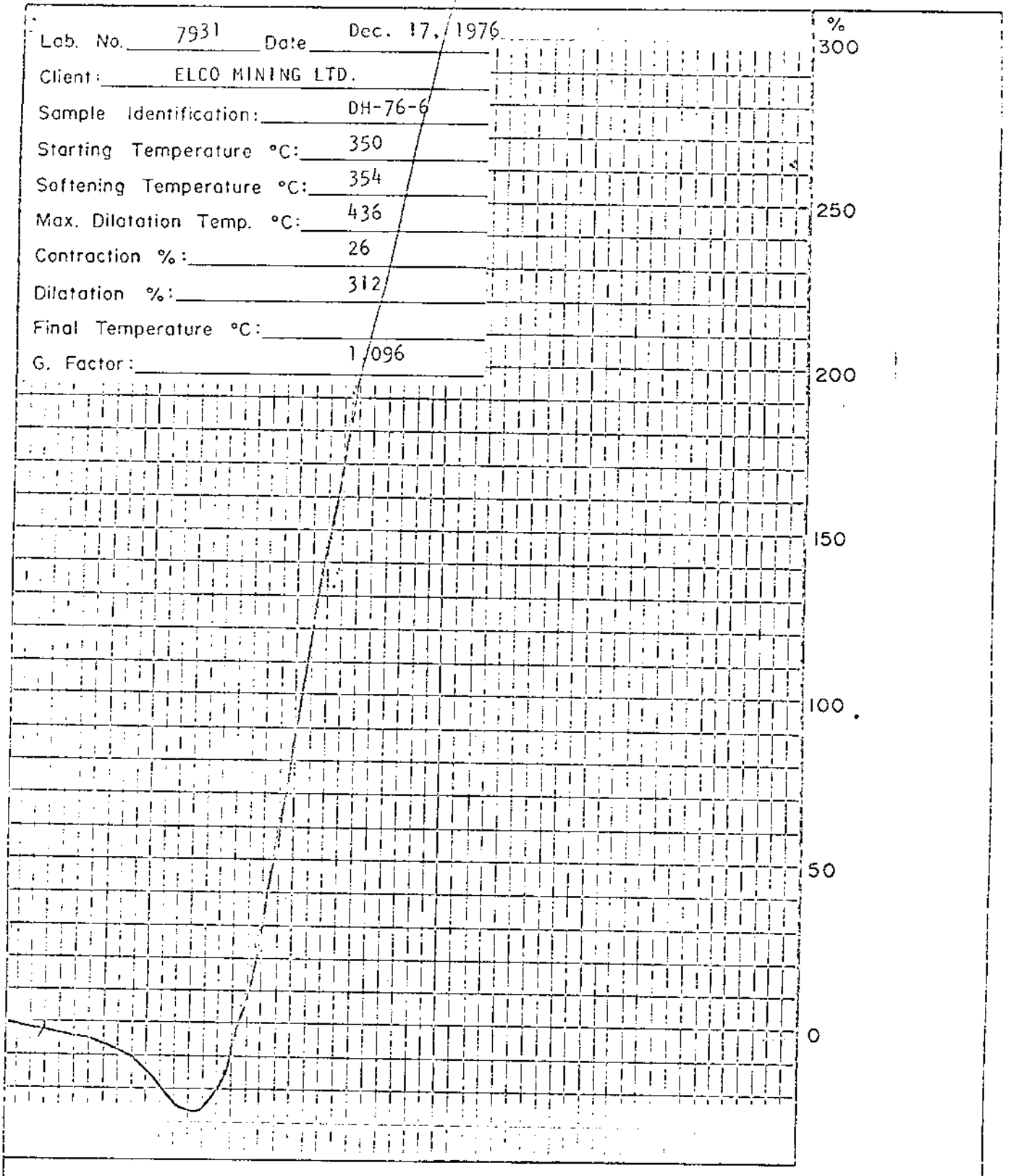
Max. Dilatation Temp. °C: 436

Contraction %: 26

Dilatation %: 312

Final Temperature °C:

G. Factor: 1.096



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7932 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-7

Starting Temperature °C: 350

Softening Temperature °C: 369

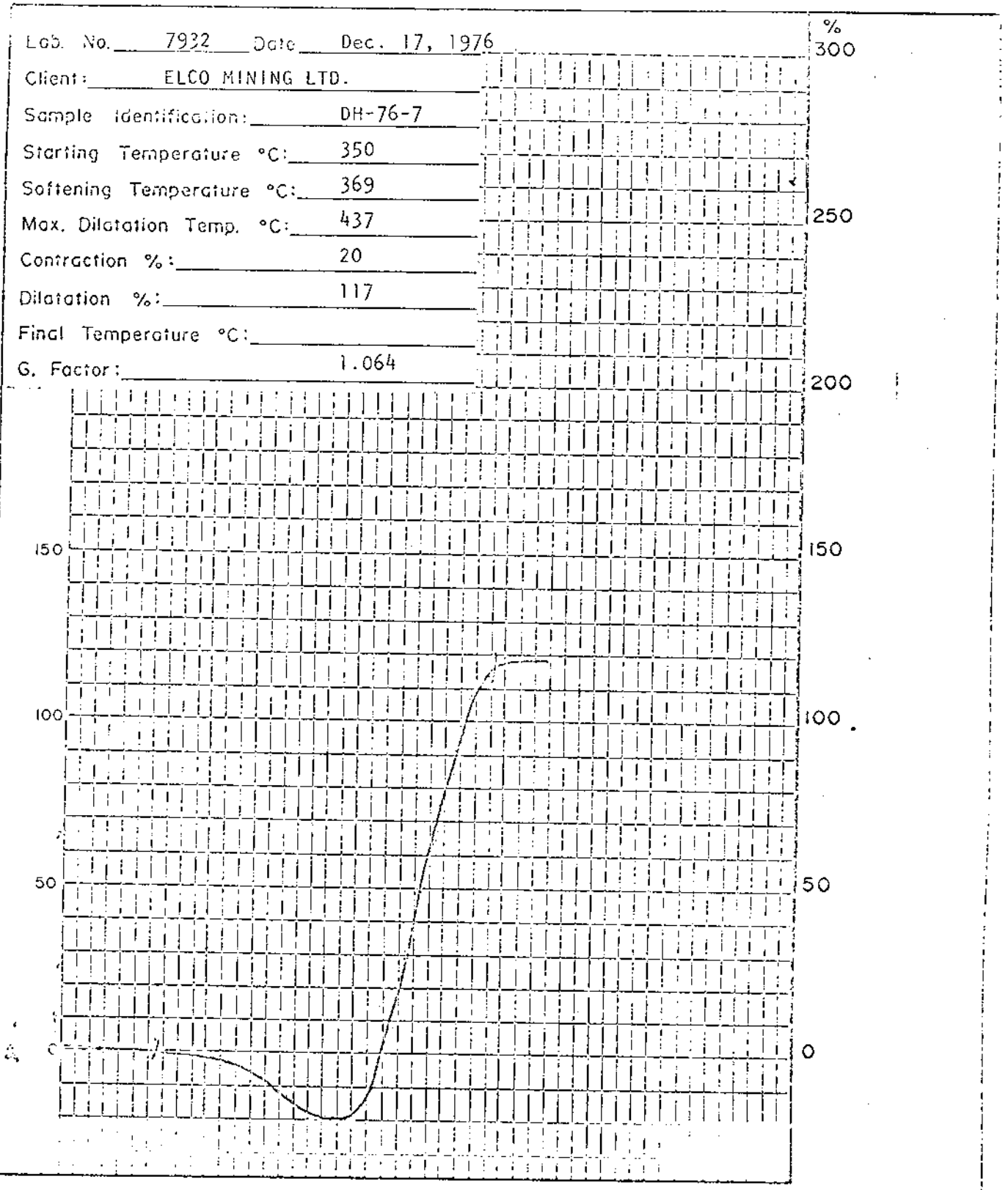
Max. Dilatation Temp. °C: 437

Contraction %: 20

Dilatation %: 117

Final Temperature °C:

G. Factor: 1.064



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7933 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-76-8

Starting Temperature °C: 350

Softening Temperature °C: 358

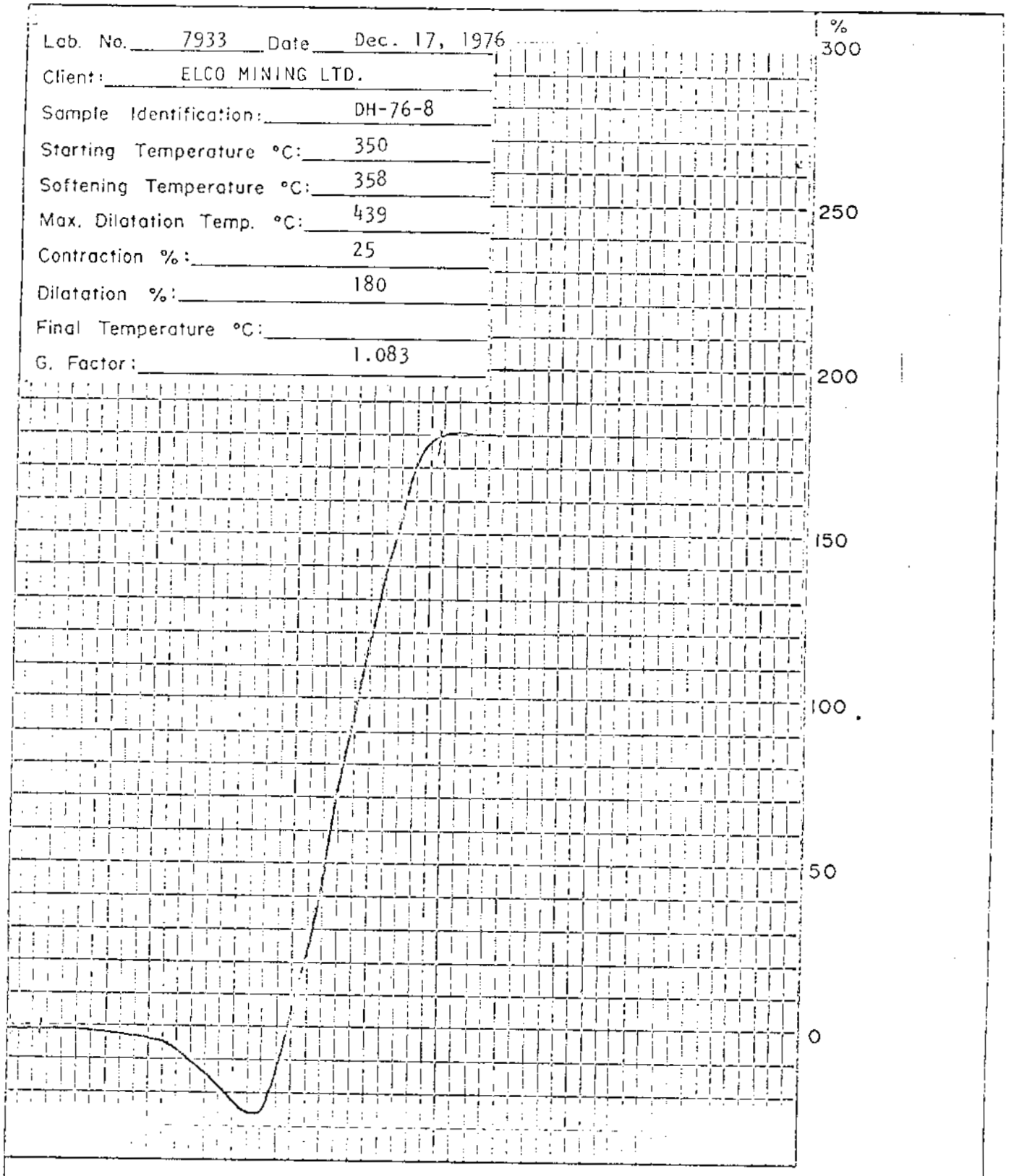
Max. Dilatation Temp. °C: 439

Contraction %: 25

Dilatation %: 180

Final Temperature °C:

G. Factor: 1.083



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77 - 1 — Warnock Hersey Lab. No.: 76 - 11234

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.9	34.7	24.3	40.1	0.65	61.5	35.0	24.5	40.5	0.66

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	78.9	1.0	38.4	0.60	38.8	0.60
65 x 0	21.1	0.9	27.3	0.65	27.6	0.65
TOTAL	100.0	--	--	--	36.4	0.61

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	39.7	1.0	6.6	35.1	57.3	0.60	6.7	35.4	57.9	0.61
1.40	1.50	6.4	1.0	18.5	30.2	50.3	0.57	18.6	30.5	50.9	0.58
1.50	1.60	6.4	0.8	29.2	26.4	43.6	0.50	29.4	26.6	44.0	0.50
1.60		47.5	--	--	--	--	--	71.3	--	--	--
TOTAL		100.0	--	--	--	--	--	39.6	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.034						

Lab. No. 8059 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11234 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 359

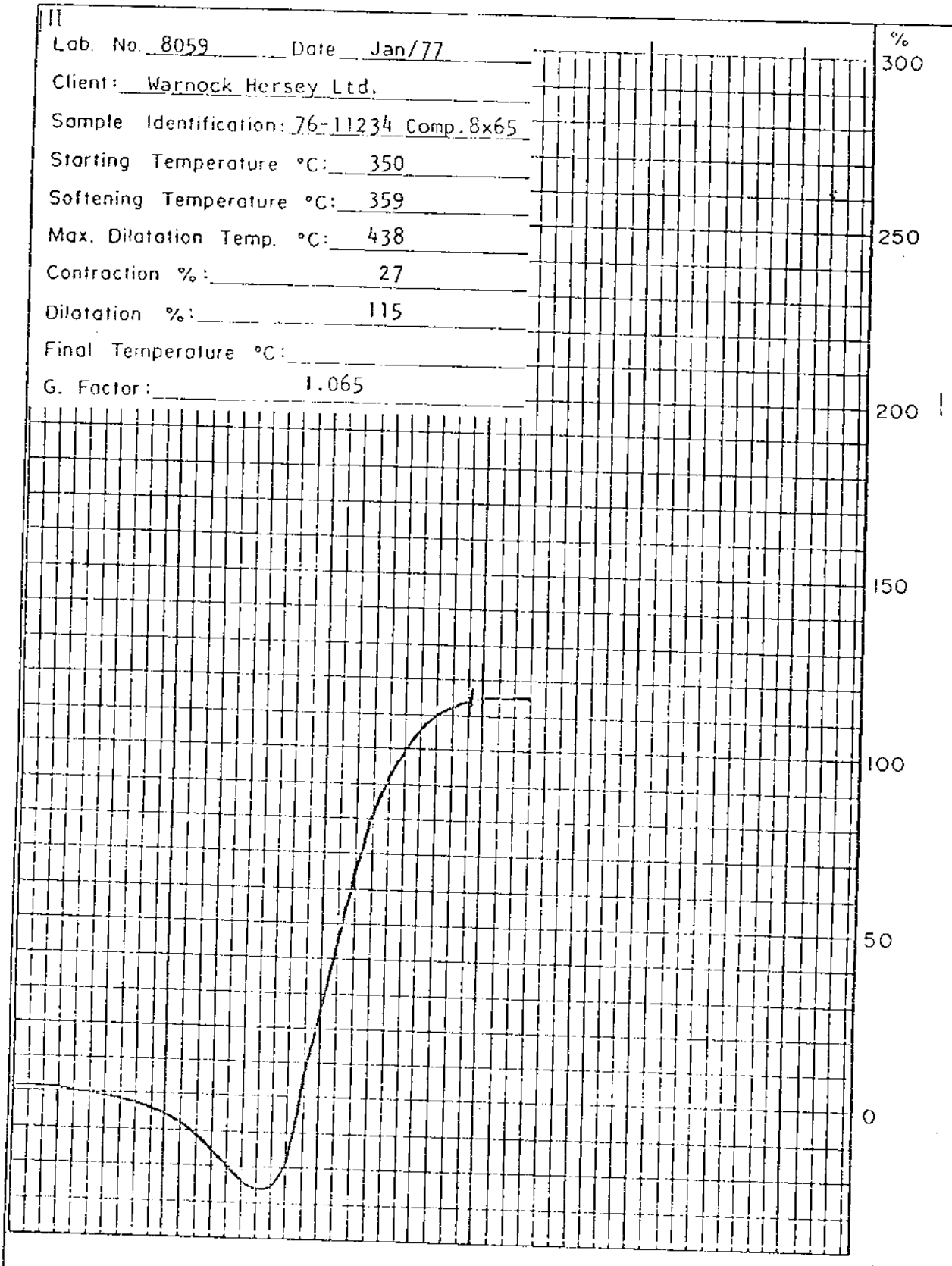
Max. Dilatation Temp. °C: 438

Contraction %: 27

Dilatation %: 115

Final Temperature °C:

G. Factor: 1.065



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77 - 2 Warnock Hersey Lab. No.: 76 - 11

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.9	23.1	28.8	47.2	0.60	75.4	23.3	29.1	47.6	0.61

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	76.5	1.0	22.5	0.56	22.8	0.57
65 x 0	23.5	0.9	26.8	0.55	27.1	0.56
TOTAL	100.0	--	--	--	23.8	0.57

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	69.5	1.1	5.8	33.4	59.7	0.58	5.9	33.8	60.3	0.59
1.40	1.50	6.2	1.1	18.7	30.2	50.0	0.57	18.9	30.5	50.6	0.58
1.50	1.60	2.3	1.0	19.2	29.8	50.0	0.55	19.4	30.1	50.5	0.56
1.60		22.0	--	--	--	--	--	71.0	--	--	--
TOTAL		100.0	--	--	--	--	--	21.3	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.10						

Lab. No. 8060 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11235 Comp.

Starting Temperature °C: 350

Softening Temperature °C: 352

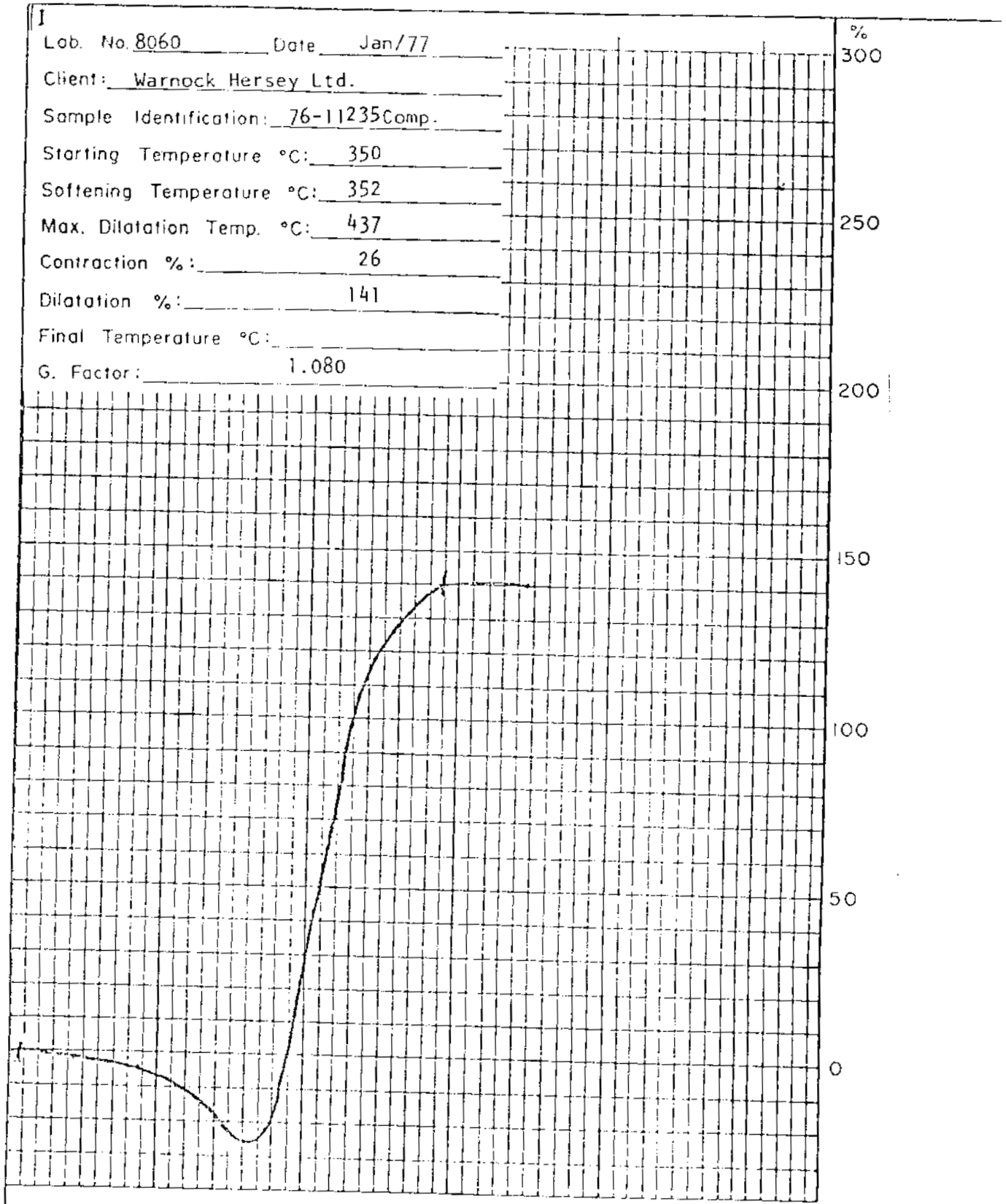
Max. Dilatation Temp. °C: 437

Contraction %: 26

Dilatation %: 141

Final Temperature °C:

G. Factor: 1.080



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77 - 3 Warnock Hersey Lab. No.: 76 - 11236

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	16.6	32.5	50.1	0.53	68.4	16.7	32.8	50.5	0.53

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	82.8	0.9	15.2	0.53	15.3	0.54
65 x 0	17.2	0.9	18.7	0.57	18.9	0.58
TOTAL	100.0	--	--	--	15.9	0.55

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	75.4	1.1	4.7	34.7	59.5	0.54	4.8	35.1	60.1	0.55
1.40	1.50	4.2	1.0	13.8	33.1	52.1	0.53	14.0	33.4	52.6	0.54
1.50	1.60	3.7	0.7	30.7	27.6	41.0	0.52	30.9	27.8	41.3	0.52
1.60		16.7	--	--	--	--	--	58.2	--	--	--
TOTAL		100.0	--	--	--	--	--	15.1	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.012						

Lab. No. 8061 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11236 Comp.

Starting Temperature °C: 350

Softening Temperature °C: 364

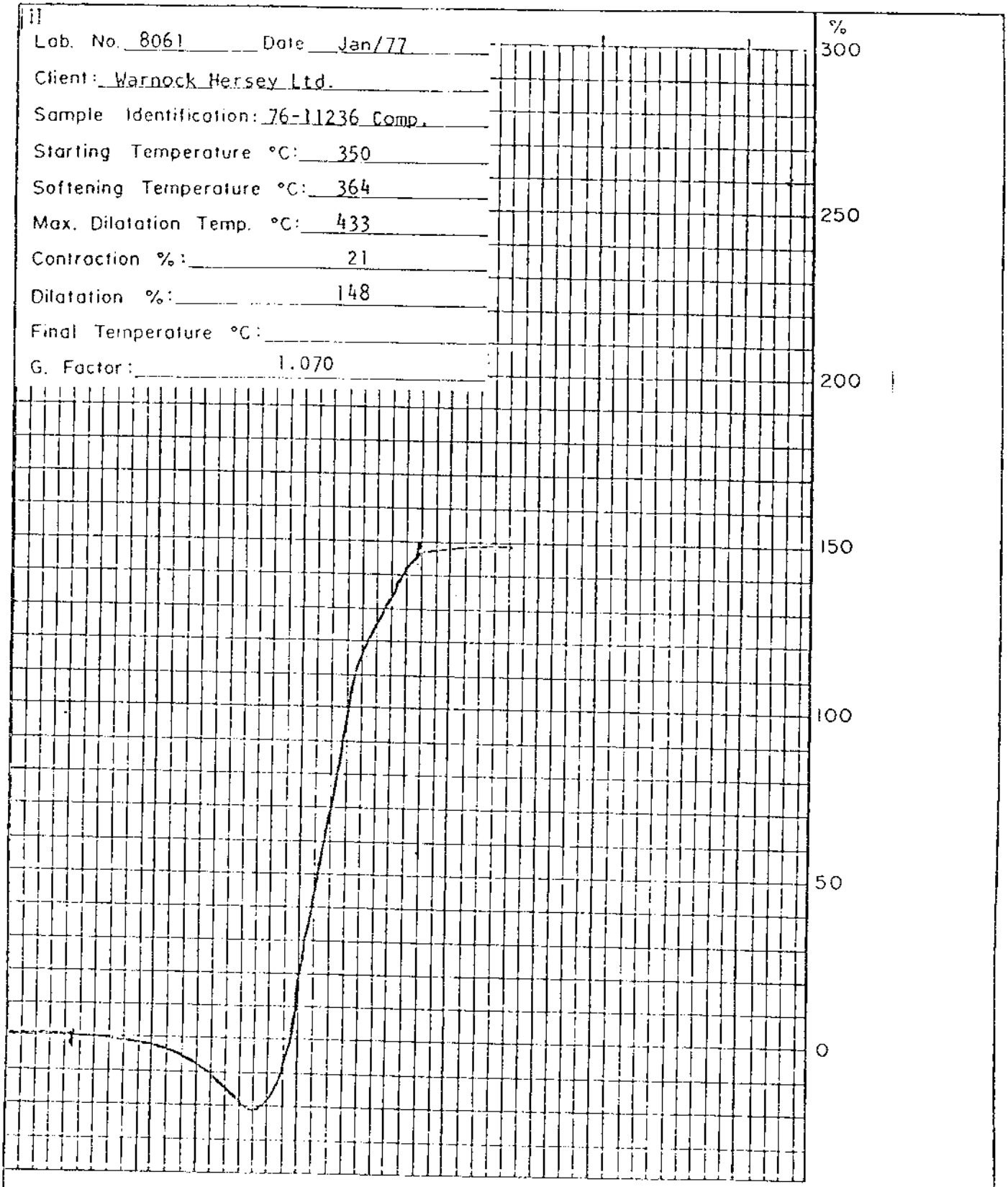
Max. Dilatation Temp. °C: 433

Contraction %: 21

Dilatation %: 148

Final Temperature °C:

G. Factor: 1.070



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77 - 4

Warnock Hersey Lab. No.: 76 - 11237

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	8.3	31.6	59.3	0.82	99.7	8.4	31.9	59.7	0.83

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	73.7	1.0	7.8	0.78	7.9	0.79
65 x 0	26.3	0.9	8.8	0.83	8.8	0.84
TOTAL	100.0	--	--	--	8.1	0.80

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	89.1	1.0	3.2	33.3	61.5	0.78	3.2	33.6	63.2	0.84
1.40	1.50	3.6	1.0	16.8	29.1	56.9	0.74	17.0	29.4	57.5	0.75
1.50	1.60	1.5	0.9	20.8	28.9	51.4	0.71	21.0	29.2	49.8	0.72
1.60		5.8	--	--	--	--	--	55.3	--	--	--
TOTAL		100.0	--	--	--	--	--	7.3	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.004						

Lab. No. 8062 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11237 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 366

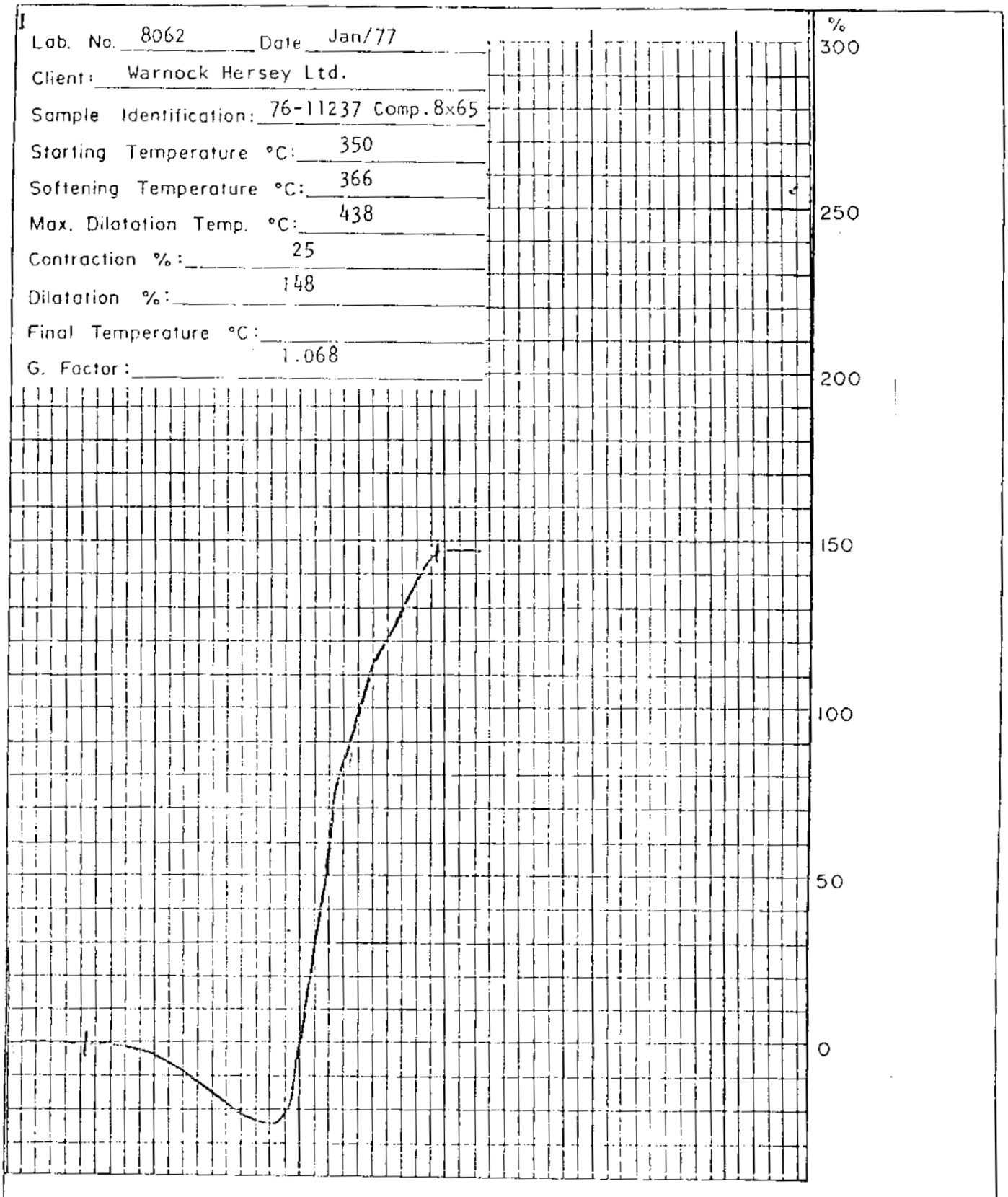
Max. Dilatation Temp. °C: 438

Contraction %: 25

Dilatation %: 148

Final Temperature °C:

G. Factor: 1.068



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77 - 5 — Warnock Hersey Lab. No.: 76 - 11238

TABLE I — Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
1.0	38.2	23.1	37.7	0.60	61.5	38.6	23.3	38.1	0.61

TABLE II — Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.4	1.0	42.2	0.49	42.6	0.50
65 x 0	19.6	1.1	23.6	0.71	23.8	0.72
TOTAL	100.0	--	--	--	38.9	0.54

TABLE III — Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	47.8	1.0	3.3	34.7	61.0	0.59	3.3	35.0	61.7	0.60
1.40	1.50	1.6	1.0	11.1	31.5	56.1	0.54	11.2	31.8	57.0	0.54
1.50	1.60	0.7	1.0	19.4	28.6	50.6	0.50	19.6	28.9	52.5	0.50
1.60		49.9	--	--	--	--	--	77.3	--	--	--
TOTAL		100.0	--	--	--	--	--	40.5	--	--	--

TABLE IV — Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.008						

Lab. No. 8062 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11238 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 368

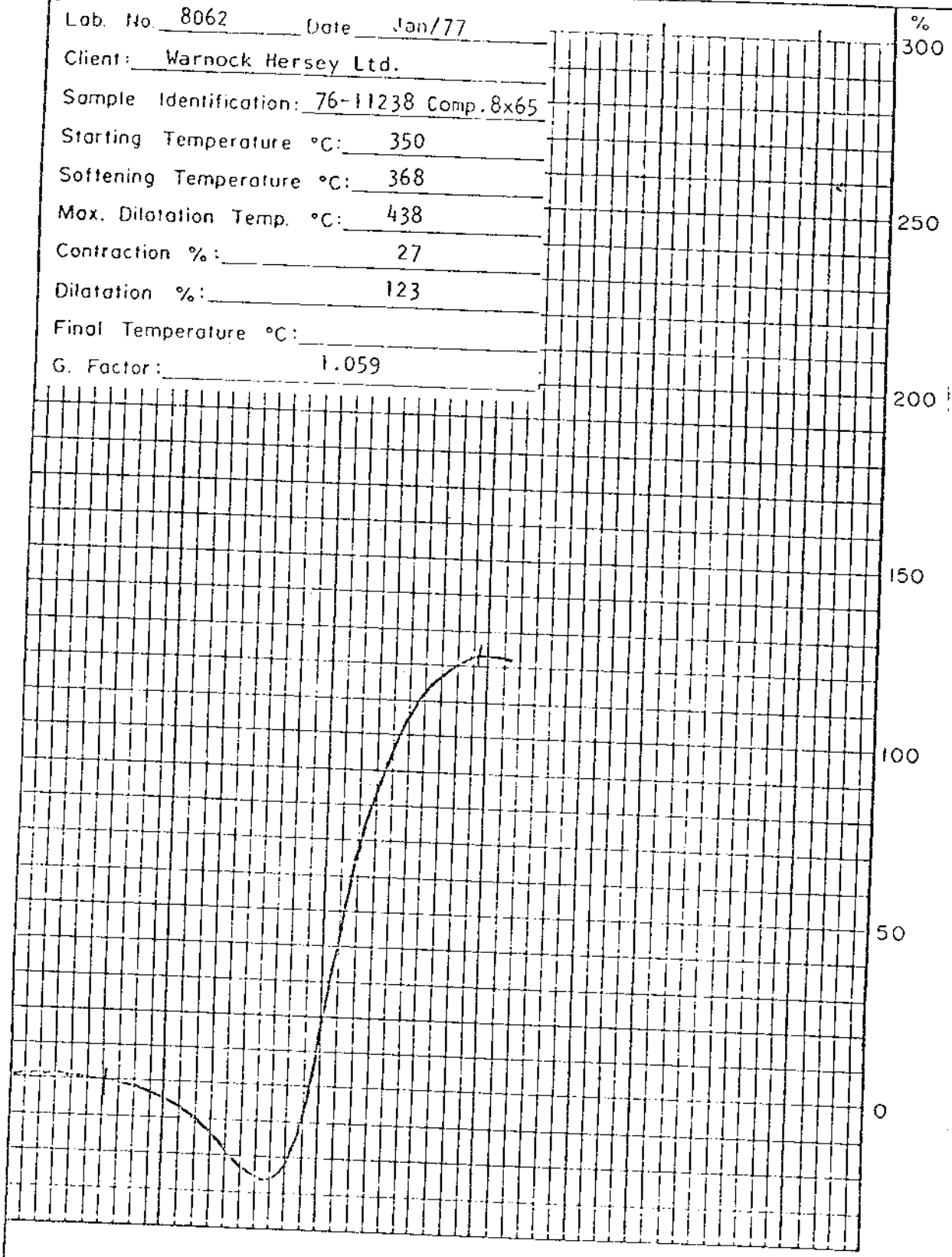
Max. Dilatation Temp. °C: 438

Contraction %: 27

Dilatation %: 123

Final Temperature °C:

G. Factor: 1.059



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77 - 6 Warnock Hersey Lab. No.: 76 - 1123

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	27.9	27.0	44.3	0.72	78.8	28.1	27.2	44.7	0.73

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	80.8	1.0	26.7	0.73	26.9	0.74
65 x 0	19.2	0.9	21.8	0.82	22.0	0.83
TOTAL	100.0	--	--	--	26.5	0.76

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	58.5	1.2	5.1	33.4	60.3	0.75	5.2	33.8	61.0	0.76
1.40	1.50	7.1	1.2	13.0	31.5	54.3	0.70	13.2	31.9	54.9	0.71
1.50	1.60	3.3	1.2	22.9	28.4	47.5	0.68	23.2	28.7	48.1	0.69
1.60		31.1	--	--	--	--	--	69.9	--	--	--
TOTAL		100.0	--	--	--	--	--	26.5	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.085						

Lab. No. 8064 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11239 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 365

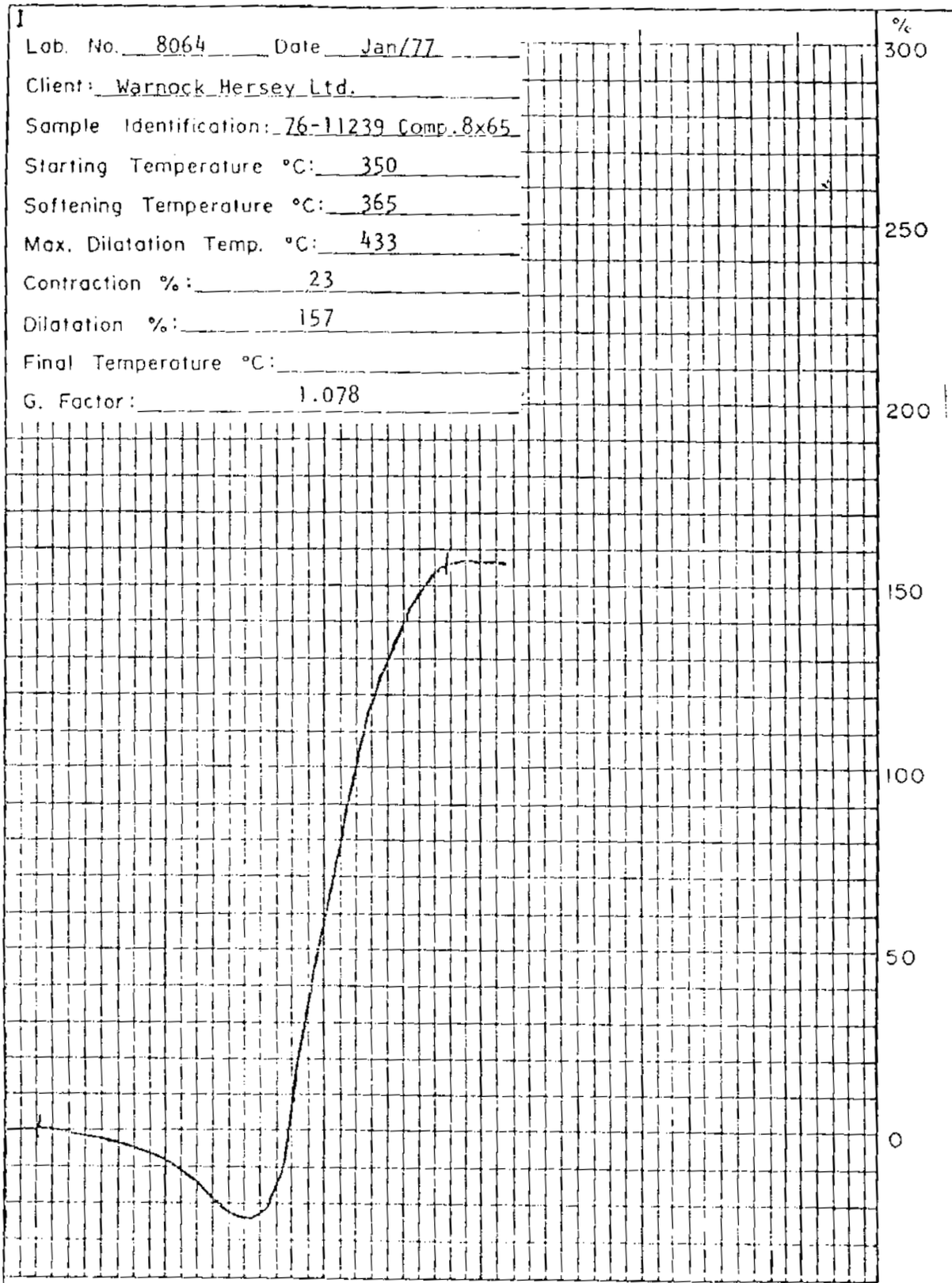
Max. Dilatation Temp. °C: 433

Contraction %: 23

Dilatation %: 157

Final Temperature °C:

G. Factor: 1.078



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77 - 7 Warnock Hersey Lab. No.: 76 - 11240

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.7	44.0	20.8	34.5	0.51	61.5	44.3	20.9	34.8	0.51

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	76.9	0.7	47.3	0.46	47.6	0.46
65 x 0	23.1	0.8	32.6	0.67	32.9	0.68
TOTAL	100.0	--	--	--	44.2	0.51

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	38.5	1.2	6.6	31.9	60.3	0.59	6.7	32.2	61.1	0.60
1.40	1.50	4.0	0.9	13.1	29.6	56.4	0.54	13.2	29.9	56.9	0.54
1.50	1.60	2.5	0.7	24.0	27.3	48.0	0.48	24.2	27.5	48.3	0.48
1.60		55.0	--	--	--	--	--	79.6	--	--	--
TOTAL		100.0	--	--	--	--	--	47.5	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
7½	0.060						

II

Lab. No. 8065 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11240 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 363

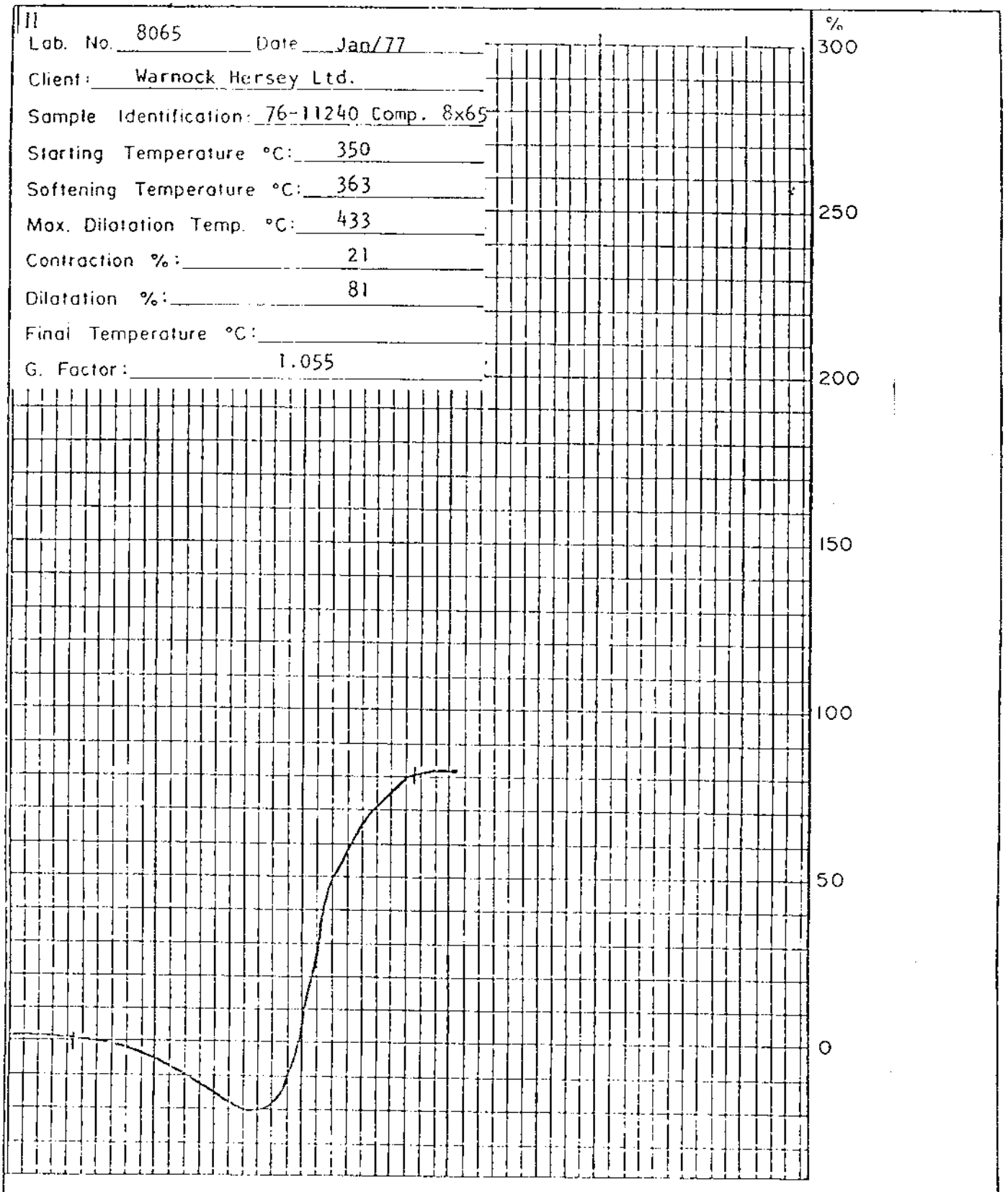
Max. Dilatation Temp. °C: 433

Contraction %: 21

Dilatation %: 81

Final Temperature °C:

G. Factor: 1.055



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. — Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77-8 — Warnock Hersey Lab. No.: 76 - 11241

TABLE I Raw Coal Head Sample ½" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.8	15.9	28.1	55.2	0.67	82.3	16.0	28.3	55.7	0.68

TABLE II Screen Analysis

Size	AIR DRIED BASIS				DRY BASIS	
	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	79.3	1.0	16.3	0.69	16.5	0.70
65 x 0	20.7	0.9	15.0	0.78	15.1	0.79
TOTAL	100.0	--	--	--	16.2	0.72

TABLE III Float/Sink ½" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	75.1	1.5	3.6	29.9	65.0	0.66	3.7	30.4	65.9	0.67
1.40	1.50	2.4	1.0	13.3	28.5	57.2	0.62	13.5	28.8	57.7	0.60
1.50	1.60	2.7	1.0	20.2	26.9	51.9	0.59	20.4	27.2	52.4	0.60
1.60		19.8	--	--	--	--	--	63.5	--	--	--
TOTAL		100.0	--	--	--	--	--	16.2	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.019						

Lab. No. 8066 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11241 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 354

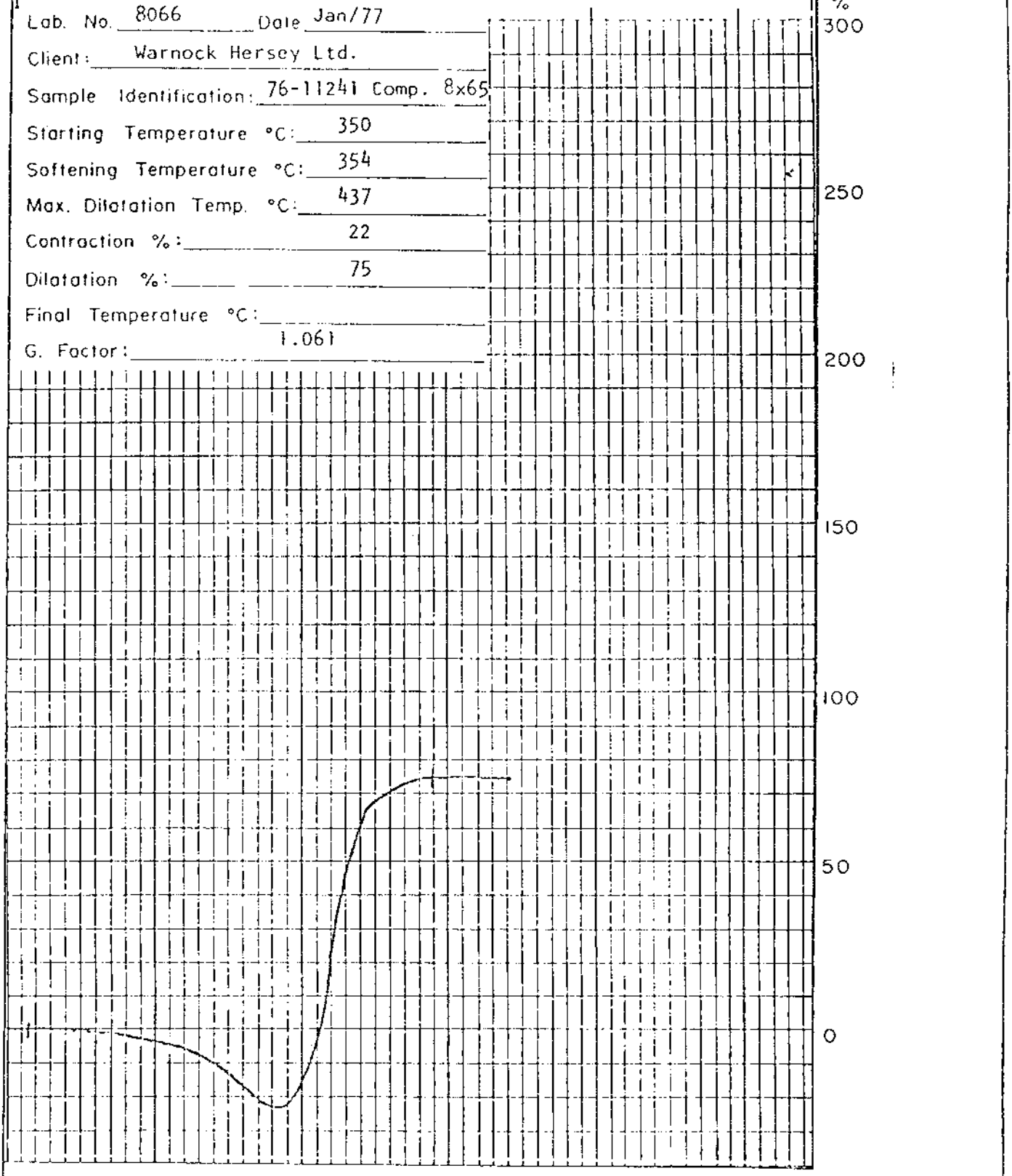
Max. Dilatation Temp. °C: 437

Contraction %: 22

Dilatation %: 75

Final Temperature °C:

G. Factor: 1.061



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 77-9 Warnock Hersey Lab. No.: 76 - 11242

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.C.I.	Ash	V. M.	F.C.	Sulphur
0.9	16.4	31.9	50.8	0.54	120.0	16.6	32.2	51.2	0.54

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	63.0	0.9	16.9	0.40	17.0	0.40
65 x 0	37.0	1.2	14.4	0.60	14.6	0.61
TOTAL	100.0	--	--	--	16.1	0.48

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	77.1	1.1	3.6	31.9	63.4	0.42	3.6	32.2	64.2	0.42
1.40	1.50	3.6	0.9	16.7	28.2	54.2	0.38	16.8	28.4	54.8	0.38
1.50	1.60	2.0	0.9	22.5	26.3	50.3	0.36	22.7	26.5	50.8	0.36
1.60		17.3	--	--	--	--	--	70.3	--	--	--
TOTAL		100.0	--	--	--	--	--	16.0	--	--	--

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.019						

II

Lab. No. 8067 Date Jan/77

Client: Warnock Hersey Ltd.

Sample Identification: 76-11242 Comp. 8x65

Starting Temperature °C: 350

Softening Temperature °C: 361

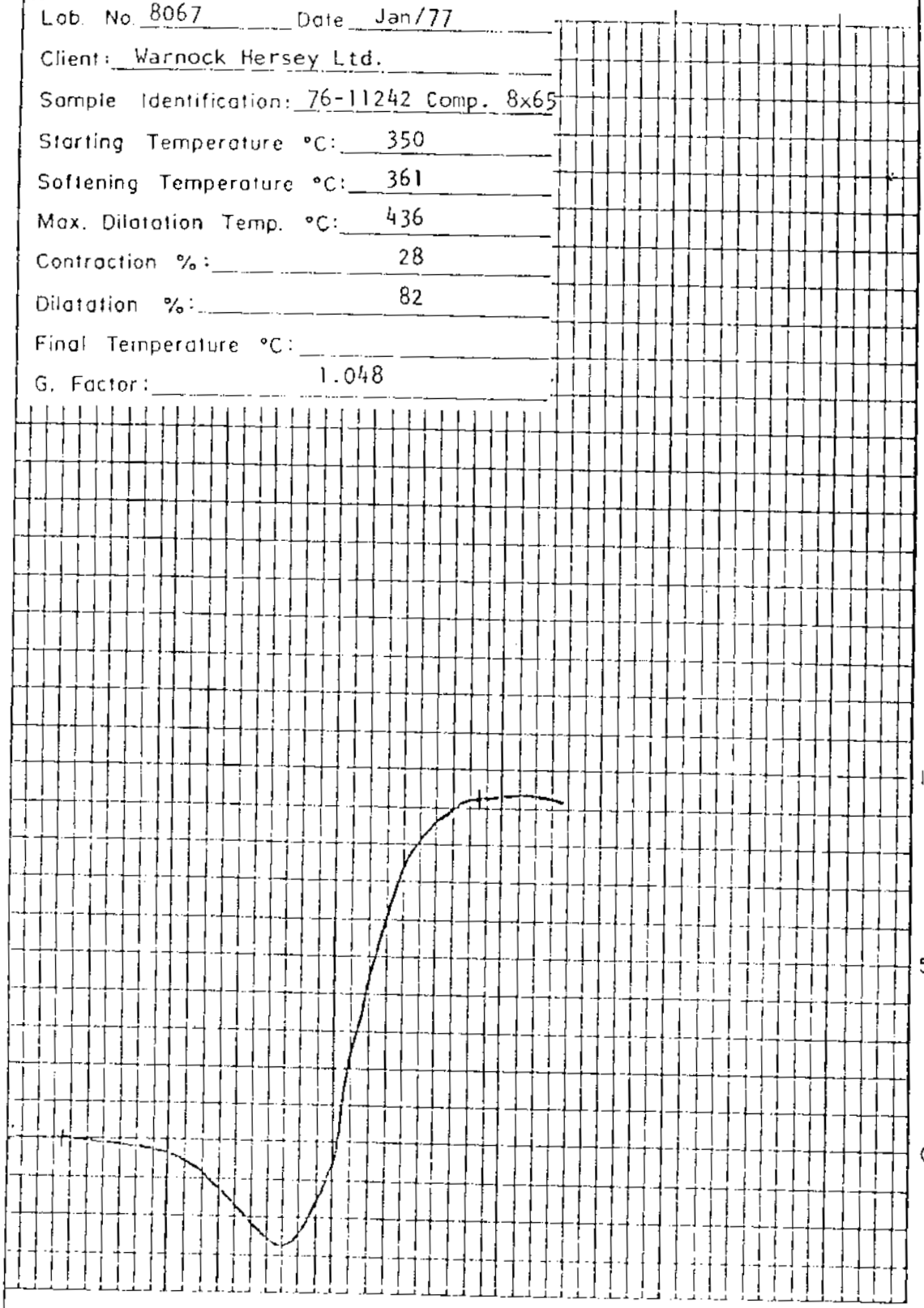
Max. Dilatation Temp. °C: 436

Contraction %: 28

Dilatation %: 82

Final Temperature °C:

G. Factor: 1.048



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7934 Date Dec. 17, 1976

Client: ELCO MINING LTD.

Sample Identification: DH-78-1

Starting Temperature °C: 350

Softening Temperature °C: 358

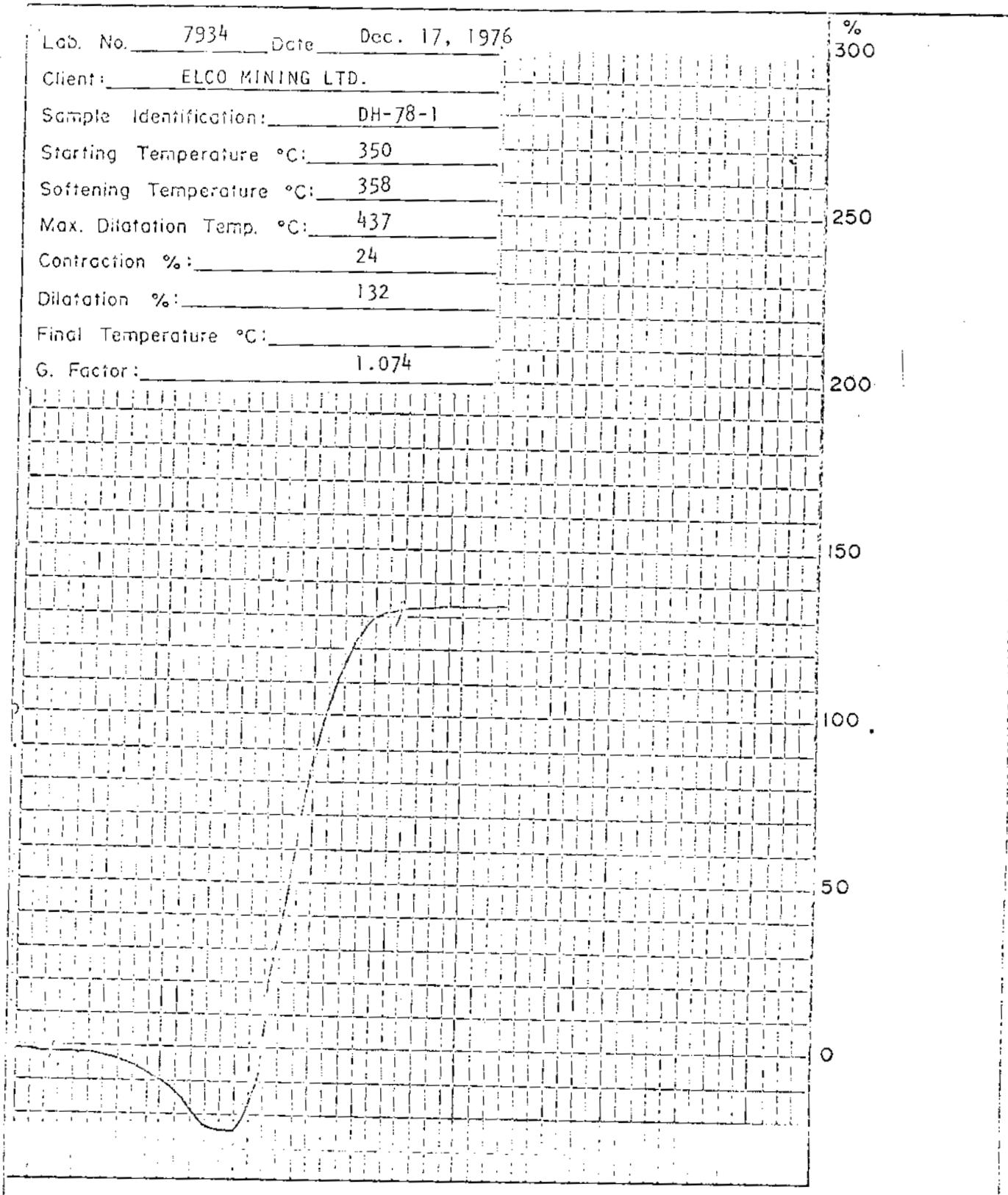
Max. Dilatation Temp. °C: 437

Contraction %: 24

Dilatation %: 132

Final Temperature °C:

G. Factor: 1.074



BARTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7935 Date Jan. 10, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-78-2

Starting Temperature °C: 350

Softening Temperature °C: 354

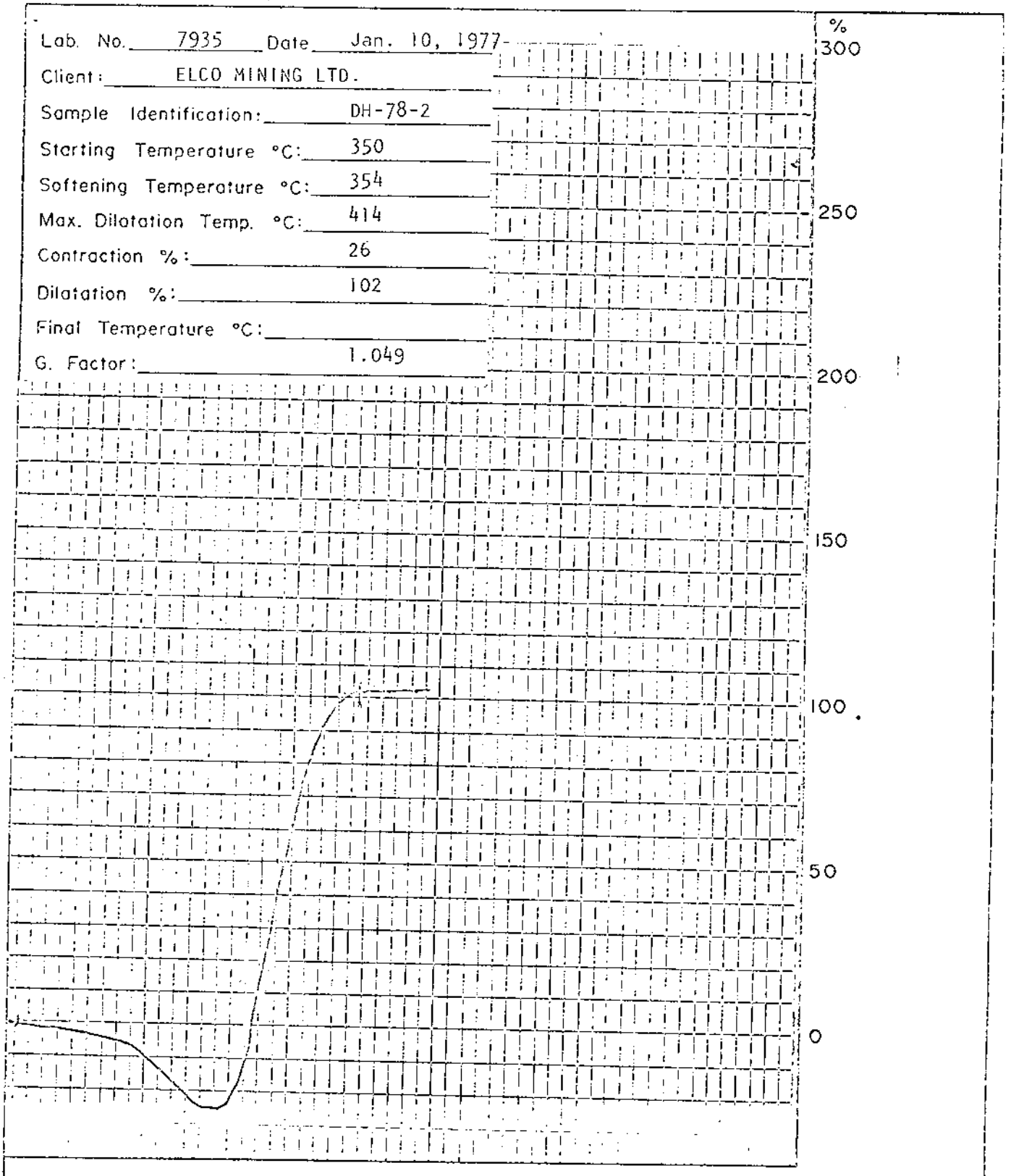
Max. Dilatation Temp. °C: 414

Contraction %: 26

Dilatation %: 102

Final Temperature °C:

G. Factor: 1.049



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7936 Date Jan 10, 1977.

Client: ELCO MINING LTD.

Sample Identification: DH-78-3

Starting Temperature °C: 350

Softening Temperature °C: 360

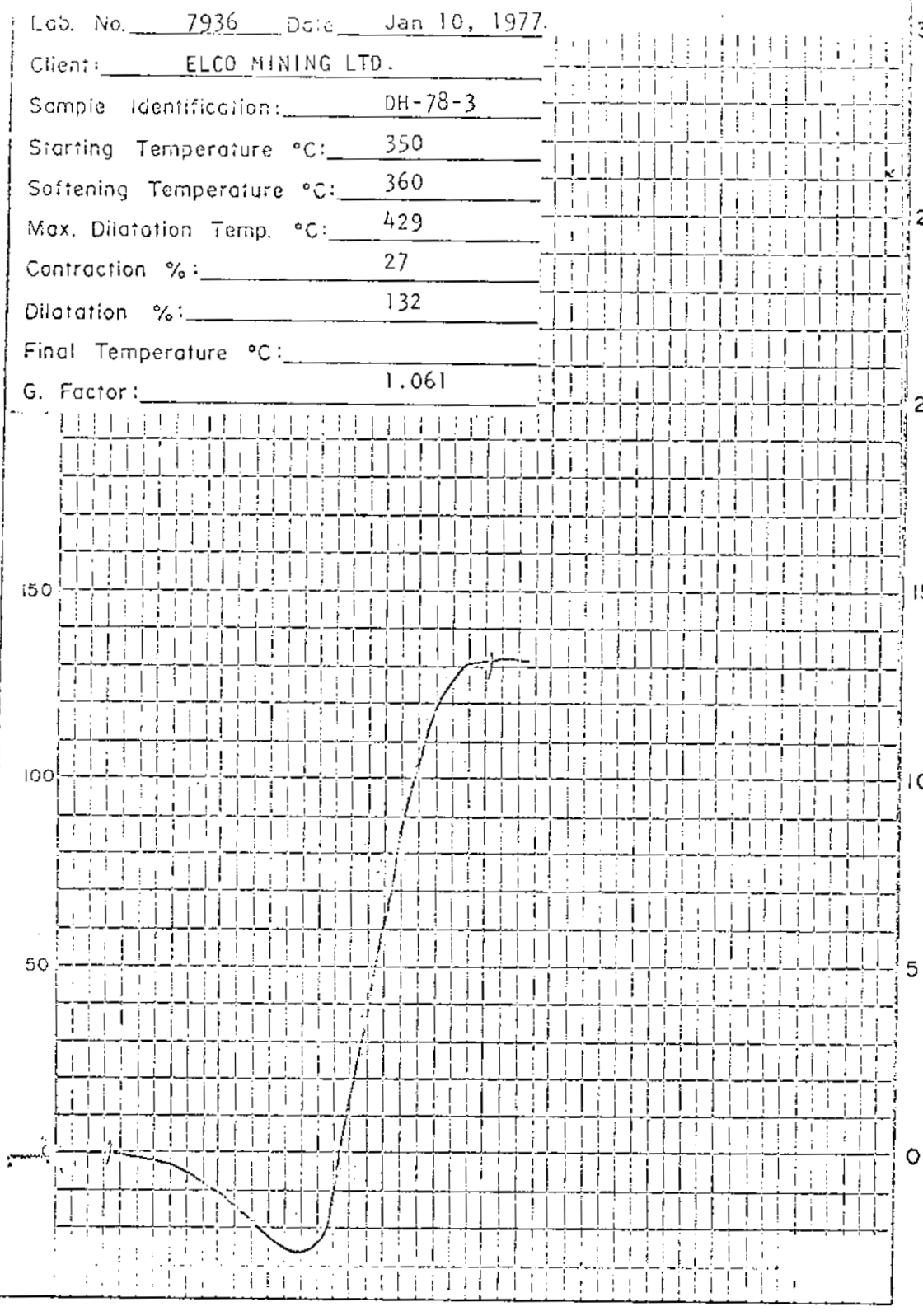
Max. Dilatation Temp. °C: 429

Contraction %: 27

Dilatation %: 132

Final Temperature °C:

G. Factor: 1.061



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Lab. No. 7937 Date Jan 10, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-78-4

Starting Temperature °C: 350

Softening Temperature °C: 381

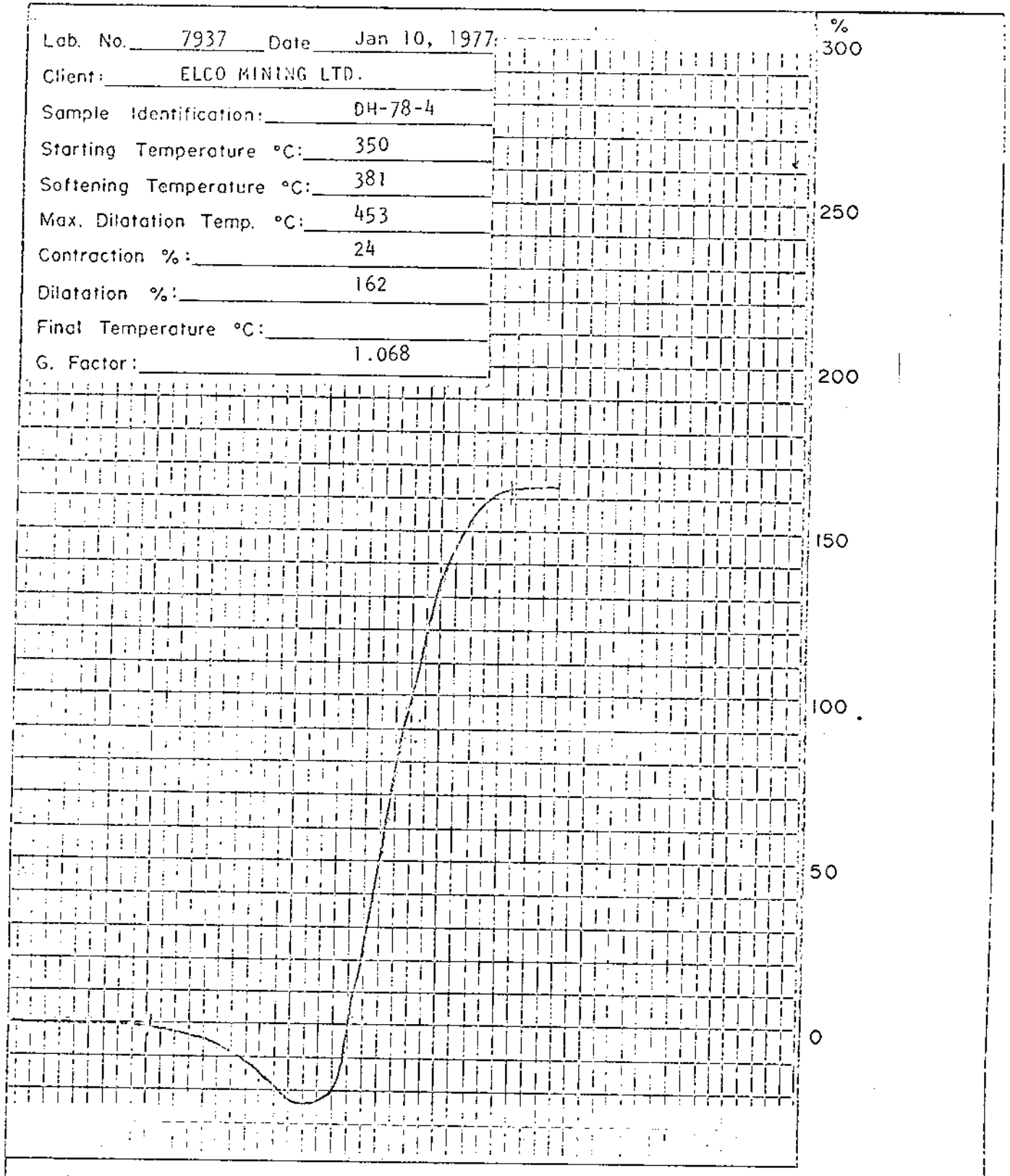
Max. Dilatation Temp. °C: 453

Contraction %: 24

Dilatation %: 162

Final Temperature °C:

G. Factor: 1.068



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Lab. No. 7938 Date Jan 10, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-78-5

Starting Temperature °C: 350

Softening Temperature °C: 382

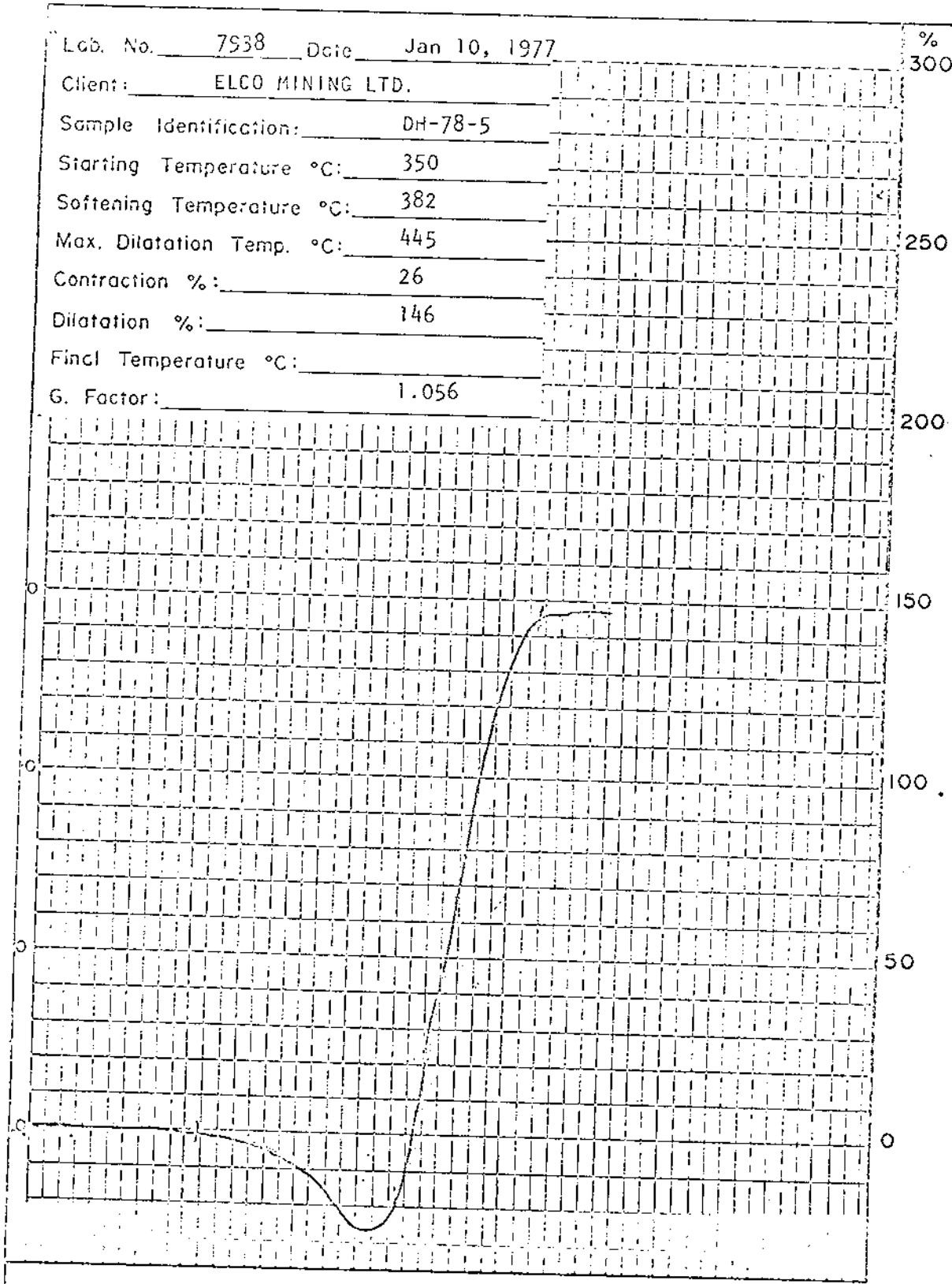
Max. Dilatation Temp. °C: 445

Contraction %: 26

Dilatation %: 146

Final Temperature °C:

G. Factor: 1.056



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 79 - 1 Warnock Hersey Lab. No.: 76 - 11297

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.9	32.5	27.4	39.2	0.42	74.0	32.8	27.7	39.5	0.43

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	84.4	0.7	30.2	0.51	30.4	0.51
65 x 0	15.6	1.1	25.2	0.42	25.4	0.43
TOTAL	100.0	-	-	-	29.6	0.50

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	39.0	1.0	7.4	35.5	56.1	1.14	7.5	35.9	56.6	1.15
1.40	1.50	9.5	0.8	18.9	29.2	51.1	1.31	19.0	29.4	51.6	1.32
1.50	1.60	9.4	1.0	29.2	25.0	44.8	1.08	29.5	25.2	45.3	1.09
1.60		42.1	-	-	-	-	-	56.9	-	-	-
TOTAL		100.0	-	-	-	-	-	31.4	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorous (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
8	0.030						

I

Lab. No. 8084 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11297

Starting Temperature °C: 350

Softening Temperature °C: 351

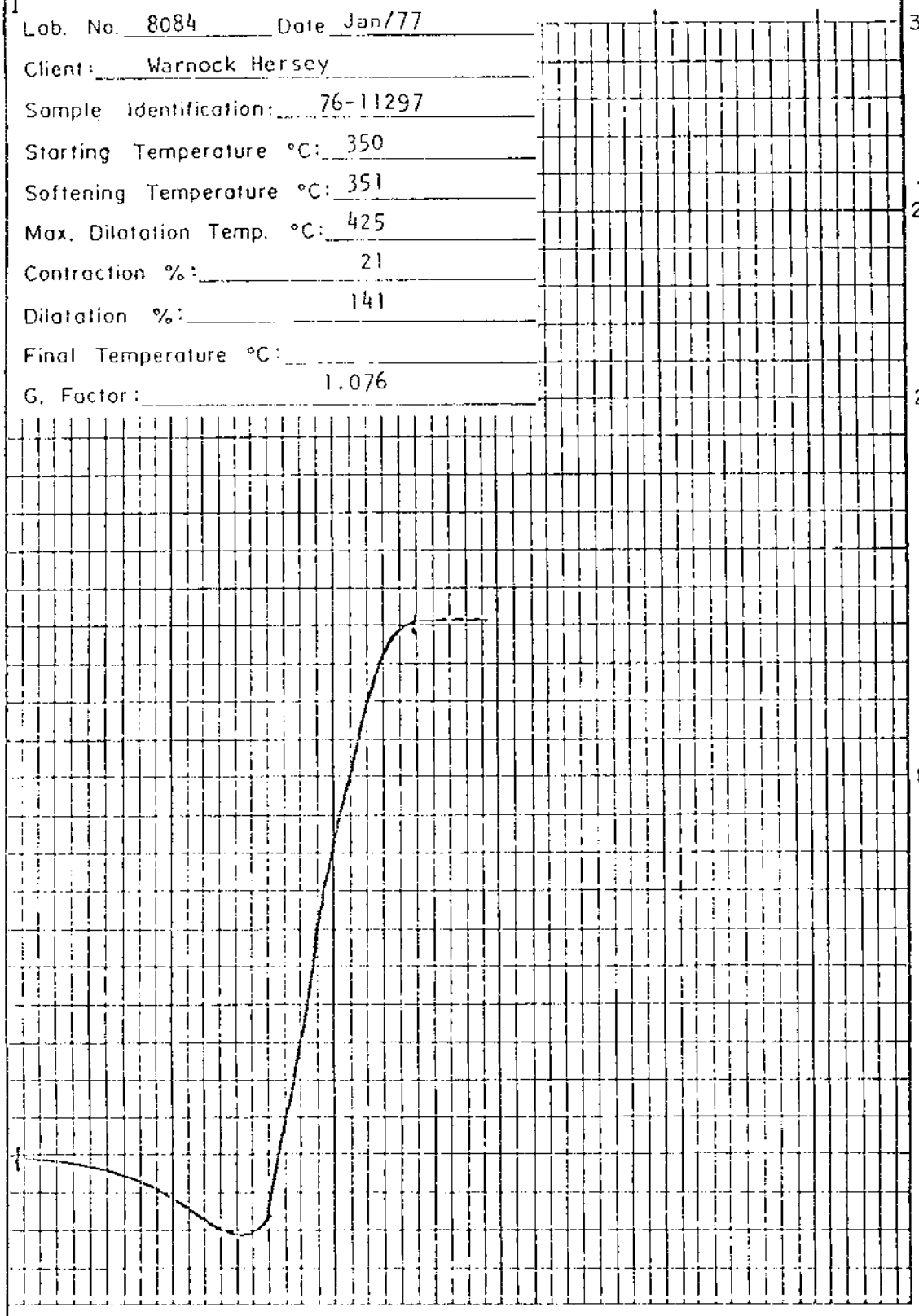
Max. Dilatation Temp. °C: 425

Contraction %: 21

Dilatation %: 141

Final Temperature °C:

G. Factor: 1.076



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 79 - 2 Warnock Hersey Lab. No.: 76 - 11298

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
1.0	46.2	22.7	30.1	1.27	98.2	46.6	23.0	30.4	1.28

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	75.4	0.9	52.7	1.43	53.2	1.44
65 x 0	24.6	1.2	31.0	1.74	31.3	1.76
TOTAL	100.0	-	-	-	47.8	1.52

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F C.	Sulphur
	1.40	16.3	1.1	6.7	35.3	56.9	1.13	6.8	35.7	57.5	1.14
1.40	1.50	4.7	0.9	17.2	29.9	52.0	1.03	17.3	30.2	52.5	1.04
1.50	1.60	7.1	1.2	27.2	25.6	46.0	0.92	27.5	25.9	46.6	0.93
1.60		71.9	-	-	-	-	-	69.7	-	-	-
TOTAL		100.0	-	-	-	-	-	54.0	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					"G" FACTOR
		TEMPERATURE °C			PER CENT		
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
6½	0.029						

Lab. No. 8085 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11298

Starting Temperature °C: 350

Softening Temperature °C: 364

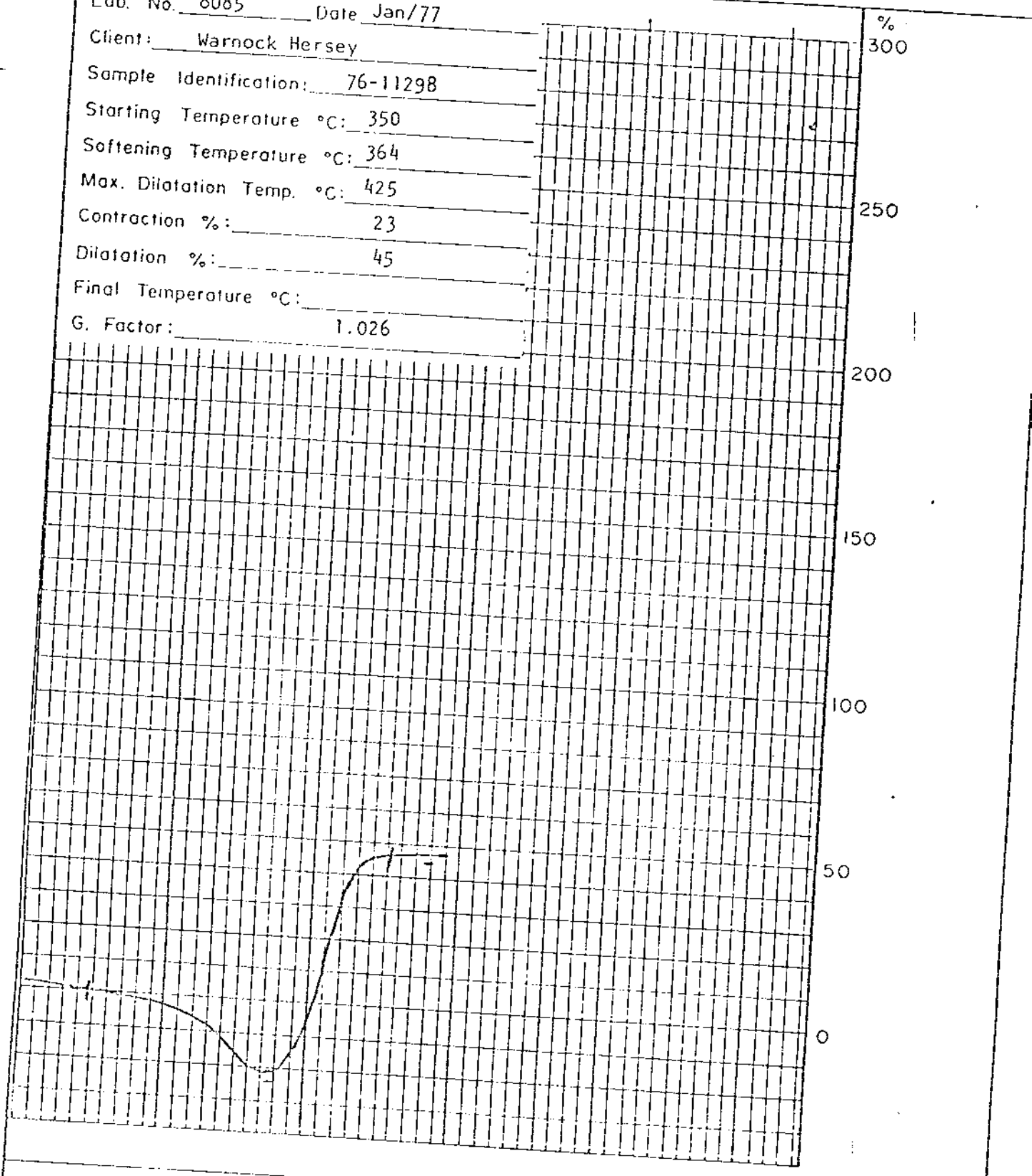
Max. Dilatation Temp. °C: 425

Contraction %: 23

Dilatation %: 45

Final Temperature °C:

G. Factor: 1.026



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 79 - 3

Warnock Hersey Lab. No.: 76 - 11299

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
1.1	26.8	31.1	41.0	0.97	89.2	27.2	31.5	41.3	0.99

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	87.6	1.1	24.2	0.96	24.5	0.97
65 x 0	12.4	1.1	19.1	0.95	19.3	0.96
TOTAL	100.0	-	-	-	23.9	0.97

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	64.0	0.8	6.6	38.9	53.7	0.99	6.6	39.2	54.2	1.00
1.40	1.50	6.6	1.2	18.2	32.2	48.4	0.98	18.4	32.6	49.0	0.99
1.50	1.60	3.0	1.2	27.6	28.3	42.9	0.94	28.0	28.6	43.4	0.95
1.60		26.4	-	-	-	-	-	69.8	-	-	-
TOTAL		100.0	-	-	-	-	-	24.7	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
6½	0.005						

Lab. No. 8086 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11299

Starting Temperature °C: 350

Softening Temperature °C: 351

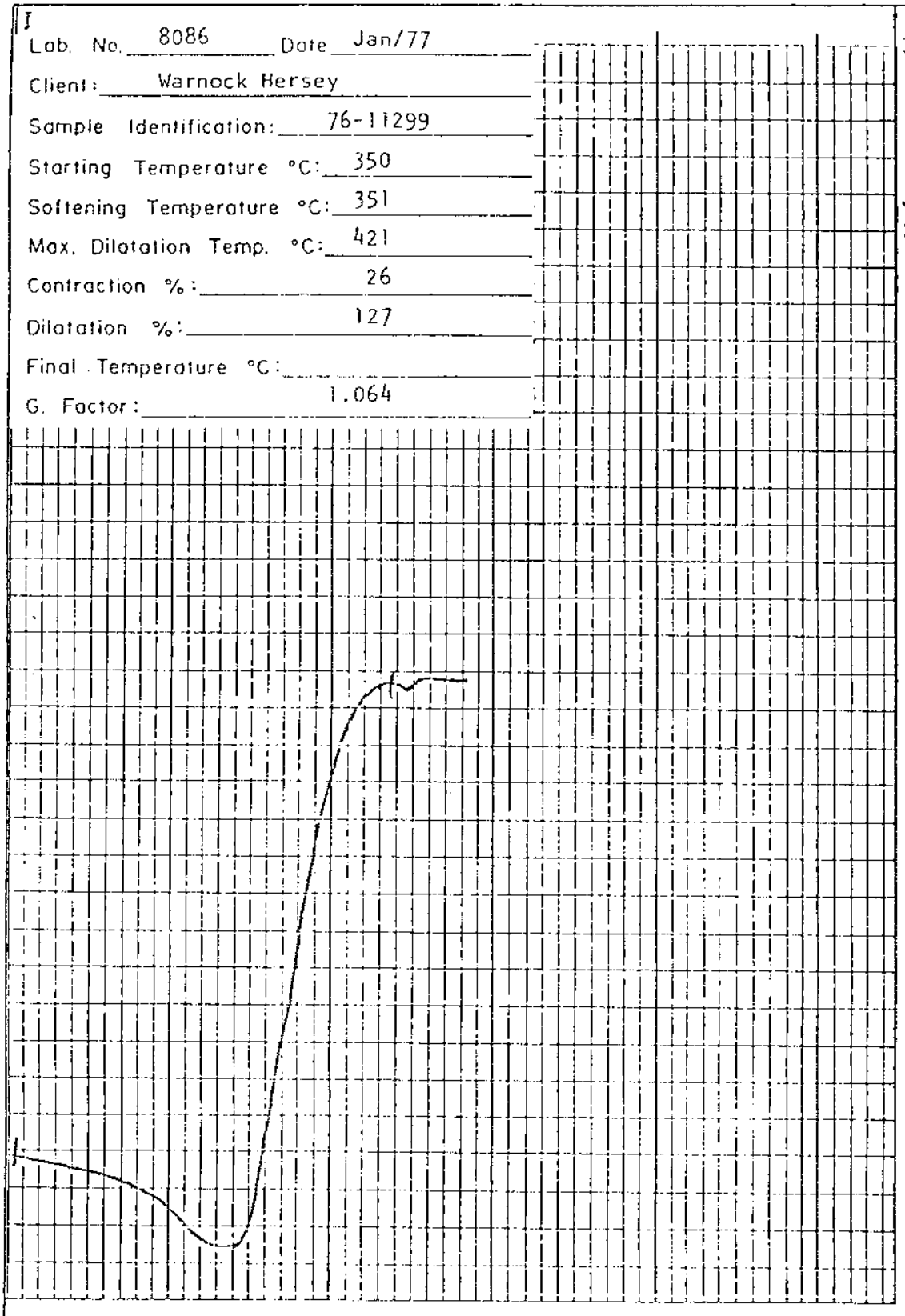
Max. Dilatation Temp. °C: 421

Contraction %: 26

Dilatation %: 127

Final Temperature °C:

G. Factor: 1.064



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: DH 79 - 4

Warnock Hersey Lab. No.: 76 - 11300

TABLE I Raw Coal Head Sample ¼" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F.C.	Sulphur	H.G.I.	Ash	V.M.	F.C.	Sulphur
0.9	45.2	23.0	30.0	0.55	92.0	45.6	23.2	30.3	0.56

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	84.9	1.0	48.7	0.47	49.2	0.47
65 x 0	15.1	1.3	34.3	0.65	34.7	0.67
TOTAL	100.0	-	-	-	47.0	0.50

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	32.8	0.8	7.8	35.6	55.8	0.77	7.9	35.9	56.2	0.78
1.40	1.50	5.2	1.1	20.4	31.5	47.0	0.76	20.6	31.8	47.6	0.77
1.50	1.60	5.4	0.9	29.5	28.5	41.1	0.67	29.8	28.8	41.4	0.68
1.60		56.6	-	-	-	-	-	83.7	-	-	-
TOTAL		100.0	-	-	-	-	-	52.6	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
6½	0.020						

11

Lab. No. 8087 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11300

Starting Temperature °C: 350

Softening Temperature °C: 362

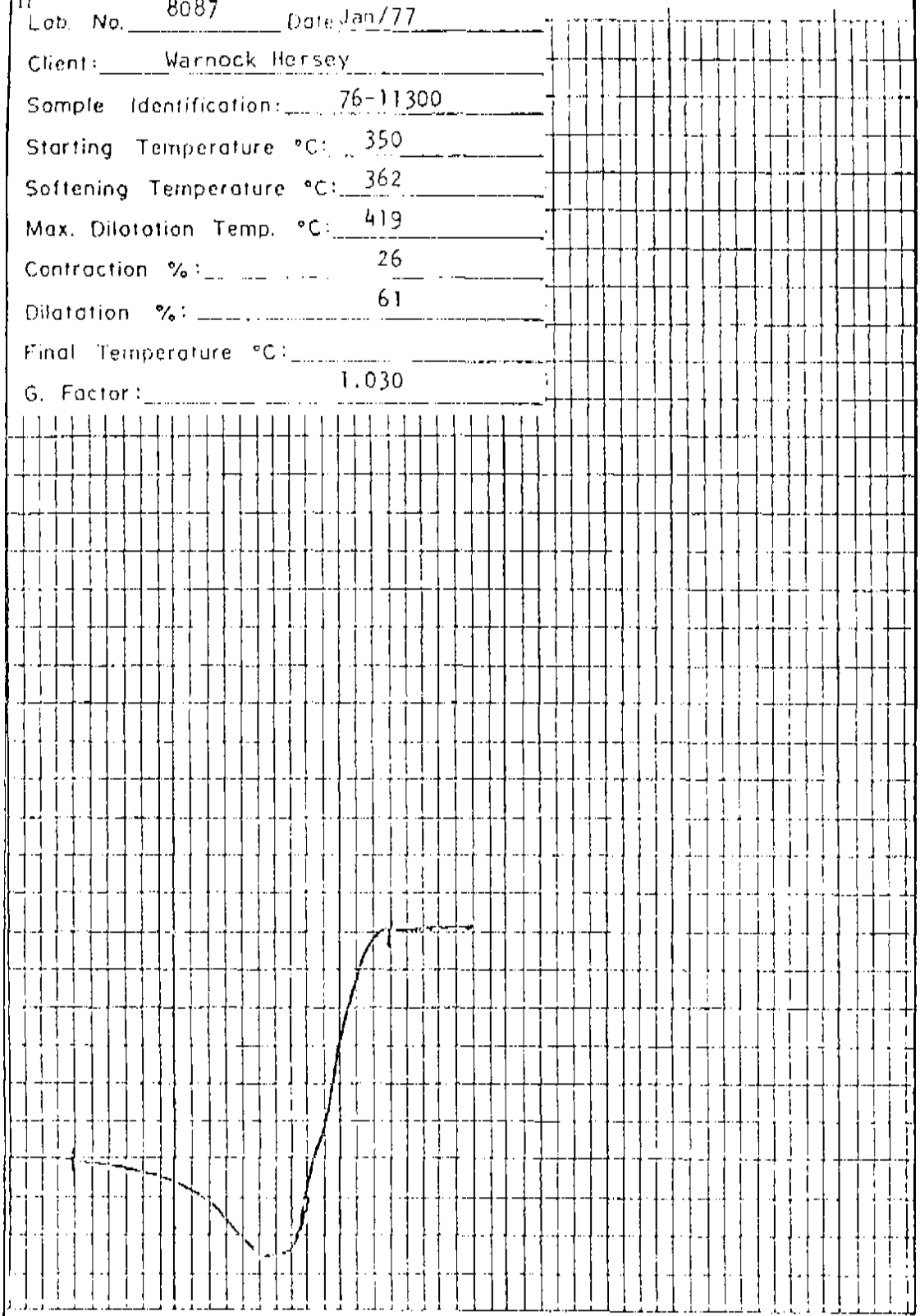
Max. Dilotation Temp. °C: 419

Contraction %: 26

Dilatation %: 61

Final Temperature °C:

G. Factor: 1.030



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.. Elk River Coal Project 1976-77

DRILL CORE ANALYSIS

Sample Identification: Channel sample (seam 10) Warnock Hersey Lab. No.: 76 - 11301
Trench 230 + 00

TABLE I Raw Coal Head Sample ½" x 0

AIR DRIED BASIS						% DRY BASIS			
Moist.	Ash	V.M.	F. C.	Sulphur	H.G.I.	Ash	V. M.	F.C.	Sulphur
0.8	18.2	21.8	59.2	0.45	105.2	18.4	22.0	59.6	0.45

TABLE II Screen Analysis

	AIR DRIED BASIS				DRY BASIS	
Size	Weight %	Moisture	ASH	Sulphur	ASH	Sulphur
¼" x 65	78.3	0.9	19.2	0.37	19.4	0.38
65 x 0	21.7	1.2	12.0	0.46	12.2	0.47
TOTAL	100.0	-	-	-	17.8	0.39

TABLE III Float/Sink ¼" x 65 Fraction

Spec. Grav.		AIR DRIED BASIS						DRY BASIS			
Sink	Float	Weight%	Moist.	Ash	V.M.	F.C.	Sulphur	ASH	V.M.	F.C.	Sulphur
	1.40	72.5	0.5	5.3	25.2	69.0	0.30	5.3	25.3	69.4	0.30
1.40	1.50	5.2	0.6	17.3	22.2	59.9	0.38	17.4	22.3	60.3	0.38
1.50	1.60	4.3	0.9	25.0	20.4	53.7	0.41	25.2	20.6	54.2	0.41
1.60		18.0	-	-	-	-	-	72.3	-	-	-
TOTAL		100.0	-	-	-	-	-	18.8	-	-	-

TABLE IV Cumulative 1.60 Float

F.S.I.	Phosphorus (in coal)	DILATATION					
		TEMPERATURE °C			PER CENT		"G" FACTOR
		Initial	Softening	Maximum Dilatation	Maximum Contraction	Maximum Dilatation	
6½	0.014						

Lab. No. 8088 Date Jan/77

Client: Warnock Hersey

Sample Identification: 76-11301

Starting Temperature °C: 350

Softening Temperature °C: 424

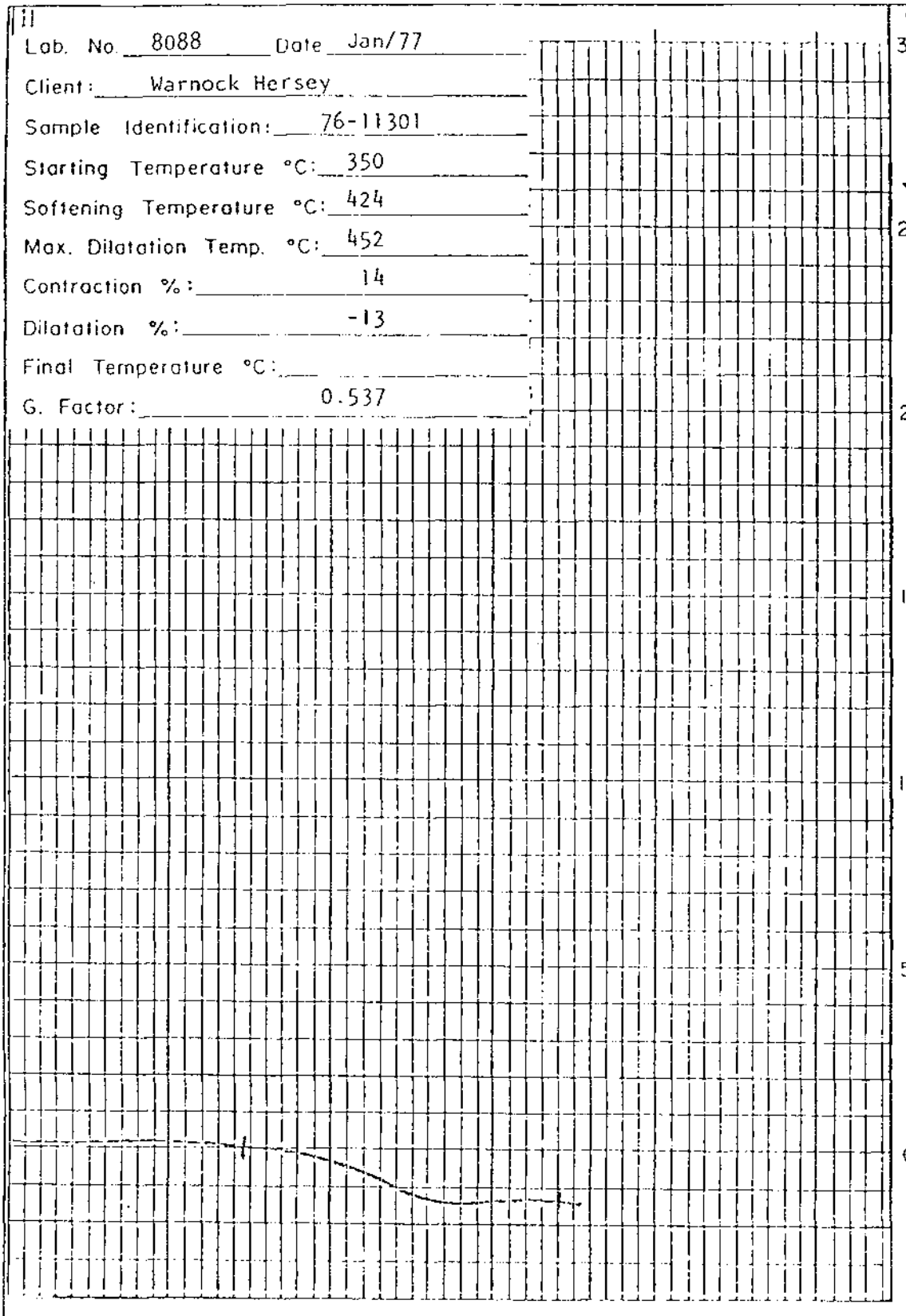
Max. Dilatation Temp. °C: 452

Contraction %: 14

Dilatation %: -13

Final Temperature °C:

G. Factor: 0.537



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 -1 Lab. No.: 77 - 2019 Date: February 25, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.7	53.2	16.9	29.2	1.02	64.3	Air Dried Basis
- - -	53.6	17.0	29.4	1.03	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	91.3	0.7	53.4	1.01	91.3	53.4	1.01	A.D.B.
	91.3	- - -	53.8	1.02	91.3	53.8	1.02	D.B.
65m x 0	8.7	1.1	40.6	1.46	100.0	52.3	1.05	A.D.B.
	8.7	- - -	41.1	1.48	100.0	52.7	1.06	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	16.3	0.6	5.5	27.8	66.1	1.20	16.3	5.5	A.D.B.
	16.3	- -	5.5	28.0	66.5	1.21	16.3	5.5	D.B.
1.40-1.50	4.1	0.8	10.9	23.6	64.7	1.08	20.4	6.6	A.D.B.
	4.1	- - -	11.0	23.8	65.2	1.09	20.4	6.6	D.B.
1.50-1.60	6.1	0.8	28.8	- - -	- - -	- - -	26.5	11.7	A.D.B.
	6.1	- - -	29.0	- - -	- - -	- - -	26.5	11.8	D.B.
+1.60	73.5	0.8	70.9	- - -	- - -	- - -	100.0	55.2	A.D.B.
	73.5	- - -	71.5	- - -	- - -	- - -	100.0	55.7	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	F % on Coal	DILATATION TESTS				
		Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
6	0.033					

Lab. No. 8593 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2019

Starting Temperature °C: 350

Softening Temperature °C: 356

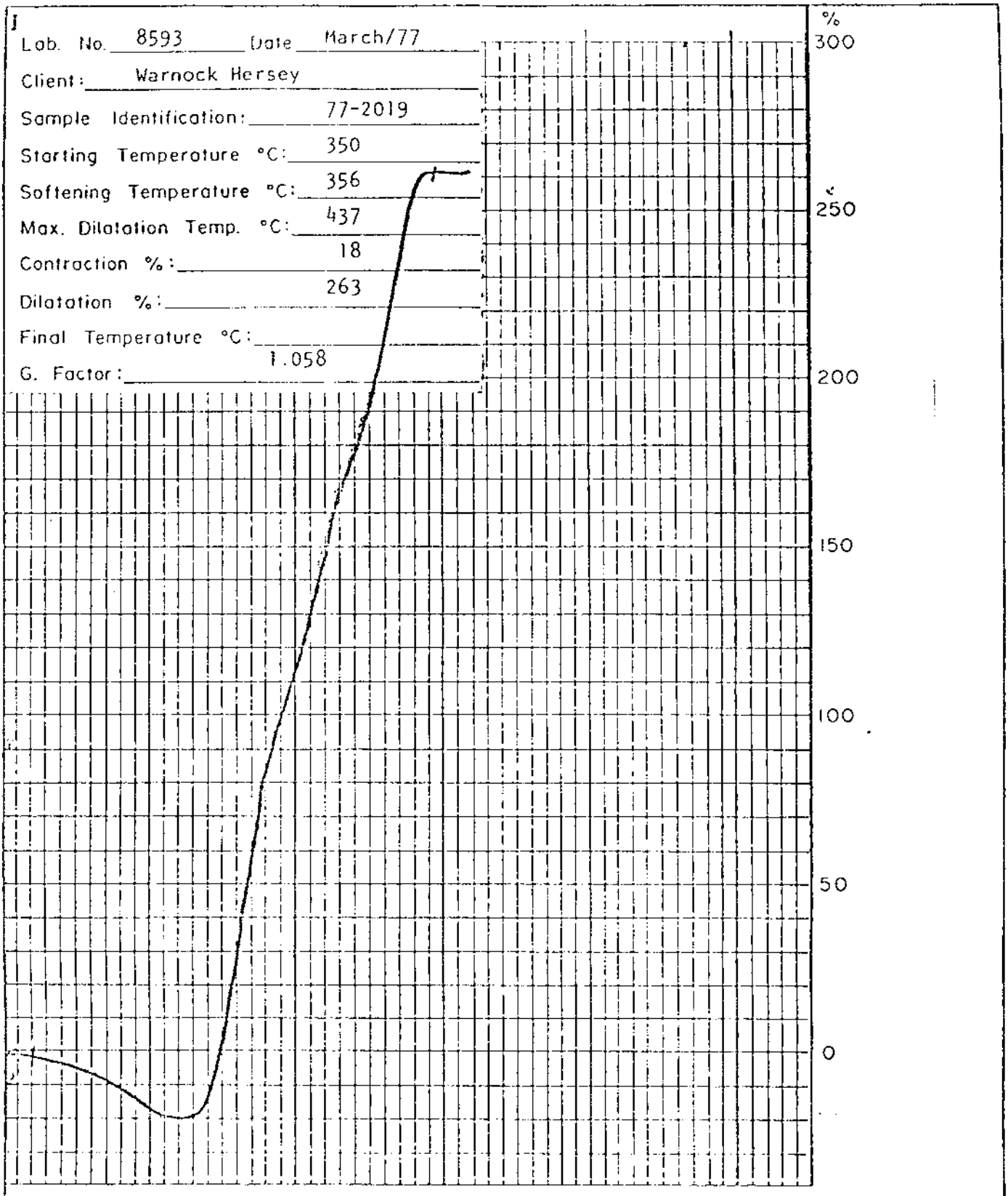
Max. Dilatation Temp. °C: 437

Contraction %: 18

Dilatation %: 263

Final Temperature °C:

G. Factor: 1.058



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 2 Lab. No.: 77 - 2020 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.8	30.1	21.9	47.2	0.68	90.6	Air Dried Basis
- --	30.4	22.1	47.5	0.69	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	92.7	0.8	31.9	0.65	92.7	31.9	0.65	A.D.B.
	92.7	- --	32.2	0.66	92.7	32.2	0.66	D.B.
65m x 0	7.3	1.0	26.5	0.64	100.0	31.5	0.65	A.D.B.
	7.3	- --	26.7	0.65	100.0	31.8	0.66	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	57.0	0.8	3.7	28.6	66.9	0.74	57.0	3.7	A.D.B.
	57.0	- -	3.7	28.8	67.5	0.75	57.0	3.7	D.B.
1.40-1.50	7.1	1.2	18.2	26.3	54.3	0.71	64.1	5.3	A.D.B.
	7.1	- --	18.4	26.6	55.0	0.72	64.1	5.3	D.B.
1.50-1.60	1.8	1.0	23.4	- --	- --	- --	65.9	5.8	A.D.B.
	1.8	- --	23.6	- --	- --	- --	65.9	5.8	D.B.
+1.60	34.1	1.2	83.4	- --	- --	- --	100.0	32.3	A.D.B.
	34.1	- --	84.4	- --	- --	- - -	100.0	32.6	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	F % on Coal	DILATATION TESTS				
		Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8½	0.025					

Lab. No. 8594 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2020

Starting Temperature °C: 350

Softening Temperature °C: 371

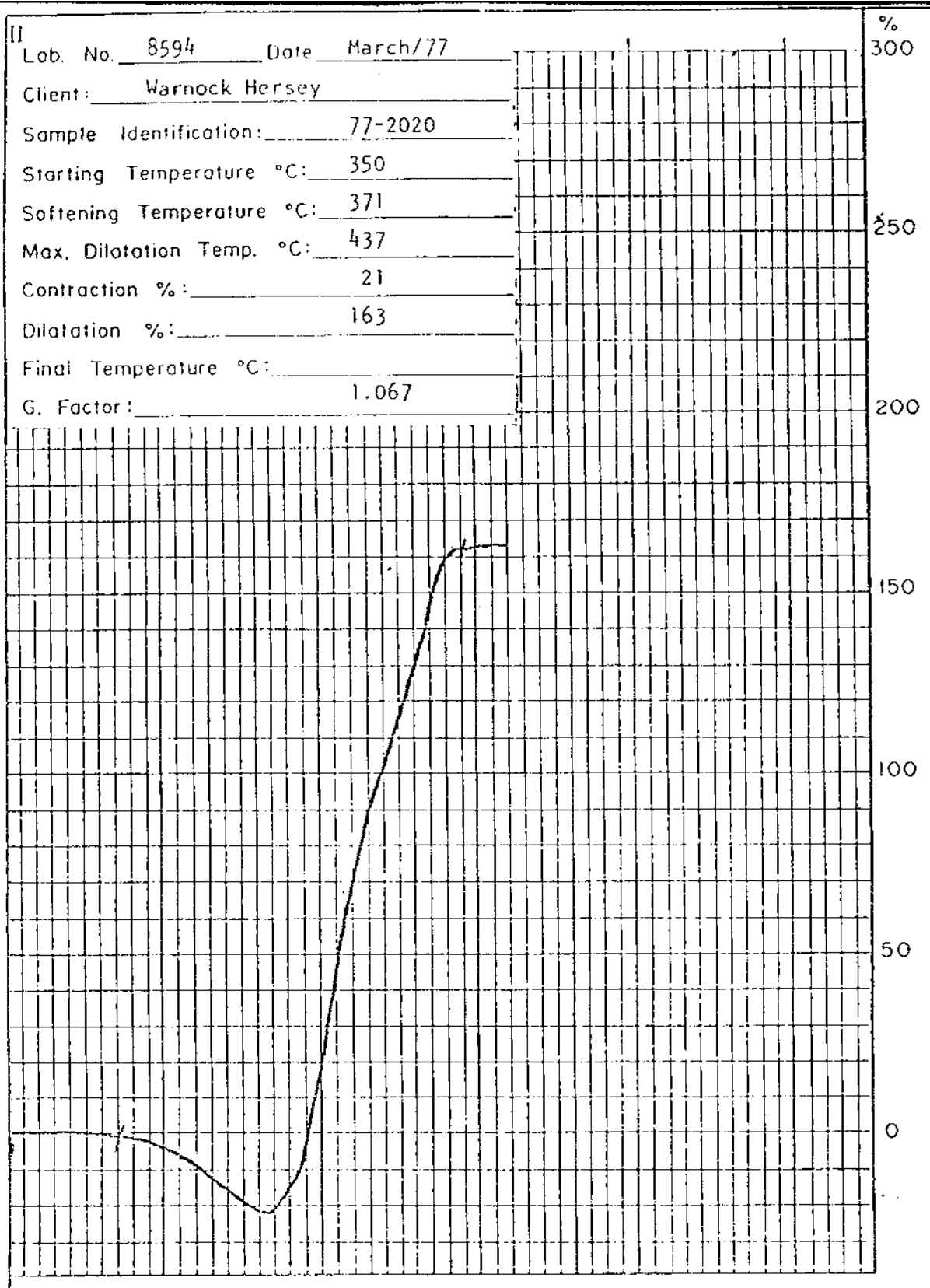
Max. Dilatation Temp. °C: 437

Contraction %: 21

Dilatation %: 163

Final Temperature °C:

G. Factor: 1.067



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 3 Lab. No.: 77 - 2021 Date: February 25, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C %	S.%	H.G.I.	REMARKS
0.8	62.4	17.8	19.0	0.74	83.7	Air Dried Basis
- - -	62.9	17.9	19.2	0.74	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼ " x 65 m	90.7	0.8	67.0	0.74	90.7	67.0	0.74	A.D.B.
	90.7	- - -	67.6	0.75	90.7	67.6	0.75	D.B.
65m x 0	9.3	0.8	46.4	0.91	100.0	65.1	0.76	A.D.B.
	9.3	- - -	46.8	0.92	100.0	65.7	0.77	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	16.1	2.7	3.2	29.1	65.0	0.82	16.1	3.2	A.D.B.
	16.0	- - -	3.3	30.0	66.7	0.84	16.0	3.3	D.B.
1.40-1.50	2.1	1.9	9.4	26.9	61 8	0.84	18.2	3.9	A.D.B.
	2.1	- - -	9.6	27.5	62.9	0.85	18.1	4.0	D.B.
1.50-1.60	1.2	1.9	18.1	- - -	- - -	- - -	19.4	4.8	A.D.B.
	1.2	- - -	18.4	- - -	- - -	- - -	19.3	4.9	D.B.
+1.60	80.6	1.2	82.1	- - -	- - -	- - -	100.0	67.1	A.D.B.
	80.7	- - -	83.1	- - -	- - -	- - -	100.0	68.1	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8½	.015					

Lab. No. 8595 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2021

Starting Temperature °C: 350

Softening Temperature °C: 374

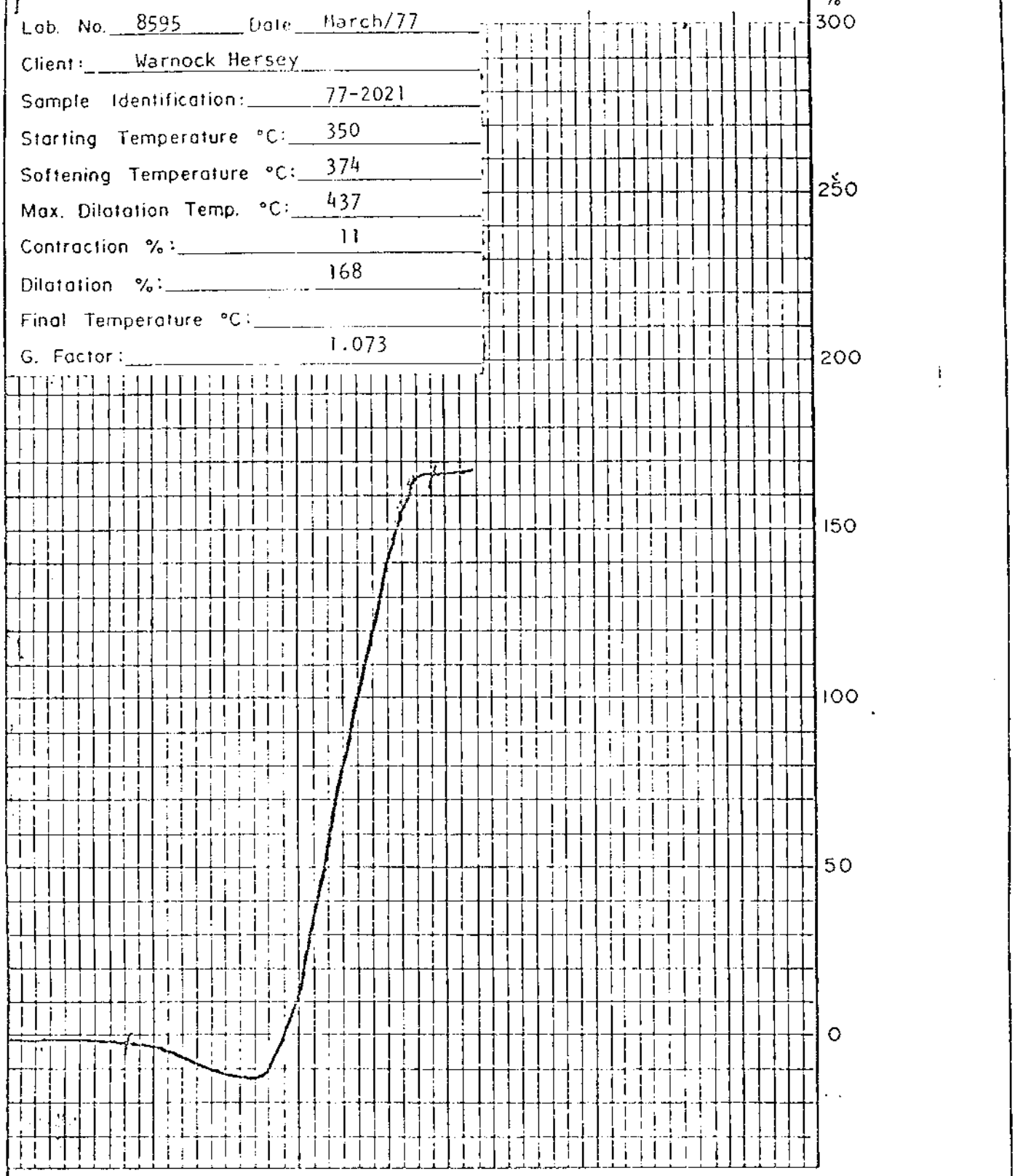
Max. Dilatation Temp. °C: 437

Contraction %: 11

Dilatation %: 168

Final Temperature °C:

G. Factor: 1.073



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80-4 Lab. No.: 77 - 2022 Date: February 25, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.6	55.9	18.7	24.8	3.98	71.2	Air Dried Basis
- - -	56.2	18.8	25.0	4.00	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE Wt. %	CUMULATIVE Ash %	CUMULATIVE S. %	
¼" x 65 m	88.0	0.6	62.0	3.56	88.0	62.0	3.56	A.D.B.
	88.0	- - -	62.3	3.58	88.0	62.3	3.58	D.B.
65 m x 0	12.0	0.8	31.9	2.94	100.0	58.4	3.48	A.D.B.
	12.0	- - -	32.1	2.96	100.0	58.7	3.50	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative Wt. %	Cumulative Ash %	
-1.40	22.8	2.1	1.7	28.4	67.8	0.89	22.8	1.7	A.D.B.
	22.7	- - -	1.7	29.0	69.3	0.91	22.7	1.7	D.B.
1.40-1.50	1.9	1.5	8.2	26.2	64.1	0.91	24.7	2.2	A.D.B.
	1.9	- - -	8.3	26.6	65.1	0.92	24.6	2.2	D.B.
1.50-1.60	0.9	1.1	12.6	- - -	- - -	- - -	25.6	2.6	A.D.B.
	0.9	- - -	12.8	- - -	- - -	- - -	25.5	2.6	D.B.
+1.60	74.4	0.6	81.6	- - -	- - -	- - -	100.0	61.4	A.D.B.
	74.5	- - -	82.2	- - -	- - -	- - -	100.0	61.8	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
9	.001					

Lab. No. 8596 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2022

Starting Temperature °C: 350

Softening Temperature °C: 371

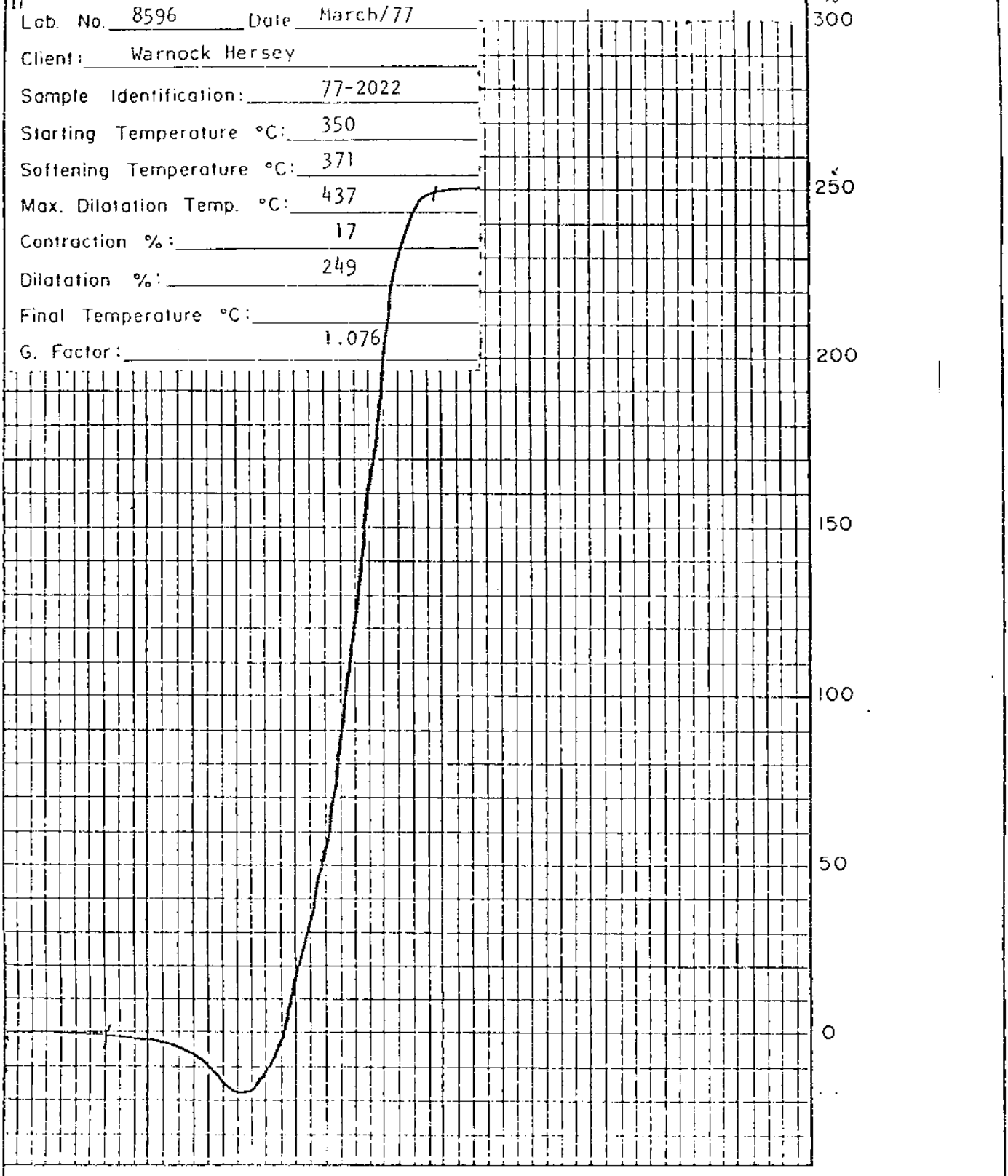
Max. Dilatation Temp. °C: 437

Contraction %: 17

Dilatation %: 249

Final Temperature °C:

G. Factor: 1.076



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 5 Lab. No.: 77 - 2023 Date: February 25, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.6	82.1	10.9	64.0	0.49	76.8	Air Dried Basis
- - -	82.6	11.0	64.0	0.49	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE Wt. %	CUMULATIVE Ash %	CUMULATIVE S. %	
¼" x 65m	91.4	0.7	84.3	0.45	91.4	84.3	0.45	A.D.B.
	91.4	- --	84.9	0.45	91.4	84.9	0.45	D.B.
65m x 0	8.6	0.9	60.0	0.70	100.0	82.2	0.47	A.D.B.
	8.6	- - -	60.5	0.71	100.0	82.8	0.47	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative Wt. %	Cumulative Ash %	
-1.40	2.0	1.5	3.2	28.9	66.4	0.94	2.0	3.2	A.D.B.
	2.0	- - -	3.3	29.3	67.4	0.95	2.0	3.3	D.B.
1.40-1.50	0.6	1.2	6.3	27.3	65.2	0.99	2.6	3.9	A.D.B.
	0.6	- - -	6.4	27.6	66.0	1.00	2.6	4.0	D.B.
1.50-1.60	0.4	1.3	13.1	- - -	- -	- - -	3.0	5.1	A.D.B.
	0.4	- - -	13.3	- --	- --	- - -	3.0	5.2	D.B.
+1.60	97.0	0.9	85.7	- --	- --	- - -	100.0	84.7	A.D.B.
	97.0	- - -	86.5	- - -	- - -	- -	100.0	85.5	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
9	.003					

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 6 Lab. No.: 77 - 2024 Date: February 25, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.7	50.4	19.3	29.6	1.38	87.2	Air Dried Basis
- - -	50.8	19.4	29.8	1.39	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE Wt. %	CUMULATIVE Ash %	CUMULATIVE S. %	
¼" x 65m	85.6	0.6	57.0	1.58	85.6	57.0	1.58	A.D.B.
	85.6	- - -	57.3	1.59	85.6	57.3	1.59	D.B.
65m x 0	14.4	0.8	25.7	1.14	100.0	52.5	1.52	A.D.B.
	14.4	- - -	25.9	1.15	100.0	52 8	1.53	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative Wt. %	Cumulative Ash %	
-1.40	24.6	2.1	4.3	28.2	65.4	0.76	24.6	4.3	A.D.B.
	24.5	- - -	4.4	28.8	66.8	0.78	24.5	4.4	D.B.
1.40-1.50	2.2	1.3	9.9	26.0	62.8	0.88	26.8	4.8	A.D.B.
	2.2	- - -	10.1	26.3	63.6	0.89	26.7	4.9	D.B.
1.50-1.60	2.7	1.3	20.3	- - -	- - -	- - -	29.5	6.2	A.D.B.
	2.7	- -	20.6	- - -	- - -	- - -	29.4	6.3	D.B.
+1.60	70.5	1.0	76.8	- - -	- - -	- - -	100.0	56.0	A.D.B.
	70.6	- - -	77.6	- - -	- - -	- - -	100.0	56.6	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8	.003					

Lab. No. 8597 Date March 4/77

Client: Warnock Hersey

Sample Identification: 77-2024

Starting Temperature °C: 350

Softening Temperature °C: 371

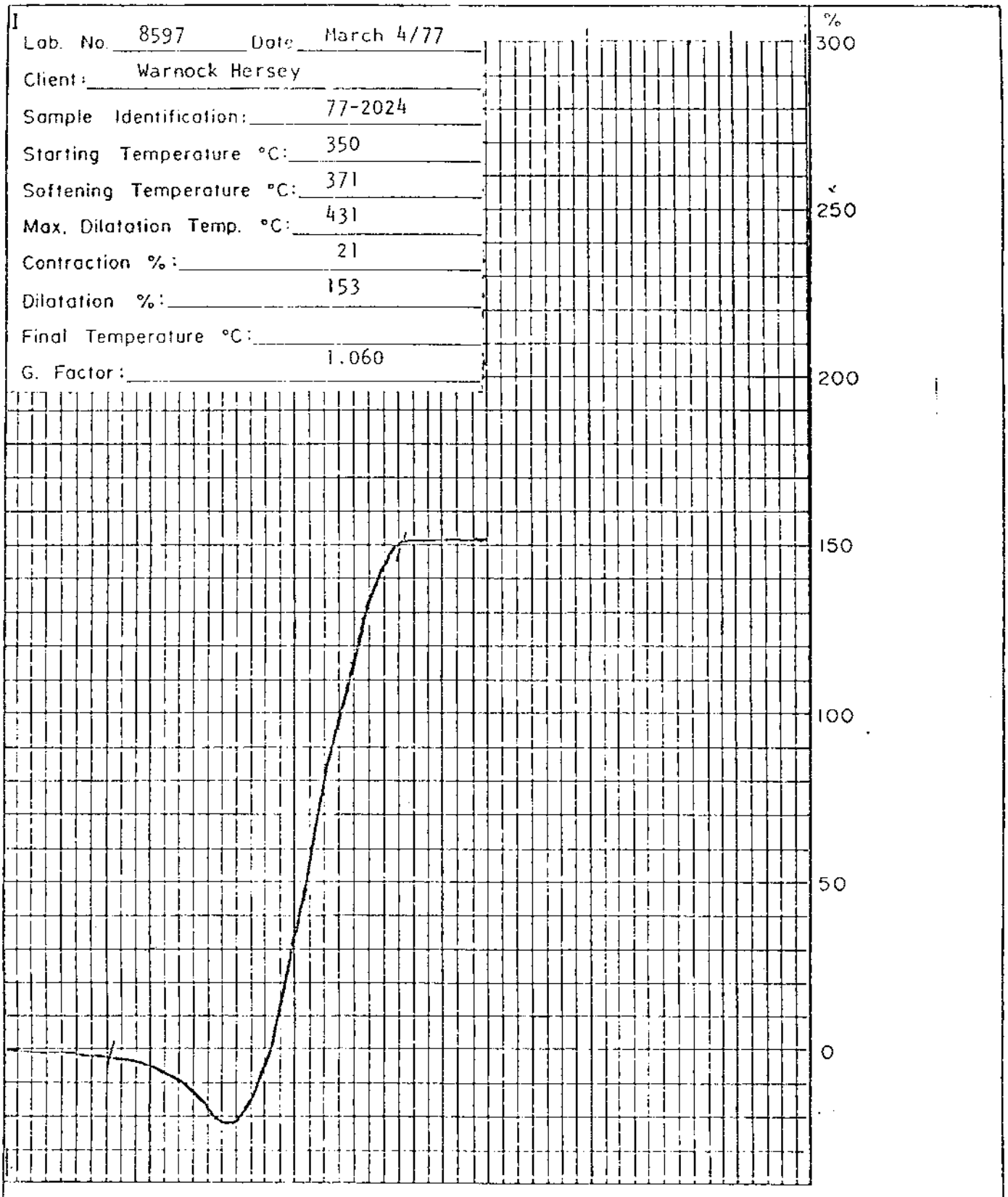
Max. Dilatation Temp. °C: 431

Contraction %: 21

Dilatation %: 153

Final Temperature °C:

G. Factor: 1.060



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 7 Lab. No.: 77 - 2025 Date: February 25, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.4	44.0	16.8	38.8	2.80	89.2	Air Dried Basis
- - -	44.2	16.9	38.9	2.81	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE Wt. %	CUMULATIVE Ash %	CUMULATIVE S. %	
¼" x 65 m	84.9	0.4	46.1	2.68	84.9	46.1	2.68	A.D.B.
	84.9	- - -	46.4	2.69	84.9	46.4	2.69	D.B.
65m x 0	15.1	0.6	28.9	2.93	100.0	43.5	2.72	A.D.B.
	15.1	- - -	29.1	2.95	100.0	43.8	2.73	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative Wt. %	Cumulative Ash %	
-1.40	41.2	1.7	1.9	29.4	67.0	0.96	41.2	1.9	A.D.B.
	41.0	- -	1.9	29 9	68.2	0.98	41.0	1.9	D.B.
1.40-1.50	2.2	1.1	8.5	25.9	64.5	1.05	43.4	2.2	A.D.B.
	2.2	- - -	8.6	26.2	65.2	1.06	43.2	2.2	D.B.
1.50-1.60	2.4	1.1	18.8	- -	- -	- -	45.8	3.1	A.D.B.
	2.4	- -	19.0	- -	- -	- -	45.6	3.1	D.B.
+1.60	54.2	0.6	80.5	- -	- -	- -	100.0	45.0	A.D.B.
	54.4	- -	80.9	- -	- -	- -	100.0	45.4	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8½	.001					

Lab. No. 8598 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2025

Starting Temperature °C: 350

Softening Temperature °C: 374

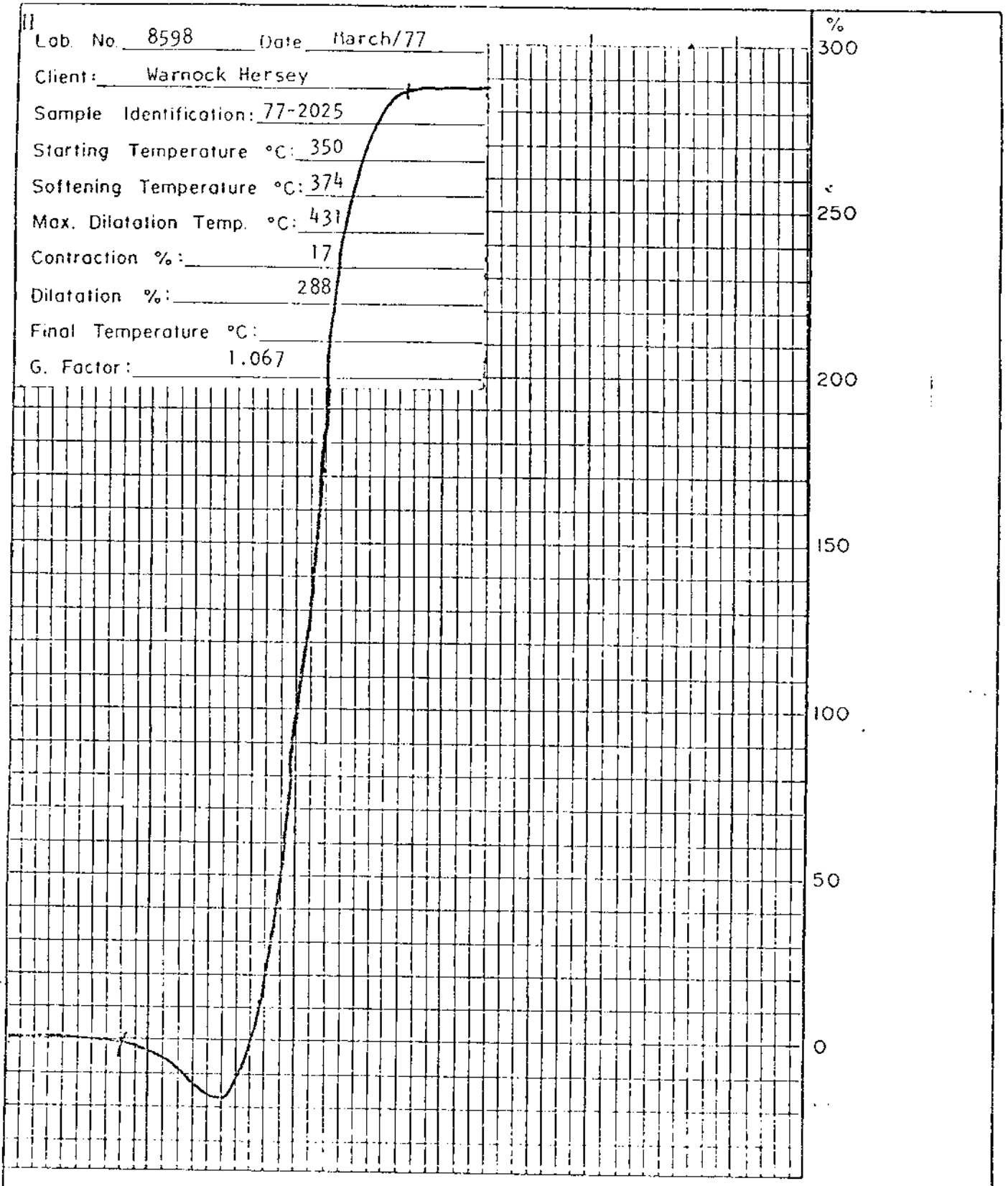
Max. Dilatation Temp. °C: 431

Contraction %: 17

Dilatation %: 288

Final Temperature °C:

G. Factor: 1.067



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 8 Lab. No.: 77 - 2026 Date: February 28, 1977

HEAD RAW ANALYSIS

R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.7	25.8	22.3	51.2	0.78	101.0	Air Dried Basis
- - -	25.9	22.4	51.7	0.79	- - -	Dry Basis

SIZE / RAW ANALYSES

Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE Wt. %	CUMULATIVE Ash %	CUMULATIVE S. %	
¼" x 65m	87.6	0.6	26.0	0.82	87.6	26.0	0.82	A.D.B.
	87.6	- - -	26.2	0.82	87.6	26.2	0.82	D.B.
65m x 0	12.4	0.8	29.0	0.78	100.0	26.4	0.81	A.D.B.
	12.4	- - -	29.2	0.79	100.0	26.7	0.82	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M

S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative Wt. %	Cumulative Ash %	
-1.40	61.6	1.0	4.7	29.7	64.6	0.70	61.6	4.7	A.D.B.
	61.6	- -	4 7	30.0	65.3	0.71	61.6	4.7	D.B.
1.40-1.50	6.7	1.1	18.4	22.8	57.7	0.66	68.3	6.0	A.D.B.
	6.7	- -	18.6	23.0	58.4	0.67	68.3	6.1	D.B.
1.50-1.60	2.7	1.0	29.4	- - -	- - -	- - -	71.0	6.9	A.D.B.
	2.7	- - -	29.8	- - -	- - -	- - -	71.0	7.0	D.B.
+1.60	29.0	1.3	70.5	- - -	- - -	- - -	100.0	25.4	A.D.B.
	29.0	- - -	71.5	- - -	- - -	- - -	100.0	25.7	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.

F.S.I.	F % on Coal	DILATATION TESTS Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G. No.
8	.020					

Lab. No. 8599 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2026

Starting Temperature °C: 350

Softening Temperature °C: 368

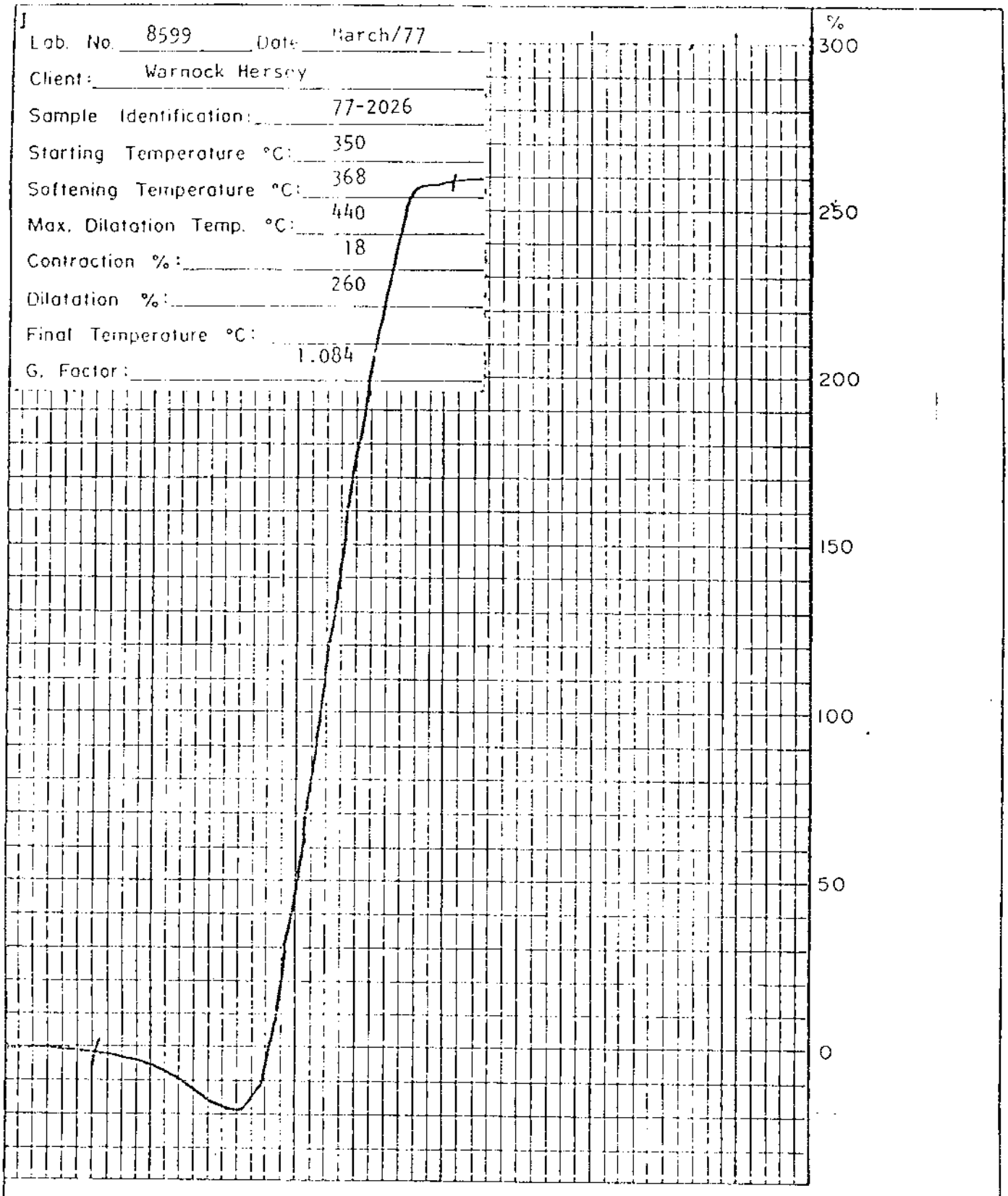
Max. Dilatation Temp. °C: 440

Contraction %: 18

Dilatation %: 260

Final Temperature °C:

G. Factor: 1.084



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 9 Lab. No.: 77 - 2027 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.6	18.1	23.6	57.7	0.65	94.8	Air Dried Basis
- - -	18.2	23.8	58.0	0.65	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	92.9	0.6	17.5	0.65	92.9	17.5	0.65	A.D.B.
	92.9	- - -	17.6	0.65	92.9	17.6	0.65	D.B.
65m x 0	7.1	0.7	21.7	0.73	100.0	17.8	0.66	A.D.B.
	7.1	- - -	21.9	0.74	100.0	17.9	0.66	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	68.2	0.8	5.5	27.0	66.7	0.69	68.2	5.5	A.D.B.
	68.2	- - -	5.6	27.2	67.2	0.70	68.2	5.6	D.B.
1.40-1.50	10.3	0.9	18.0	21.2	59.9	0.56	78.5	7.1	A.D.B.
	10.3	- - -	18.2	21.4	60.4	0.56	78.5	7.2	D.B.
1.50-1.60	6.6	0.8	28.5	- - -	- - -	- - -	85.1	8.8	A.D.B.
	6.6	- - -	28.8	- - -	- - -	- - -	85.1	8.9	D.B.
+1.60	14.9	0.8	63.7	- - -	- - -	- - -	100.0	17.0	A.D.B.
	14.9	- - -	64.2	- - -	- - -	- - -	100.0	17.1	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
7½	0.25					

Lab. No. 8600 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2027

Starting Temperature °C: 350

Softening Temperature °C: 371

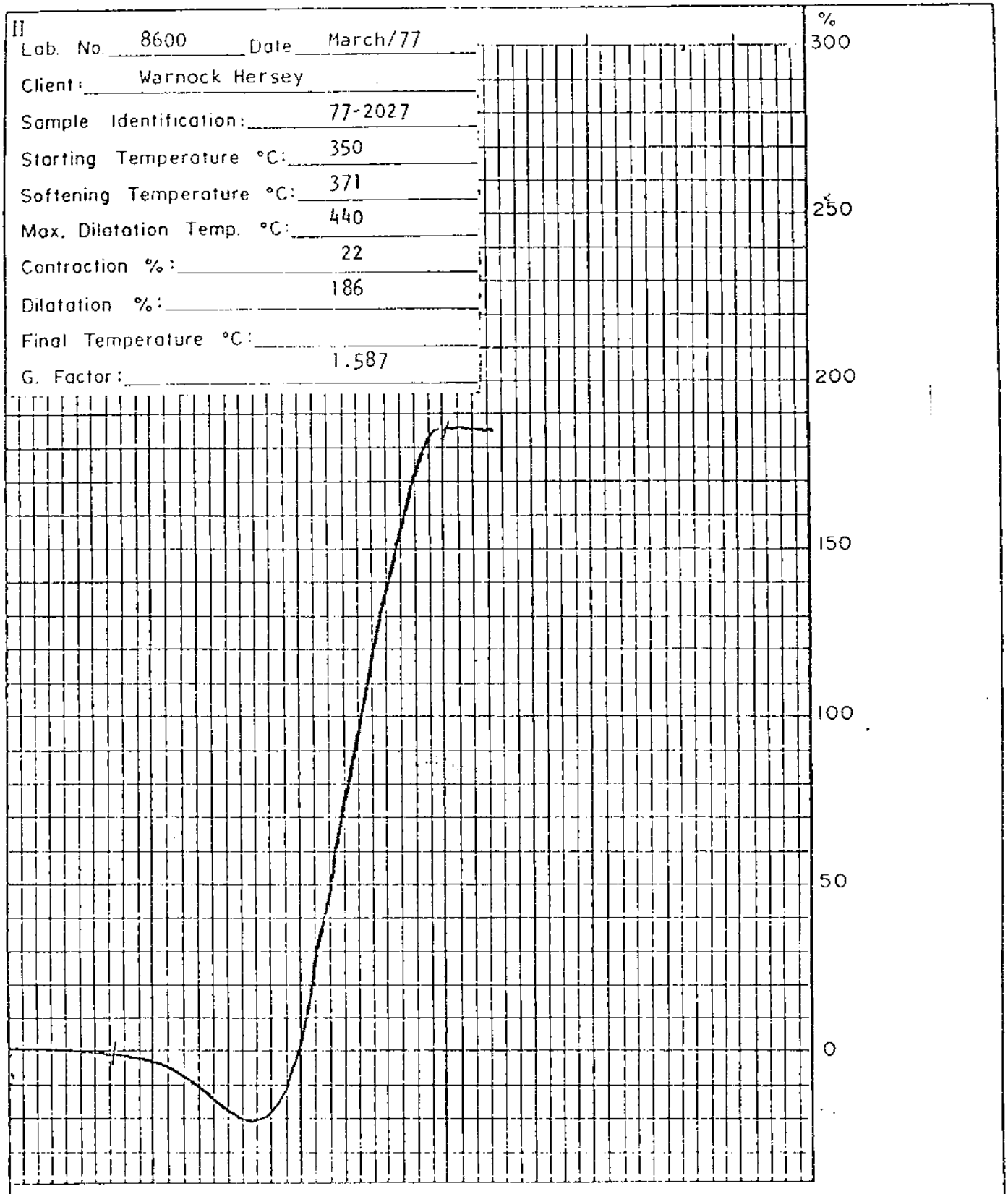
Max. Dilatation Temp. °C: 440

Contraction %: 22

Dilatation %: 186

Final Temperature °C:

G. Factor: 1.587



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 10 Lab. No.: 77 - 2028 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS:
0.7	41.0	17.9	40.4	0.65	118.3	Air Dried Basis
- - -	41.2	18.0	40.8	0.65	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	86.9	0.6	43.6	0.62	86.9	43.6	0.62	A.D.B.
	86.9	- - -	43.9	0.62	86.9	43.9	0.62	D.B.
65m x 0	13.1	0.8	30.7	0.75	100.0	41.9	0.64	A.D.B.
	13.1	- - -	30.9	0.76	100.0	42.2	0.64	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	40.4	1.7	4.4	27.7	66.2	0.75	40.9	4.4	A.D.B.
	40.9	- - -	4.5	28.2	67.3	0.76	40.9	4.5	D.B.
1.40-1.50	5.3	1.8	13.3	23.9	61.0	0.80	46.2	5.4	A.D.B.
	5.3	- - -	13.6	24.4	62.0	0.81	46.2	5.5	D.B.
1.50-1.60	2.6	1.8	22.9	- - -	- - -	- - -	48.8	6.4	A.D.B.
	2.6	- - -	23.3	- - -	- - -	- - -	48.8	6.5	D.B.
+1.60	51.2	0.8	77.7	- - -	- - -	- - -	100.0	42.9	A.D.B.
	51.2	- - -	78.3	- - -	- - -	- - -	100.0	43.3	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8	.029					

Lab. No. 8601 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2028

Starting Temperature °C: 350

Softening Temperature °C: 374

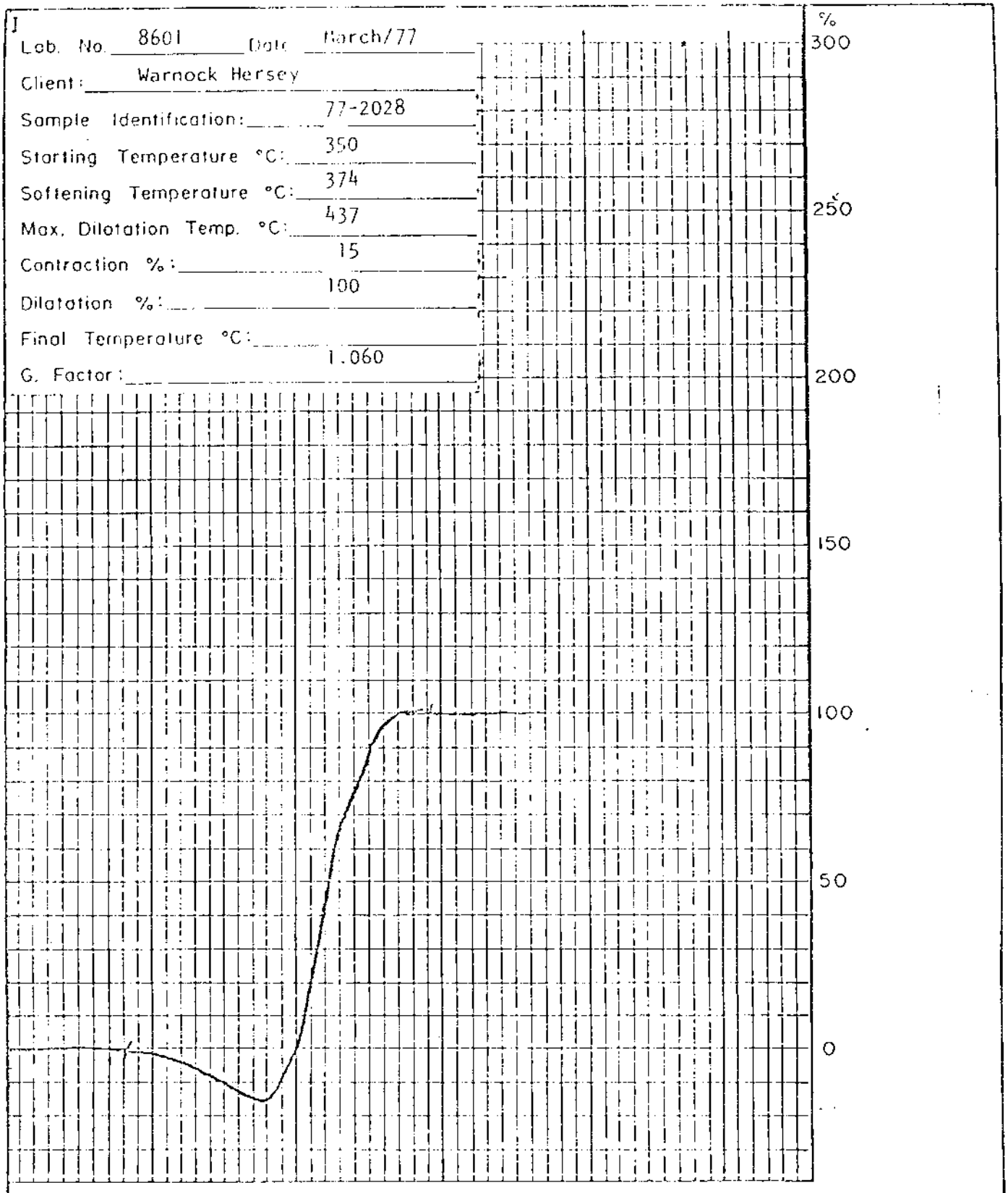
Max. Dilatation Temp. °C: 437

Contraction %: 15

Dilatation %: 100

Final Temperature °C:

G. Factor: 1.060



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 80 - 11 Lab. No.: 77 - 2029 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.8	32.4	19.4	47.4	0.48	100.3	Air Dried Basis
- - -	32.6	19.5	47.9	0.48	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	90.4	0.6	33.6	0.51	90.4	33.6	0.51	A.D.B.
	90.4	- - -	33.8	0.51	90.4	33.8	0.51	D.B.
65m x 0	9.6	0.8	26.5	0.58	100.0	32.9	0.52	A.D.B.
	9.6	- - -	26.7	0.58	100.0	33.1	0.52	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	52.5	1.0	4.9	26.3	67.8	0.56	52.5	4.9	A.D.B.
	52.5	- - -	4.9	26.5	68.6	0.57	52.5	4.9	D.B.
1.40-1.50	7.2	1.1	14.5	23.7	60.7	0.54	59.7	6.0	A.D.B.
	7.2	- - -	14.7	24.0	61.3	0.55	59.7	6.1	D.B.
1.50-1.60	3.8	1.1	28.5	- - -	- - -	- - -	63.5	7.4	A.D.B.
	3.8	- - -	28.8	- - -	- - -	- - -	63.5	7.5	D.B.
+1.60	36.5	0.9	77.7	- - -	- - -	- - -	100.0	33.1	A.D.B.
	36.5	- - -	78.4	- - -	- - -	- - -	100.0	33.4	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.							
F.S.I.	P % on Coal	DILATATION TESTS					
		Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.	
8½	.037						

Lab. No. 8602 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2029

Starting Temperature °C: 350

Softening Temperature °C: 380

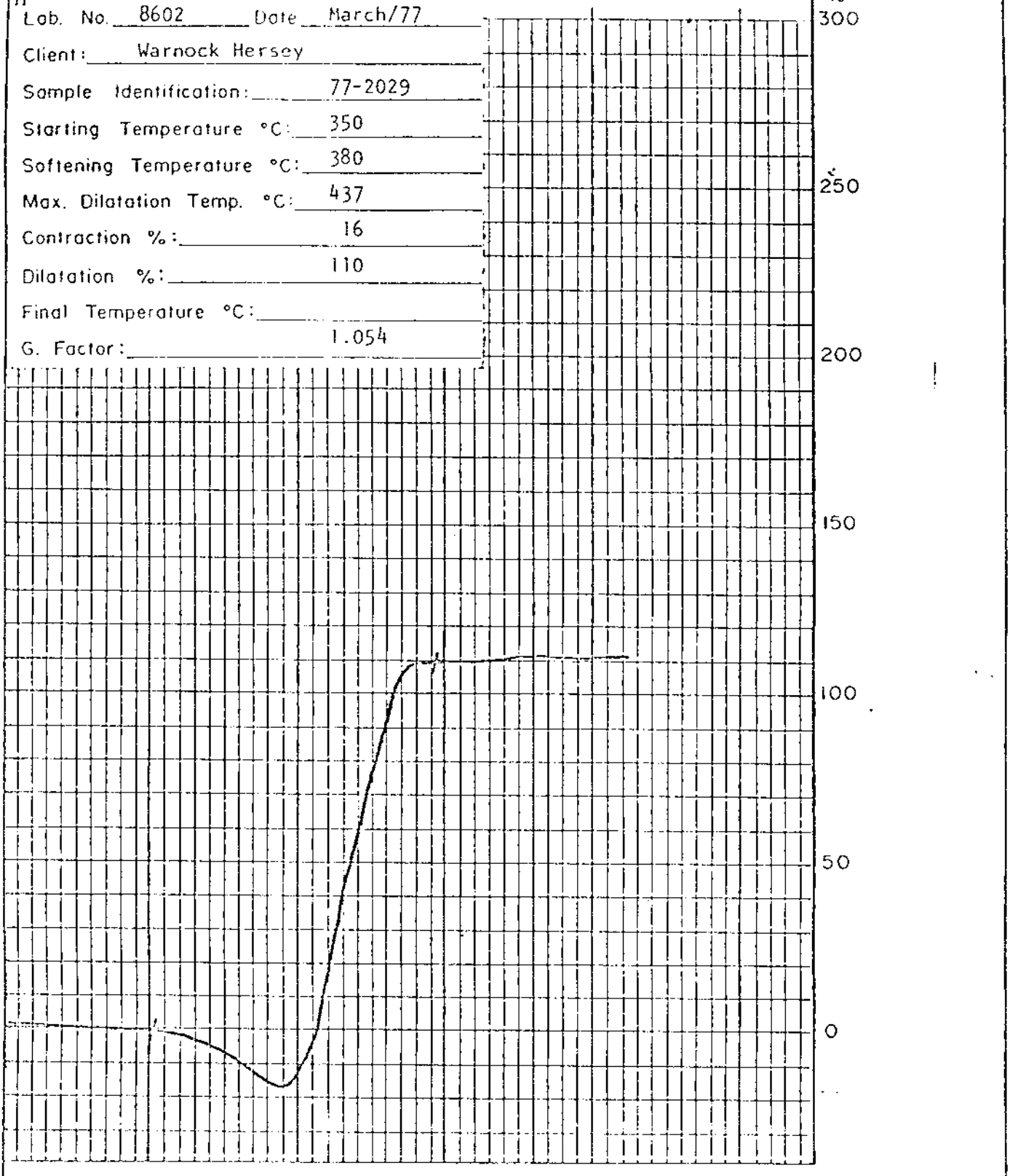
Max. Dilatation Temp. °C: 437

Contraction %: 16

Dilatation %: 110

Final Temperature °C:

G. Factor: 1.054



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 1 Lab. No.: 77 - 2030 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS:
0.8	33.8	24.2	41.2	0.59	65.0	Air Dried Basis
- - -	34.2	24.4	41.4	0.60	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	93.2	0.7	33.8	0.65	93.2	33.8	0.65	A.D.B.
	93.2	- - -	34.1	0.65	93.2	34.1	0.65	D.B.
65m x 0	6.8	1.0	27.1	0.82	100.0	33.3	0.66	A.D.B.
	6.8	- - -	27.4	0.83	100.0	33.6	0.66	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	59.5	0.9	5.0	33.0	61.1	0.72	59.5	5.0	A.D.B.
	59.5	- - -	5.0	33.3	61.7	0.73	59.5	5.0	D.B.
1.40-1.50	2.4	1.0	15.4	26.6	57.0	0.71	61.9	5.4	A.D.B.
	2.4	- - -	15.6	26.8	57.6	0.72	61.9	5.5	D.B.
1.50-1.60	0.5	0.9	27.1	- - -	- - -	- - -	62.4	5.6	A.D.B.
	0.5	- - -	27.3	- - -	- - -	- - -	62.4	5.6	D.B.
+1.60	37.6	0.9	80.3	- - -	- - -	- - -	100.0	33.7	A.D.B.
	37.6	- - -	81.0	- - -	- - -	- - -	100.0	34.0	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8	.027					

Lab. No. 8603 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2030

Starting Temperature °C: 350

Softening Temperature °C: 371

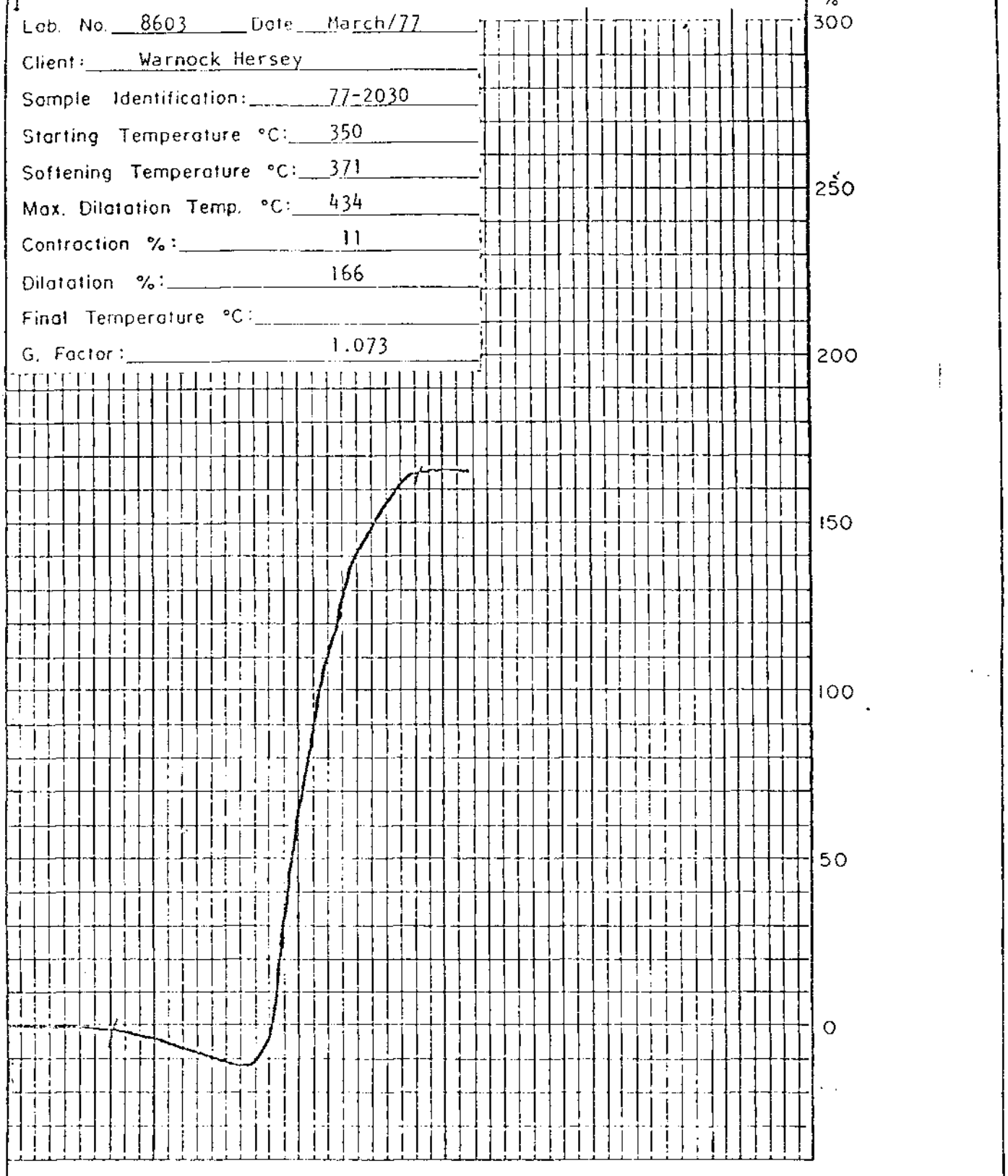
Max. Dilatation Temp. °C: 434

Contraction %: 11

Dilatation %: 166

Final Temperature °C:

G. Factor: 1.073



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 2 Lab. No.: 77 - 2031 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C %	S.%	H.G.I.	REMARKS
0.6	42.1	21.1	36.2	0.60	60.8	Air Dried Basis
- - -	42.4	21.2	36.4	0.60	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	88.1	0.6	43.3	0.61	88.1	43.3	0.61	A.D.B.
	88.1	- - -	43.6	0.61	88.1	43.6	0.61	D.B.
65m x 0	11.9	0.8	40.4	0.68	100.0	43.0	0.62	A.D.B.
	11.9	- - -	40.8	0.69	100.0	43.3	0.62	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	37.6	1.1	6.0	32.6	60.3	1.03	37.6	6.0	A.D.B.
	37.6	- - -	6.0	32.9	61.1	1.04	37.6	6.0	D.B.
1.40-1.50	5.9	0.9	18.2	26.9	54.0	0.80	43.5	7.7	A.D.B.
	5.9	- - -	18.4	27.2	54.4	0.81	43.5	7.8	D.B.
1.50-1.60	2.8	0.9	26.1	- --	- --	- --	46.3	8.8	A.D.B.
	2.8	- - -	26.4	- - -	- --	- --	46.3	8.9	D.B.
+1.60	53.7	0.9	73.8	- --	- --	- --	100.0	43.7	A.D.B.
	53.7	- --	74.5	- - -	- --	- - -	100.0	44.1	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
7½	.053					

Lab. No. 8604 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2031

Starting Temperature °C: 350

Softening Temperature °C: 377

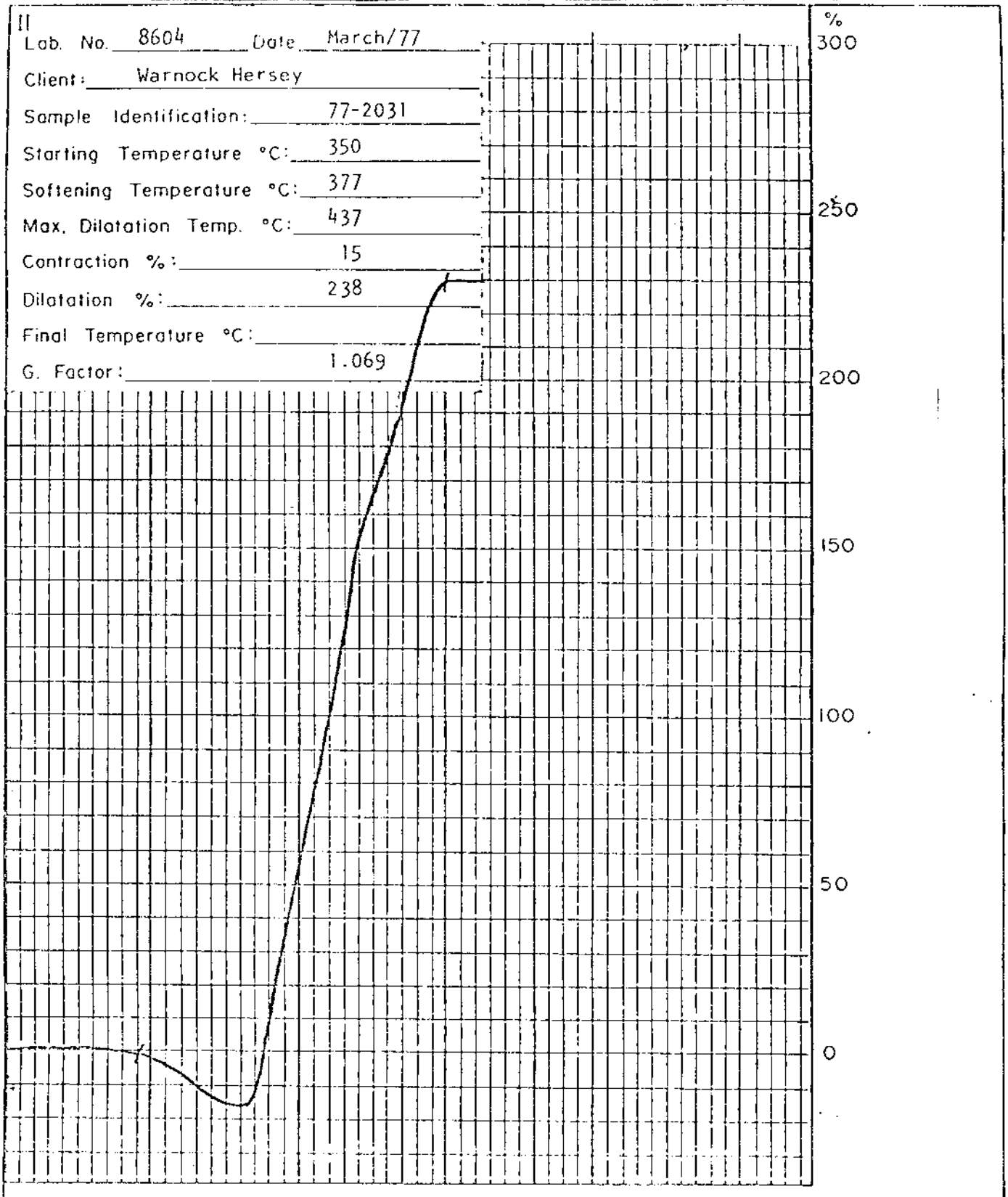
Max. Dilatation Temp. °C: 437

Contraction %: 15

Dilatation %: 238

Final Temperature °C:

G. Factor: 1.069



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 3 Lab. No.: 77 - 2032 Date: February 28 , 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.7	12.0	28.2	59.1	0.75	75.4	Air Dried Basis
- - -	12.1	28.4	59.5	0.76	- --	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	89.5	0.8	11.2	0.68	89.5	11.2	0.68	A.D.B.
	89.5	- --	11.3	0.68	89.5	11.3	0.68	D.B.
65m x 0	10.5	1.0	10.9	0.73	100.0	11.2	0.68	A.D.B.
	10.5	- --	11.0	0.74	100.0	11.3	0.69	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	86.0	1.2	3.0	31.7	64.1	0.69	86.0	3.0	A.D.B.
	86.0	- --	3.1	32.1	64.8	0.70	86.0	3.1	D.B.
1.40-1.50	3.0	1.2	9.6	28.2	61.0	0.67	89.0	3.2	A.D.B.
	3.0	- --	9.8	28.6	61.6	0.68	89.0	3.3	D.B.
1.50-1.60	1.0	0.9	18.8	- --	- - -	- --	90.0	3.4	A.D.B.
	1.0	- --	19.0	- - -	- --	- - -	90.0	3.5	D.B.
+1.60	10.0	0.9	78.1	- -	- - -	- -	100.0	10.9	A.D.B.
	10.0	- --	78.7	- --	- --	- --	100.0	11.0	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8½	.017					

Lab. No. 8605 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2032

Starting Temperature °C: 350

Softening Temperature °C: 368

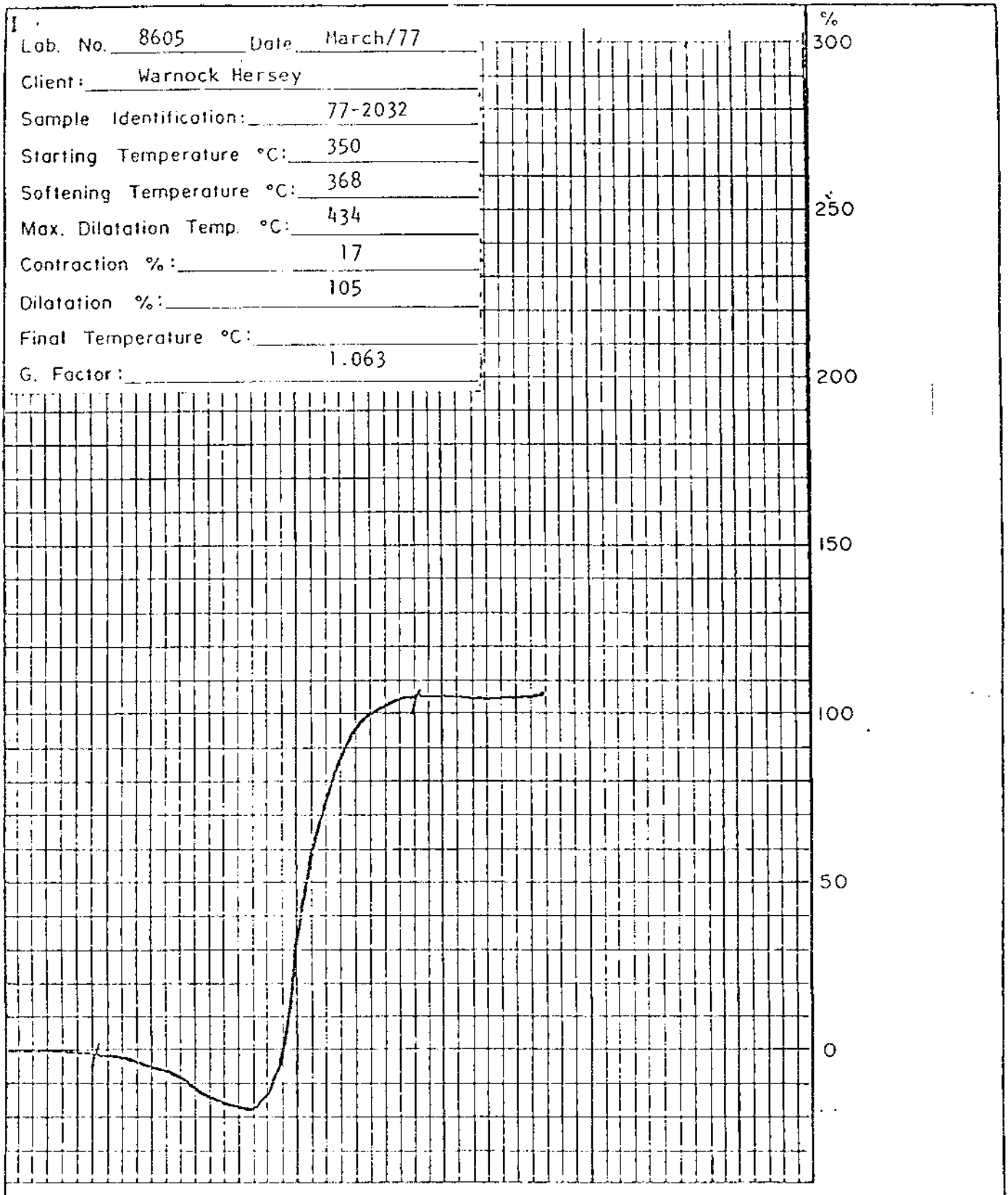
Max. Dilatation Temp. °C: 434

Contraction %: 17

Dilatation %: 105

Final Temperature °C:

G. Factor: 1.063



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 4 Lab. No.: 77 - 2033 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.6	43.0	24.0	32.4	0.86	67.1	Air Dried Basis
- - -	43.3	24.1	32.6	0.87	- --	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE Wt. %	CUMULATIVE Ash %	CUMULATIVE S. %	
¼" x 65m	91.6	0.5	43.5	0.86	91.6	43.5	0.86	A.D.B.
	91.6	- - -	43.7	0.86	91.6	43.7	0.86	D.B.
65m x 0	8.4	0.8	35.9	0.65	100.0	42.9	0.84	A.D.B.
	8.4	- --	36.2	0.66	100.0	43.1	0.84	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative Wt. %	Cumulative Ash %	
-1.40	25.8	0.9	5.8	34.8	58.5	0.73	25.8	5.8	A.D.B.
	25.8	- - -	5.8	35.1	59.1	0.74	25.8	5.8	D.B.
1.40-1.50	5.5	0.9	16.9	30.2	52.0	0.68	31.3	7.8	A.D.B.
	5.5	- - -	17.0	30.5	52.5	0.69	31.3	7.8	D.B.
1.50-1.60	8.3	0.8	28.3	- --	- --	- --	39.6	12.0	A.D.B.
	8.3	- - -	28.5	- - -	- - -	- - -	39.6	12.1	D.B.
+1.60	60.4	0.7	62.9	- --	- --	- --	100.0	42.8	A.D.B.
	60.4	- --	63.3	- - -	- --	- - -	100.0	43.1	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8	.013					

Lab. No. 8606 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2033

Starting Temperature °C: 350

Softening Temperature °C: 359

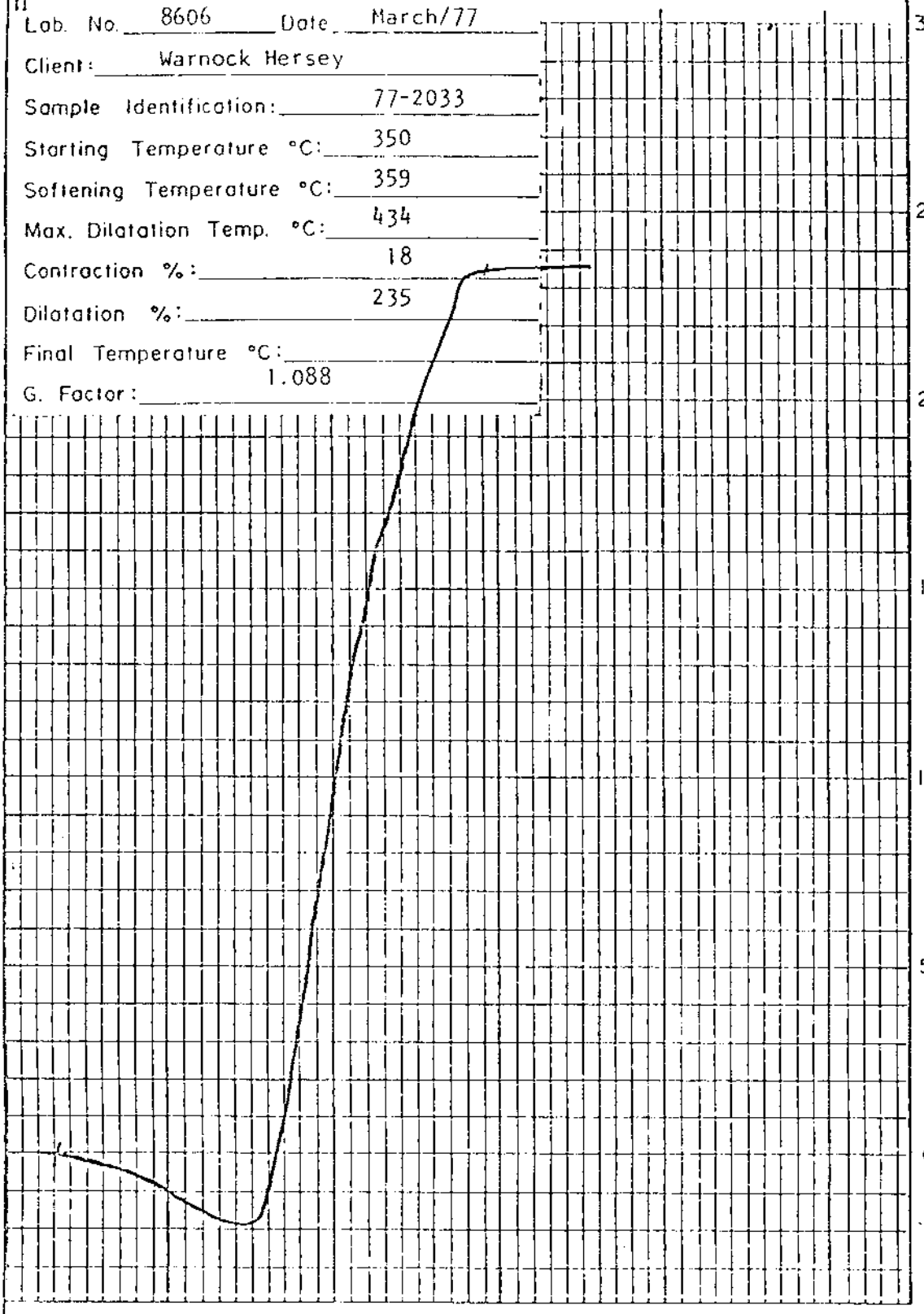
Max. Dilatation Temp. °C: 434

Contraction %: 18

Dilatation %: 235

Final Temperature °C:

G. Factor: 1.088



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 5 Lab. No.: 77 - 2034 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.6	69.1	16.0	14.3	0.35	58.0	Air Dried Basis
- - -	69.5	16.1	14.4	0.35	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	87.9	0.6	74.2	0.34	87.9	74.2	0.34	A.D.B.
	87.9	- - -	74.6	0.34	87.9	74.6	0.34	D.B.
65m x 0	12.1	0.9	49.6	0.51	100.0	71.2	0.36	A.D.B.
	12.1	- - -	50.1	0.51	100.0	71.6	0.36	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	3.8	1.0	7.8	28.3	62.9	0.56	3.8	7.8	A.D.B.
	3.8	- - -	7.9	28.6	63.5	0.57	3.8	7.9	D.B.
1.40-1.50	2.6	1.0	17.2	26.2	55.6	0.50	6.4	11.6	A.D.B.
	2.6	- - -	17.3	26.5	56.2	0.50	6.4	11.7	D.B.
1.50-1.60	1.6	0.9	24.0	- - -	- - -	- - -	8.0	14.1	A.D.B.
	1.6	- - -	24.2	- - -	- - -	- - -	8.0	14.2	D.B.
+1.60	92.0	0.8	79.9	- - -	- - -	- - -	100.0	74.6	A.D.B.
	92.0	- - -	80.6	- - -	- - -	- - -	100.0	75.3	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
4½	.015					

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 6 Lab. No.: 77 - 2035 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.7	13.9	28.4	57.0	0.52	103.1	Air Dried Basis
- - -	14.0	28.6	57.4	0.52	- - -	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	86.9	0.7	14.1	0.57	86.9	14.1	0.57	A.D.B.
	86.9	- - -	14.2	0.57	86.9	14.2	0.57	D.B.
65m x 0	13.1	0.9	10.0	0.68	100.0	13.6	0.58	A.D.B.
	13.1	- - -	10.1	0.68	100.0	13.7	0.58	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	79.0	1.4	4.1	32.2	62.3	0.47	79.0	4.1	A.D.B.
	79.0	- - -	4.2	32.6	63.2	0.48	79.0	4.2	D.B.
1.40-1.50	6.7	1.2	15.2	26.2	57.4	0.56	85.7	5.0	A.D.B.
	6.7	- - -	15.4	26.5	58.1	0.57	85.7	5.1	D.B.
1.50-1.60	3.3	1.2	24.4	- - -	- - -	- - -	89.0	8.1	A.D.B.
	3.3	- - -	24.7	- - -	- - -	- - -	89.0	8.2	D.B.
+1.60	11.0	1.1	60.8	- - -	- - -	- - -	100.0	13.9	A.D.B.
	11.0	- - -	61.5	- - -	- - -	- - -	100.0	14.1	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	F % on Coal	DILATATION TESTS				
		Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8	.026					

Lab. No. 8607 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2035

Starting Temperature °C: 350

Softening Temperature °C: 371

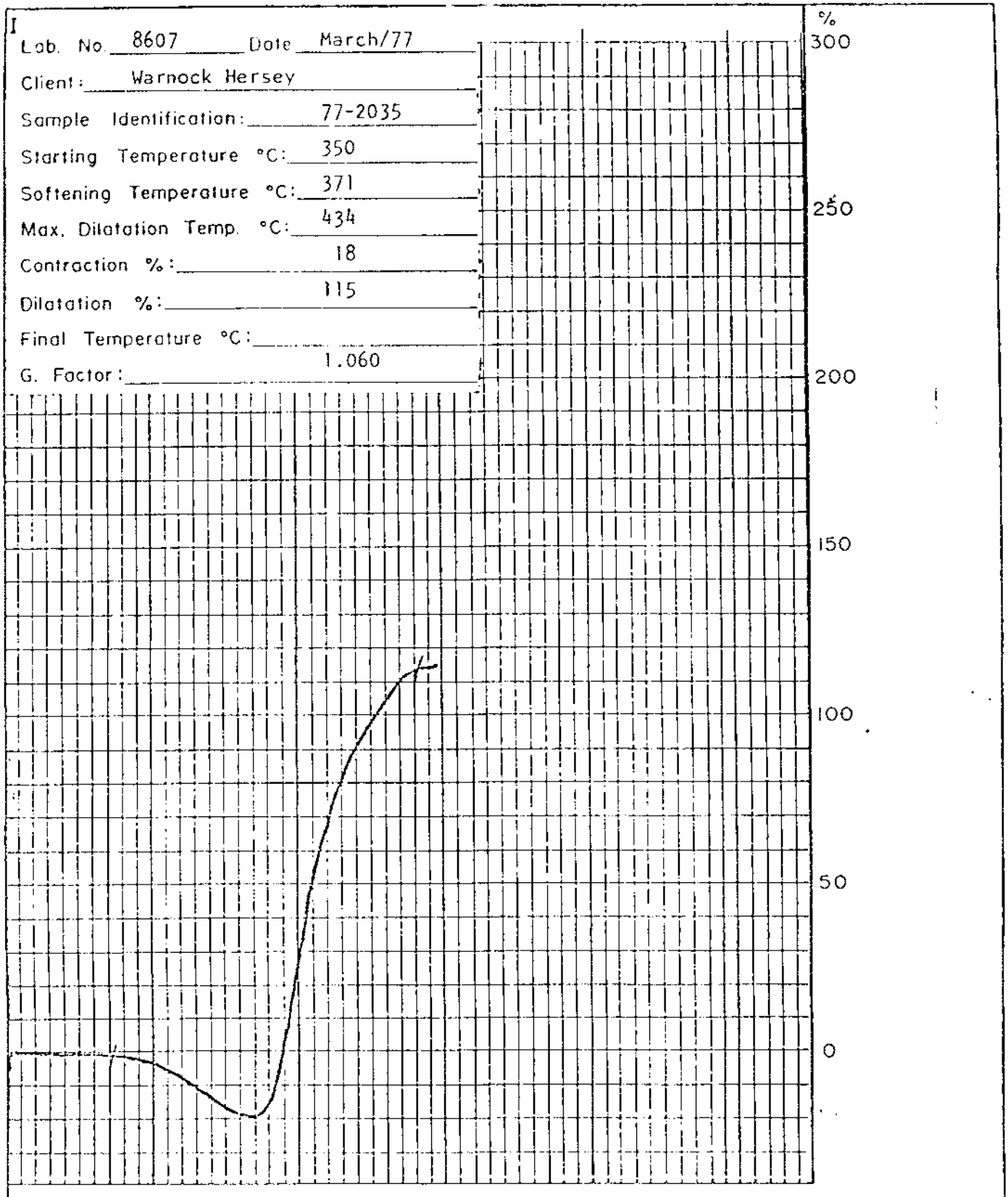
Max. Dilatation Temp. °C: 434

Contraction %: 18

Dilatation %: 115

Final Temperature °C:

G. Factor: 1.060



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 7 Lab. No.: 77 - 2036 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.7	11.0	27.2	61.1	0.94	94.8	Air Dried Basis
- --	11.0	27.4	61.6	0.95	- --	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE Wt. %	CUMULATIVE Ash %	CUMULATIVE S. %	
¼" x 65m	89.6	0.7	10.3	0.95	89.6	10.3	0.95	A.D.B.
	89.6	- --	10.4	0.96	89.6	10.4	0.96	D.B.
65m x 0	10.4	0.8	13.8	1.17	100.0	10.7	0.97	A.D.B.
	10.4	- --	13.9	1.18	100.0	10.8	0.98	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative Wt. %	Cumulative Ash %	
-1.40	83.7	1.3	3.3	29.5	65.9	0.75	83.7	3.3	A.D.B.
	83.7	- --	3.3	29.9	66.8	0.76	83.7	3.3	D.B.
1.40-1.50	4.3	1.0	14.4	23.7	60.9	0.73	88.0	3.8	A.D.B.
	4.3	- --	14.6	24.0	61.4	0.74	88.0	3.8	D.B.
1.50-1.60	1.8	1.0	23.9	- --	- --	- --	89.8	4.2	A.D.B.
	1.8	- - -	24.2	- --	- --	- --	89.8	4.2	D.B.
+1.60	10.2	1.0	64.4	- --	- --	- --	100.0	10.4	A.D.B.
	10.2	- --	65.0	- --	- --	- --	100.0	10.5	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS Softening Temp. (°C)	Max. Dil. Temp. (°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8½	.018					

Lab. No. 8608 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2036

Starting Temperature °C: 350

Softening Temperature °C: 380

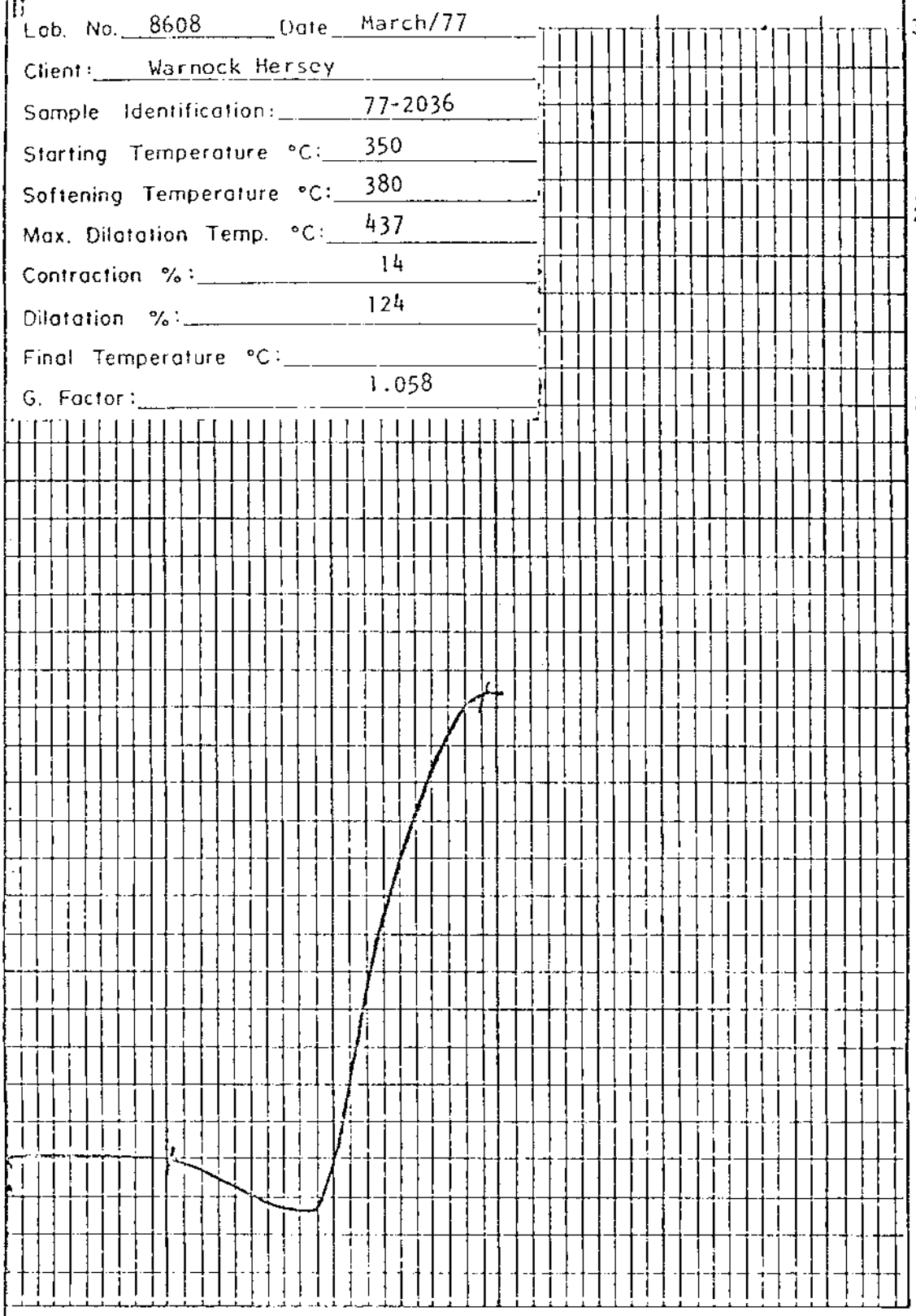
Max. Dilatation Temp. °C: 437

Contraction %: 14

Dilatation %: 124

Final Temperature °C:

G. Factor: 1.058



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

Warnock Hersey Professional Services Ltd.

ELCO MINING LTD. CORE SAMPLE ANALYSIS

Hole No.: DH 81 - 8 Lab. No.: 77 - 2037 Date: February 28, 1977

HEAD RAW ANALYSIS						
R.M.%	Ash%	V.M.%	F.C.%	S.%	H.G.I.	REMARKS
0.8	53.4	16.9	28.9	0.74	71.2	Air Dried Basis
- - -	53.8	17.0	29.2	0.75	- --	Dry Basis

SIZE / RAW ANALYSES								
Size Fraction	Wt. %	R.M.%	Ash %	S. %	CUMULATIVE			
					Wt. %	Ash %	S. %	
¼" x 65m	85.5	0.7	57.2	0.74	85.5	57.2	0.74	A.D.B.
	85.5	- --	57.6	0.74	85.5	57.6	0.74	D.B.
65m x 0	14.5	0.8	33.6	0.94	100.0	53.8	0.77	A.D.B.
	14.5	- --	33.9	0.95	100.0	54.2	0.78	D.B.

SINK - FLOAT ANALYSIS: ¼" x 65 M									
S. G.	Wt.%	R.M%	Ash %	V.M%	F.C%	S.%	Cumulative		
							Wt. %	Ash %	
-1.40	24.3	1.5	4.8	31.4	62.3	1.00	24.3	4.8	A.D.B.
	24.3	- - -	4.9	31.9	63.2	1.02	24.3	4.9	D.B.
1.40-1.50	3.4	1.2	13.9	25.6	59.3	1.00	27.7	5 .9	A.D.B.
	3.4	- - -	14.1	25.9	60.0	1.01	27.7	6.0	D.B.
1.50-1.60	2.1	1.5	24.7	- --	- --	- -	29.8	7.2	A.D.B.
	2.1	- --	25.1	- --	- --	- --	29.8	7.3	D.B.
+1.60	70.2	1.2	77.6	- --	- --	- - -	100.0	56.6	A.D.B.
	70.2	- - -	78.5	- --	- --	---	100.0	57.3	D.B.

COMPOSITE ¼" x 65 m FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P % on Coal	DILATATION TESTS				
		Softening Temp.(°C)	Max. Dil. Temp.(°C)	Maximum Contr. %	Maximum Dil. %	G.No.
8½	.014					

Lab. No. 8609 Date March/77

Client: Warnock Hersey

Sample Identification: 77-2037

Starting Temperature °C: 350

Softening Temperature °C: 365

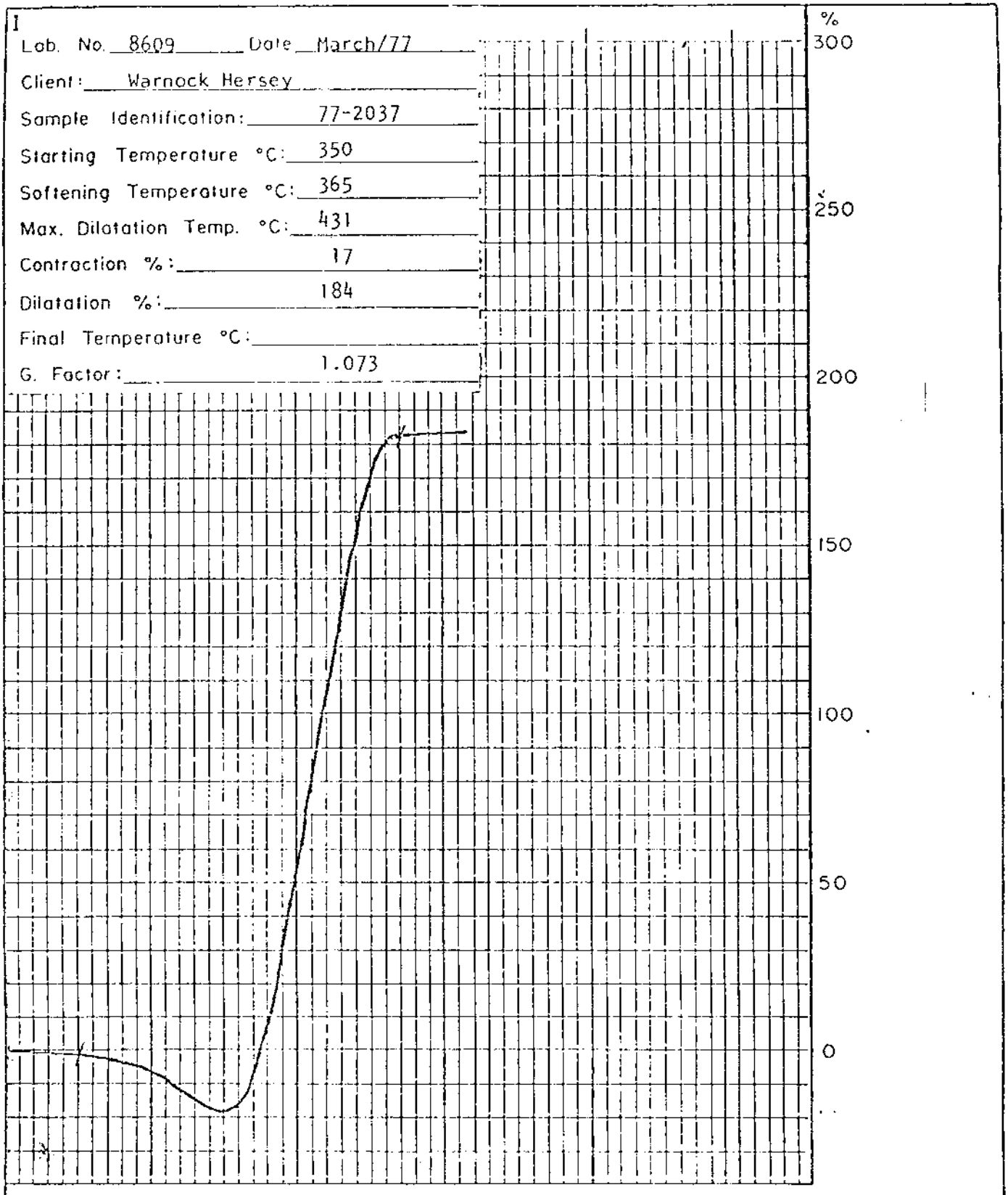
Max. Dilatation Temp. °C: 431

Contraction %: 17

Dilatation %: 184

Final Temperature °C:

G. Factor: 1.073



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 1 LAB. NO. 8356 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.3	8.6	33.7	56.4	0.88	69	Air Dried Basis
	8.7	34.1	57.2	0.89	--	Dry Basis

SIZE/RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	82.8	1.0	8.5	0.92	82.8	8.5	0.92	A.D.B.
	82.8		8.6	0.93	82.8	8.6	0.93	D.B.
65M x 0	17.2	1.2	12.8	0.92	100.0	9.2	0.92	A.D.B.
	17.2		13.0	0.93	100.0	9.4	0.93	D.B.

SINK-FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	89.5	1.0	3.8	35.7	59.5	0.98	89.5	3.8	A.D.B.
	89.6		3.8	36.1	60.1	0.99	89.6	3.8	D.B.
1.40-1.50	4.2	2.2	19.7	24.5	53.6	1.13	93.7	4.5	A.D.B.
	4.1		20.1	25.1	54.8	1.16	93.7	4.5	D.B.
1.50-1.60	1.2	1.0	33.1				94.9	4.9	A.D.B.
	1.2		33.4				94.9	4.9	D.B.
+1.60	5.1	0.9	75.9				100.0	8.5	A.D.B.
	5.1		76.6				100.0	8.5	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
5 1/2	.04	353	404	16	206	1.061

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8356 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-1

Starting Temperature °C: 350

Softening Temperature °C: 353

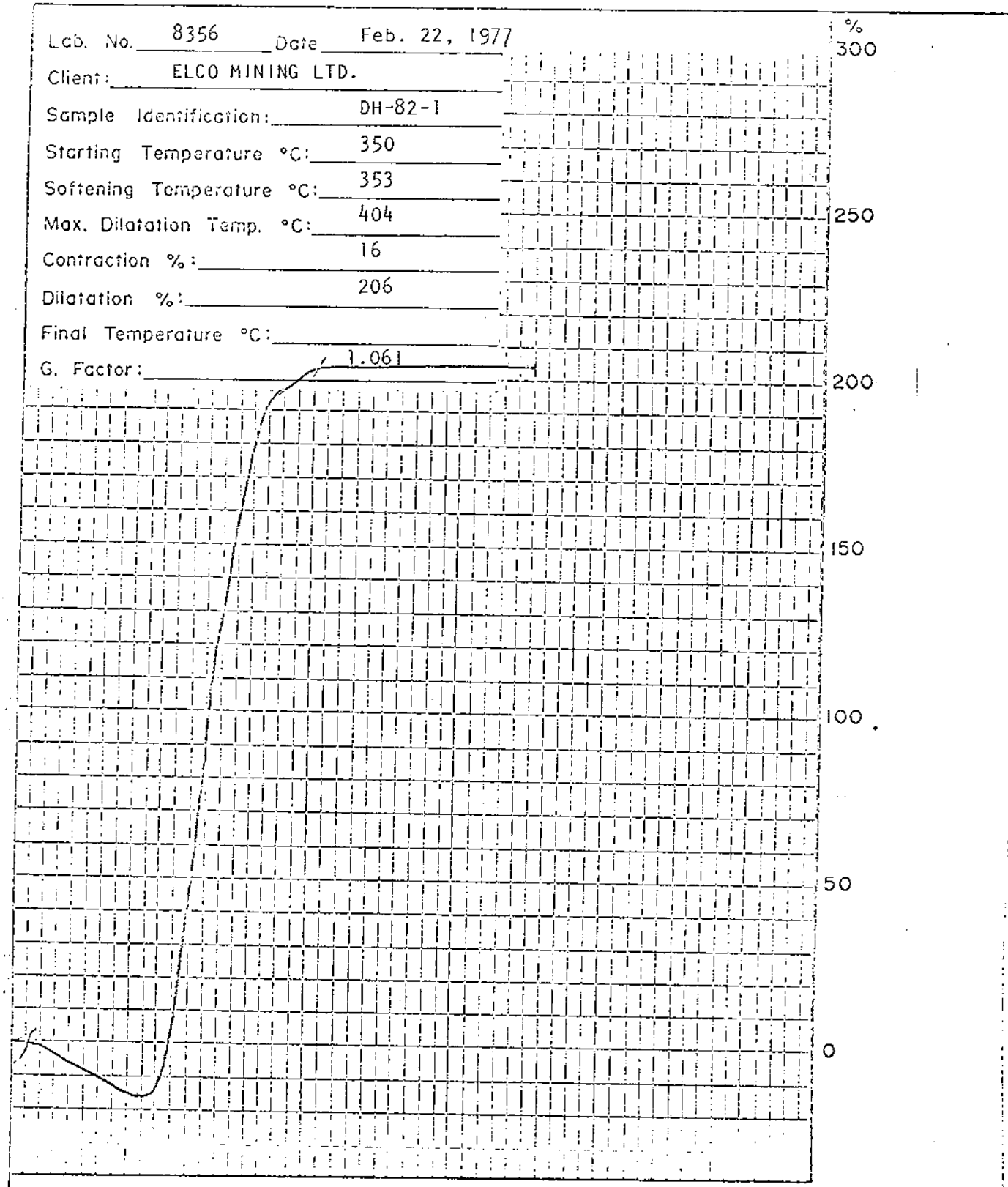
Max. Dilatation Temp. °C: 404

Contraction %: 16

Dilatation %: 206

Final Temperature °C:

G. Factor: 1.061



BARTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 2 LAB. NO. 8357 DATE: FEB./88

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.1	14.8	31.5	52.6	0.98	75	Air Dried Basis
	15.0	31.9	53.1	0.99	--	Dry Basis

SIZE/RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	91.3	1.1	14.0	0.99	91.3	14.0	0.99	A.D.B.
	91.3		14.2	1.00	91.3	14.2	1.00	D.B.
65M x 0	8.7	1.1	16.1	0.87	100.0	14.2	0.98	A.D.B.
	8.7		16.3	0.88	100.0	14.4	0.99	D.B.

SINK-FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	83.9	1.2	2.7	35.8	60.3	0.88	83.9	2.7	A.D.B.
	83.8		2.7	36.2	61.1	0.89	83.8	2.7	D.B.
1.40-1.50	0.9	1.4	9.3	32.1	57.2	1.01	84.8	2.8	A.D.B.
	0.9		9.4	32.6	58.0	1.02	84.7	2.8	D.B.
1.50-1.60	0.4	1.4	24.2				85.2	2.9	A.D.B.
	0.4		24.5				85.1	2.9	D.B.
+1.60	14.8	0.8	73.5				100.0	13.3	A.D.B.
	14.9		74.1				100.0	13.5	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
6 1/2	Trace	368	428	18	187	1.066

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8357 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-2

Starting Temperature °C: 350

Softening Temperature °C: 368

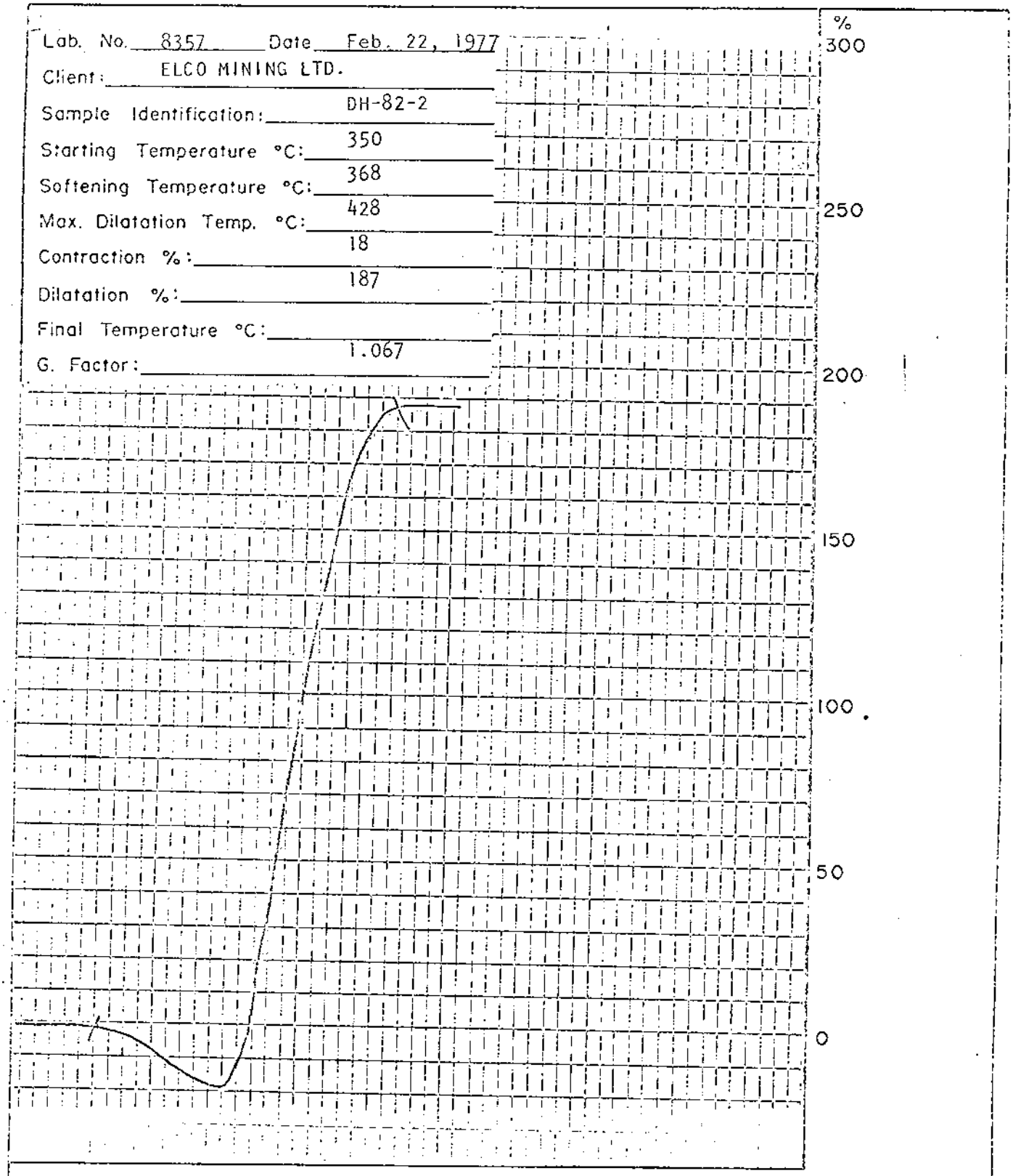
Max. Dilatation Temp. °C: 428

Contraction %: 18

Dilatation %: 187

Final Temperature °C:

G. Factor: 1.067



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 3 LAB. NO. 8358 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.1	46.1	20.8	32.0	0.51	71	Air Dried Basis
	46.6	21.0	32.4	0.52	--	Dry Basis

SIZE / RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	89.5	1.4	46.9	0.52	89.5	46.9	0.52	A.D.B.
	89.6		47.6	0.53	89.6	47.6	0.53	D.B.
65M x 0	10.5	1.9	33.6	0.60	100.0	45.5	0.53	A.D.B.
	10.4		34.3	0.61	100.0	46.2	0.54	D.B.

SINK - FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	30.8	1.0	6.2	33.5	59.3	0.83	30.8	6.2	A.D.B.
	30.8		6.3	33.8	59.9	0.84	30.8	6.3	D.B.
1.40-1.50	8.1	1.0	16.7	30.1	52.2	0.77	38.9	8.4	A.D.B.
	8.1		16.9	30.4	52.7	0.78	38.9	8.5	D.B.
1.50-1.60	3.2	1.4	31.5				42.1	10.1	A.D.B.
	3.2		31.9				42.1	10.3	D.B.
+1.60	57.9	1.0	72.8				100.0	46.4	A.D.B.
	57.9		73.5				100.0	46.9	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
6 1/2	.09	381	428	17	140	1.048

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8358 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-3

Starting Temperature °C: 350

Softening Temperature °C: 381

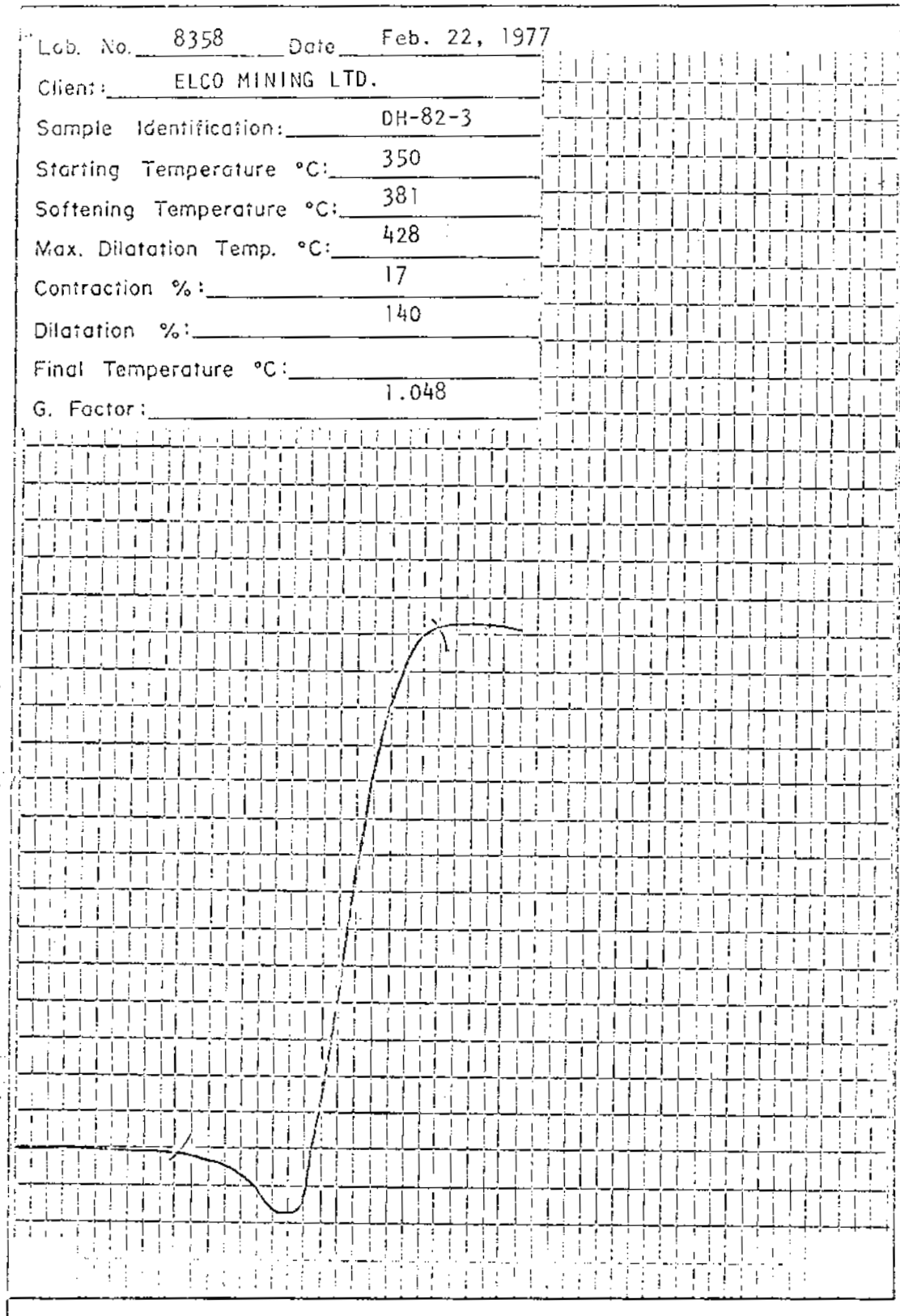
Max. Dilatation Temp. °C: 428

Contraction %: 17

Dilatation %: 140

Final Temperature °C:

G. Factor: 1.048



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 4 LAB. NO. 8359 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
0.9	49.5	19.6	30.0	0.43	54	Air Dried Basis
	49.9	19.8	30.3	0.43	--	Dry Basis

SIZE / RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	90.2	1.0	50.1	0.44	90.2	50.1	0.44	A.D.B.
	90.2		50.6	0.44	90.2	50.6	0.44	D.B.
65M x 0	9.8	1.0	36.1	0.55	100.0	48.7	0.45	A.D.B.
	9.8		36.5	0.56	100.0	49.2	0.45	D.B.

SINK - FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	35.6	1.4	5.9	32.4	60.3	0.86	35.6	5.9	A.D.B.
	35.5		6.0	32.9	61.1	0.87	35.5	6.0	D.B.
1.40-1.50	5.9	0.9	15.5	30.6	53.0	0.71	41.5	7.3	A.D.B.
	5.9		15.6	30.9	53.5	0.72	41.4	7.4	D.B.
1.50-1.60	1.9	0.9	33.8				43.4	8.4	A.D.B.
	1.9		34.1				43.3	8.5	D.B.
+1.60	56.6	0.8	81.1				100.0	49.6	A.D.B.
	56.7		81.8				100.0	50.1	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
7 1/2	.09	368	434	18	165	1.071

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8359 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-4

Starting Temperature °C: 350

Softening Temperature °C: 368

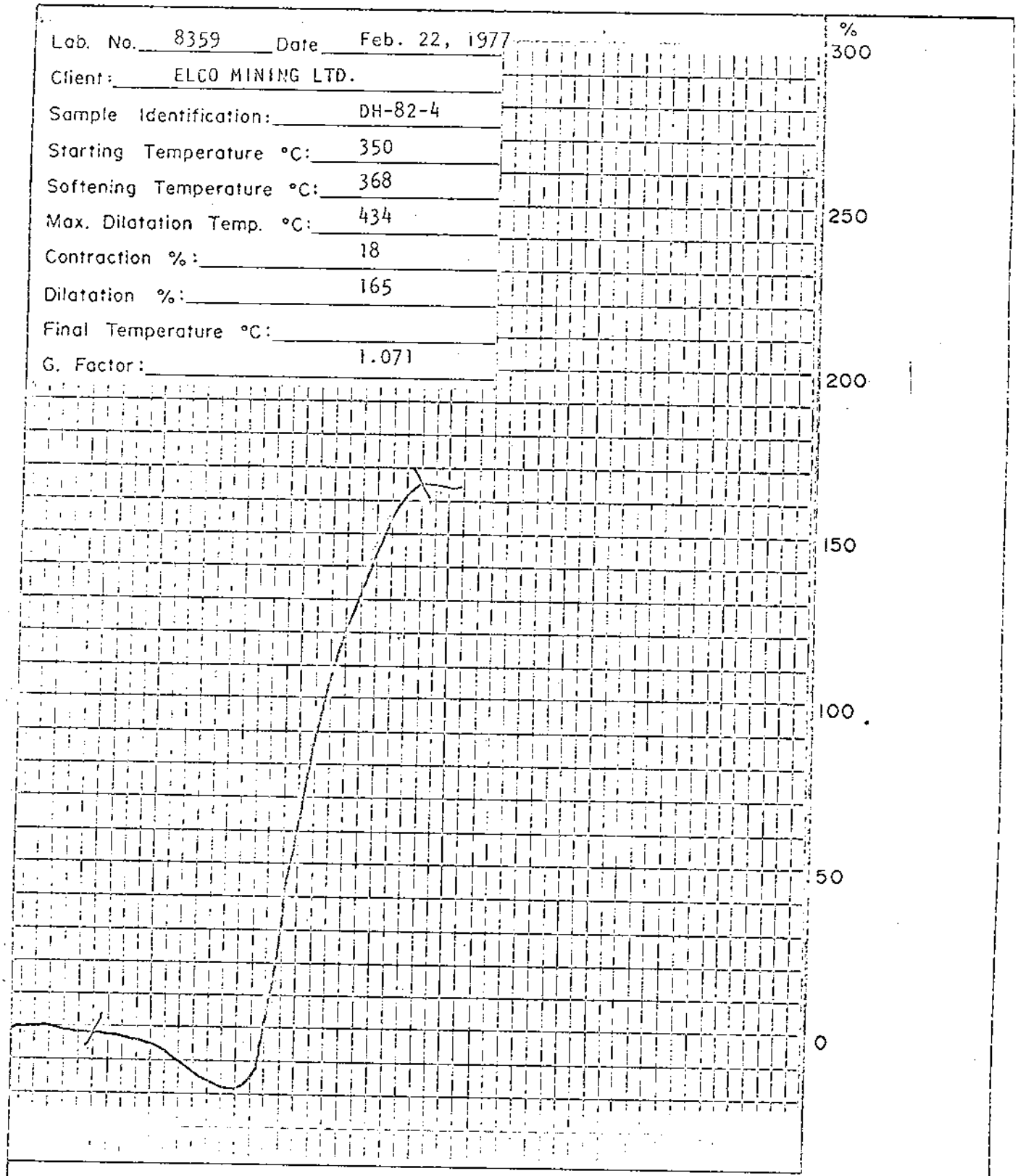
Max. Dilatation Temp. °C: 434

Contraction %: 18

Dilatation %: 165

Final Temperature °C:

G. Factor: 1.071



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 5 LAB. NO. 8360 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.0	57.3	20.8	20.9	0.36	65	Air Dried Basis
	57.9	21.0	21.1	0.36	--	Dry Basis

SIZE/RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	83.3	0.9	62.0	0.32	83.3	62.0	0.32	A.D.B.
	83.4		62.6	0.32	83.4	62.6	0.32	D.B.
65M x 0	16.7	1.2	32.4	0.51	100.0	57.1	0.35	A.D.B.
	16.6		32.8	0.52	100.0	57.6	0.35	D.B.

SINK-FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	22.9	2.2	4.8	33.2	59.8	0.70	22.9	4.8	A.D.B.
	22.7		4.9	33.9	61.2	0.72	22.7	4.9	D.B.
1.40-1.50	2.4	2.2	17.7	27.9	52.2	0.57	25.3	6.0	A.D.B.
	2.3		18.1	28.5	53.4	0.58	25.0	6.1	D.B.
1.50-1.60	1.2	3.5	29.3				26.5	7.1	A.D.B.
	1.2		30.4				26.2	7.2	D.B.
+1.60	73.5	1.2	80.6				100.0	61.1	A.D.B.
	73.8		81.6				100.0	62.1	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
7 1/2	.06	371	431	16	153	1.065

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8360 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-5

Starting Temperature °C: 350

Softening Temperature °C: 371

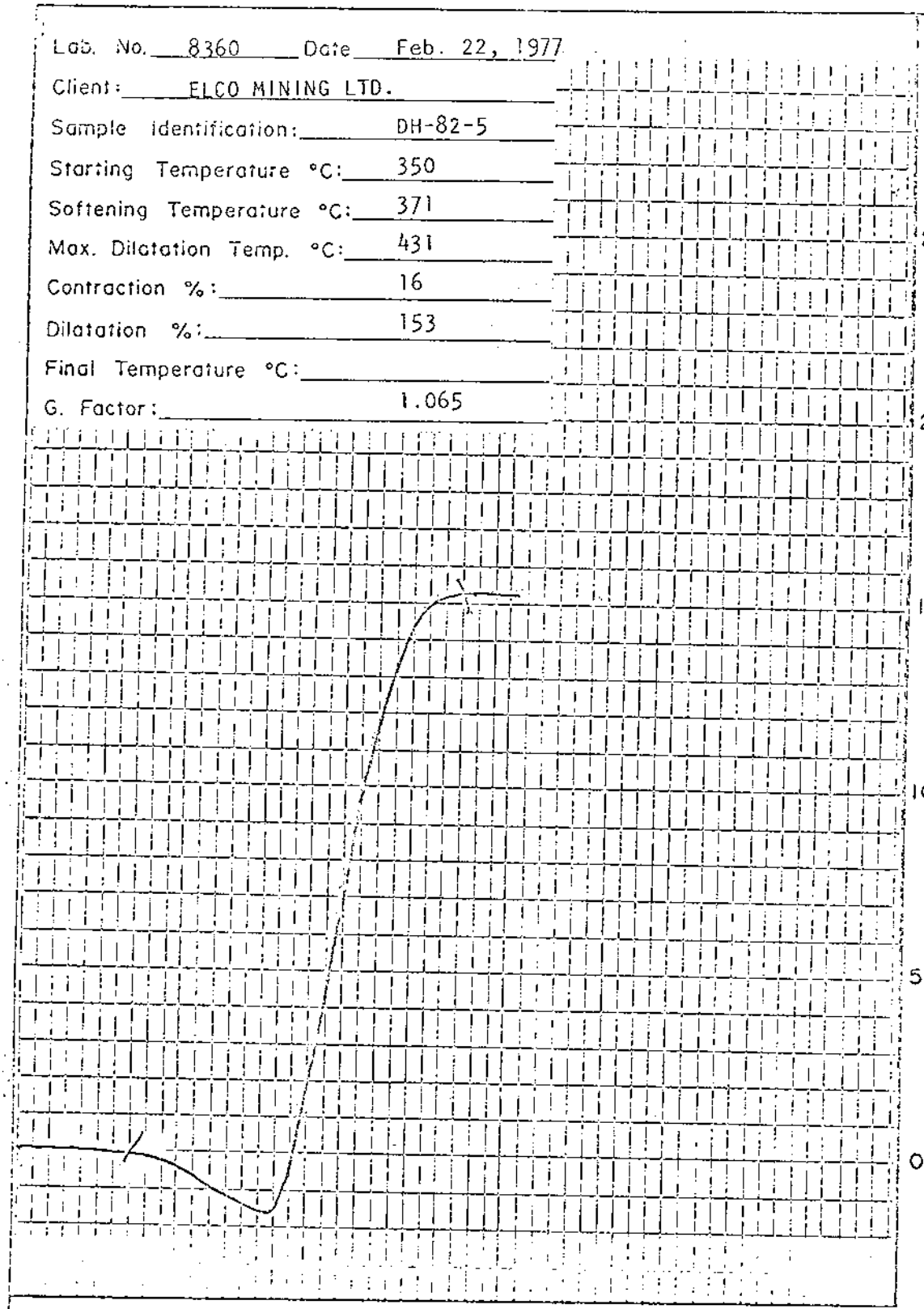
Max. Dilatation Temp. °C: 431

Contraction %: 16

Dilatation %: 153

Final Temperature °C:

G. Factor: 1.065



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 6 LAB. NO. 8361 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.2	27.9	32.7	38.2	0.43	73	Air Dried Basis
	28.2	33.1	38.7	0.44	--	Dry Basis

SIZE / RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	84.0	1.5	29.0	0.46	84.0	29.0	0.46	A.D.B.
	84.0		29.4	0.47	84.0	29.4	0.47	D.B.
65M x 0	16.0	1.5	17.0	0.62	100.0	27.1	0.48	A.D.B.
	16.0		17.3	0.63	100.0	27.5	0.49	D.B.

SINK - FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	54.4	1.7	3.5	34.3	60.5	0.70	54.4	3.5	A.D.B.
	54.3		3.6	34.9	61.5	0.71	54.3	3.6	D.B.
1.40-1.50	2.6	1.8	14.1	32.1	52.0	0.75	57.0	4.0	A.D.B.
	2.6		14.4	32.7	52.9	0.76	56.9	4.1	D.B.
1.50-1.60	1.4	2.2	25.3				58.4	4.5	A.D.B.
	1.3		25.9				58.2	4.6	D.B.
+1.60	41.6	1.1	62.2				100.0	28.5	A.D.B.
	41.8		62.9				100.0	29.0	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
7	.03	359	423	19	180	1.071

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8361 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-6

Starting Temperature °C: 350

Softening Temperature °C: 359

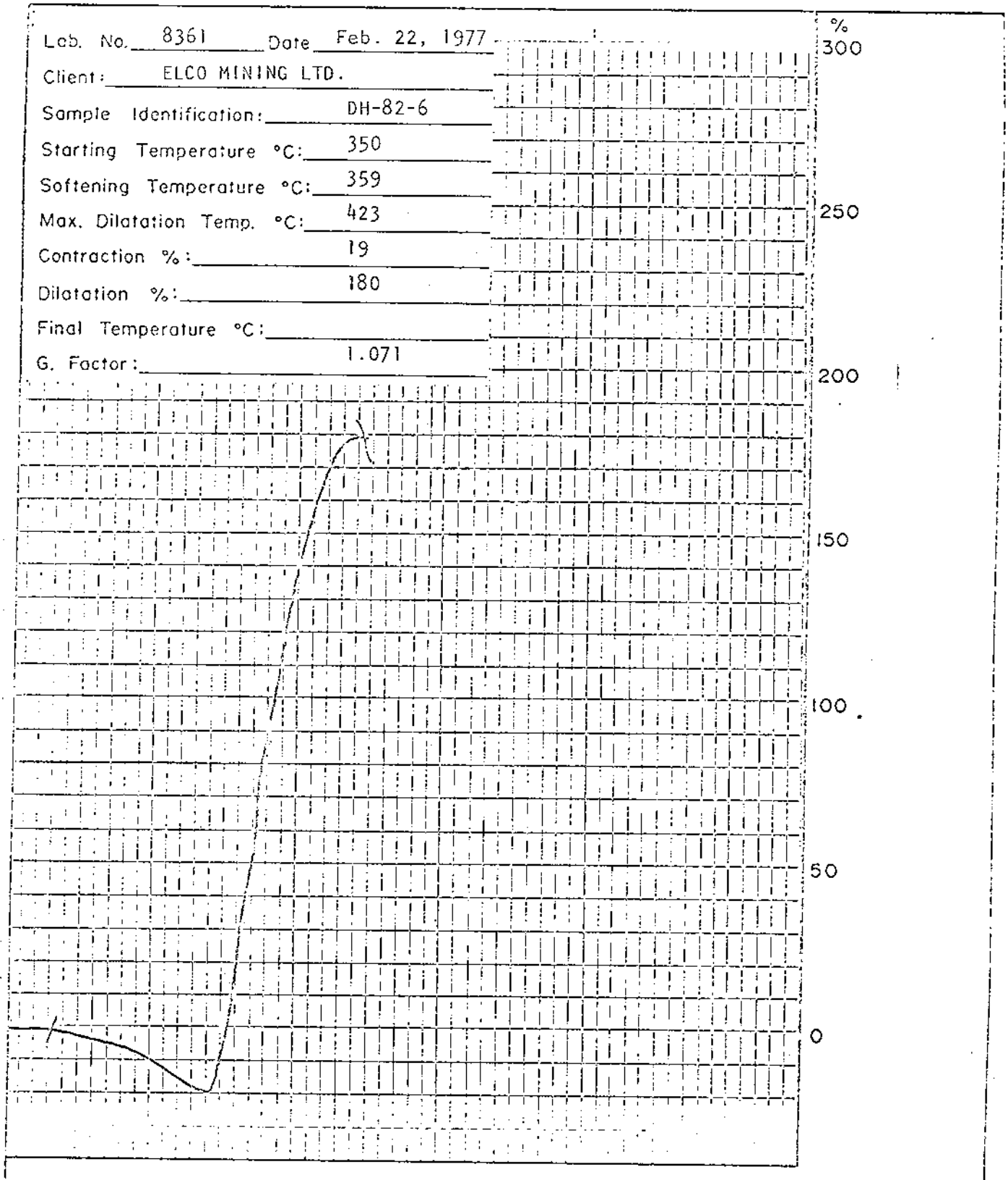
Max. Dilatation Temp. °C: 423

Contraction %: 19

Dilatation %: 180

Final Temperature °C:

G. Factor: 1.071



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 7 LAB. NO. 8362 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
0.7	68.1	17.3	13.9	0.36	54	Air Dried Basis
	68.6	17.4	14.0	0.36	--	Dry Basis

SIZE/RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	85.7	1.1	71.9	0.35	85.7	71.9	0.35	A.D.B.
	85.7		72.7	0.35	85.7	72.7	0.35	D.B.
65M x 0	14.3	1.2	41.0	0.56	100.0	67.5	0.38	A.D.B.
	14.3		41.5	0.57	100.0	68.2	0.38	D.B.

SINK-FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	15.6	2.3	3.5	34.6	59.6	0.71	15.6	3.5	A.D.B.
	15.4		3.6	35.4	61.0	0.73	15.4	3.6	D.B.
1.40-1.50	0.9	2.2	14.3	33.7	49.8	0.75	16.5	4.1	A.D.B.
	0.9		14.6	34.5	50.9	0.77	16.3	4.2	D.B.
1.50-1.60	0.5	2.5	22.2				17.0	4.6	A.D.B.
	0.5		22.8				16.8	4.8	D.B.
+1.60	83.0	0.9	85.1				100.0	71.4	A.D.B.
	83.2		85.9				100.0	72.3	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
7 1/2	.02	362	422	24	187	1.063

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8362 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-7

Starting Temperature °C: 350

Softening Temperature °C: 362

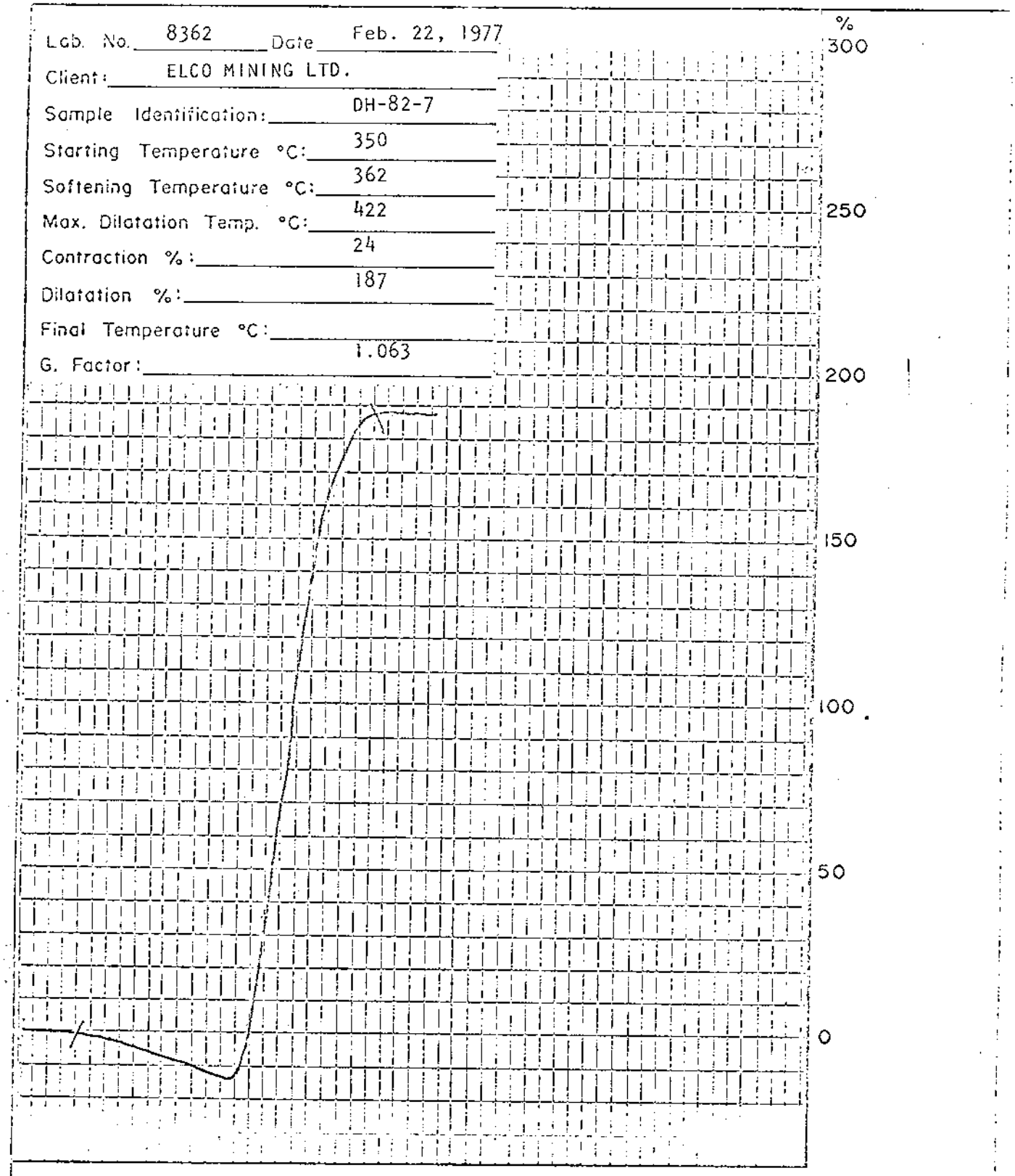
Max. Dilatation Temp. °C: 422

Contraction %: 24

Dilatation %: 187

Final Temperature °C:

G. Factor: 1.063



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 8 LAB. NO. 8363 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.1	16.0	31.1	51.8	0.86	115	Air Dried Basis
	16.2	31.4	52.4	0.87	---	Dry Basis

SIZE / RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	82.1	2.2	16.2	0.87	82.1	16.2	0.87	A.D.B.
	82.0		16.6	0.89	82.0	16.6	0.89	D.B.
65M x 0	17.9	1.3	13.8	0.85	100.0	15.8	0.87	A.D.B.
	18.0		14.0	0.85	100.0	16.1	0.88	D.B.

SINK - FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	77.4	2.3	5.4	32.3	60.0	0.86	77.4	5.4	A.D.B.
	77.3		5.5	33.1	61.4	0.88	77.3	5.5	D.B.
1.40-1.50	3.8	1.8	21.6	28.0	48.6	0.70	81.2	6.2	A.D.B.
	3.8		22.0	28.5	49.5	0.71	81.1	6.3	D.B.
1.50-1.60	3.8	3.3	24.6				85.0	7.0	A.D.B.
	3.7		25.4				84.8	7.1	D.B.
+1.60	15.0	1.6	64.8				100.0	15.7	A.D.B.
	15.2		65.9				100.0	16.0	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
7 1/2	.16	362	416	20	132	1.054

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8363 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-8

Starting Temperature °C: 350

Softening Temperature °C: 362

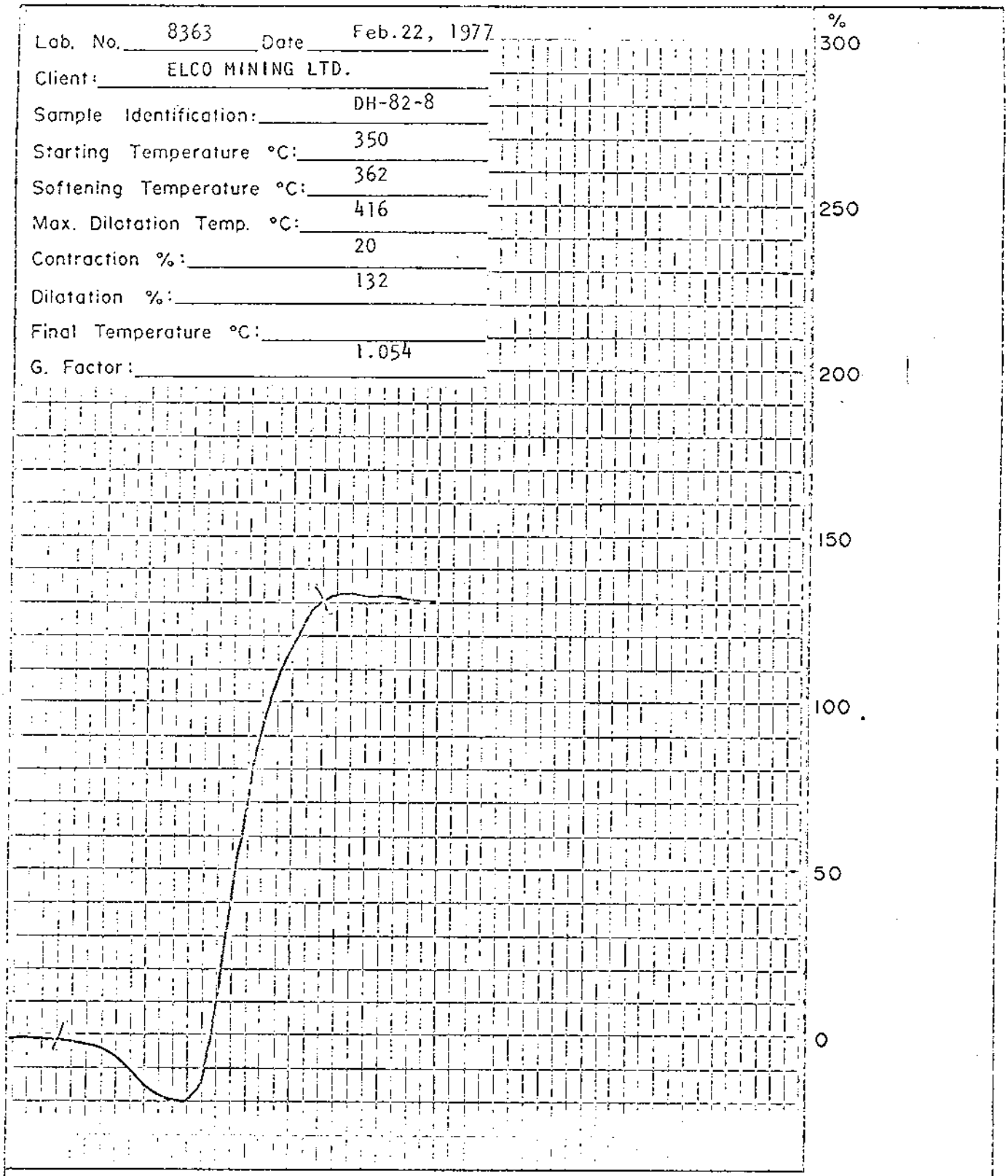
Max. Dilatation Temp. °C: 416

Contraction %: 20

Dilatation %: 132

Final Temperature °C:

G. Factor: 1.054



BIRTLEY ENGINEERING (CANADA) LTD.

Title	Date
RUHR DILATOMETER TEST	
	Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 9 LAB. NO. 8364 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
0.7	20.0	28.3	51.0	0.92	55	Air Dried Basis
	20.1	28.5	51.4	0.93	--	Dry Basis

SIZE / RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	92.4	1.0	20.2	0.94	92.4	20.2	0.94	A.D.B.
	92.4		20.4	0.95	92.4	20.4	0.95	D.B.
65M x 0	7.6	1.0	16.6	0.96	100.0	19.9	0.94	A.D.B.
	7.6		16.8	0.97	100.0	20.1	0.95	D.B.

SINK - FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	60.8	0.9	6.9	32.1	60.1	1.02	60.8	6.9	A.D.B.
	60.8		7.0	32.4	60.6	1.03	60.8	7.0	D.B.
1.40-1.50	9.2	0.9	20.0	27.8	51.3	1.11	70.0	8.6	A.D.B.
	9.2		20.2	28.1	51.7	1.12	70.0	8.7	D.B.
1.50-1.60	5.9	0.9	32.0				75.9	10.4	A.D.B.
	5.9		32.3				75.9	10.6	D.B.
+1.60	24.1	1.2	47.6				100.0	19.4	A.D.B.
	24.1		48.2				100.0	19.6	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
5 1/2	.18	371	434	15	204	1.072

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8364 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-9

Starting Temperature °C: 350

Softening Temperature °C: 371

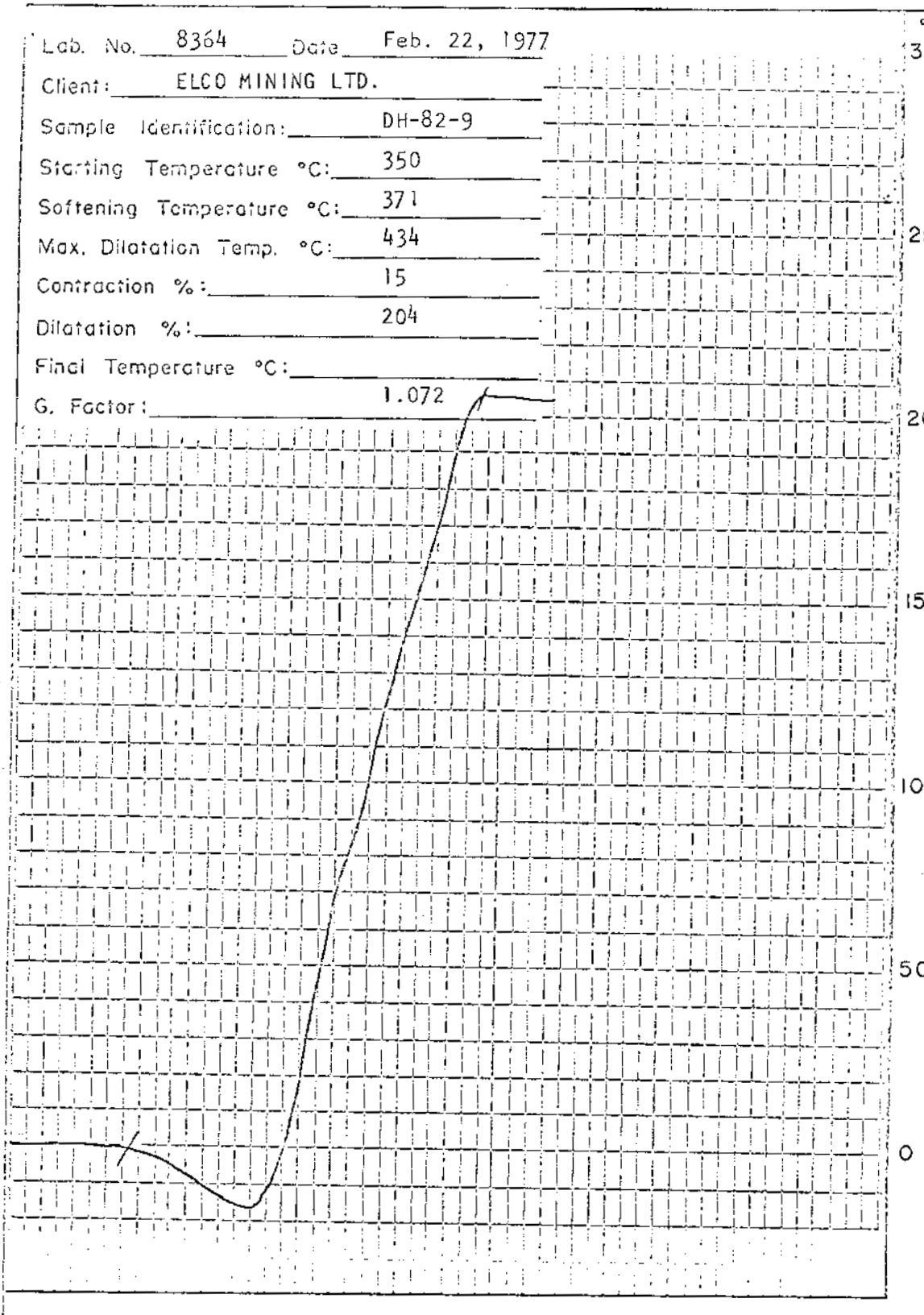
Max. Dilatation Temp. °C: 434

Contraction %: 15

Dilatation %: 204

Final Temperature °C:

G. Factor: 1.072



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 10 LAB. NO. 8365 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.0	3.8	31.7	63.5	0.71	80	Air Dried Basis
	3.8	32.0	64.2	0.72	--	Dry Basis

SIZE/RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	90.5	1.3	3.5	0.73	90.5	3.5	0.73	A.D.B.
	90.5		3.5	0.74	90.5	3.5	0.74	D.B.
65M x 0	9.5	1.2	4.2	0.71	100.0	3.6	0.73	A.D.B.
	9.5		4.3	0.72	100.0	3.6	0.74	D.B.

SINK-FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	96.6	1.3	2.7	31.9	64.1	0.73	96.6	2.7	A.D.B.
	96.6		2.7	32.3	65.0	0.74	96.6	2.7	D.B.
1.40-1.50	1.5	1.0	18.4	25.6	55.0	0.71	98.1	2.9	A.D.B.
	1.5		18.6	25.9	55.5	0.72	98.1	2.9	D.B.
1.50-1.60	1.0	1.1	23.0				99.1	3.1	A.D.B.
	1.0		23.3				99.1	3.1	D.B.
+1.60	0.9	1.2	46.5				100.0	3.5	A.D.B.
	0.9		47.1				100.0	3.5	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
8 1/2	.01	371	425	20	117	1.050

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8365 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-10

Starting Temperature °C: 350

Softening Temperature °C: 371

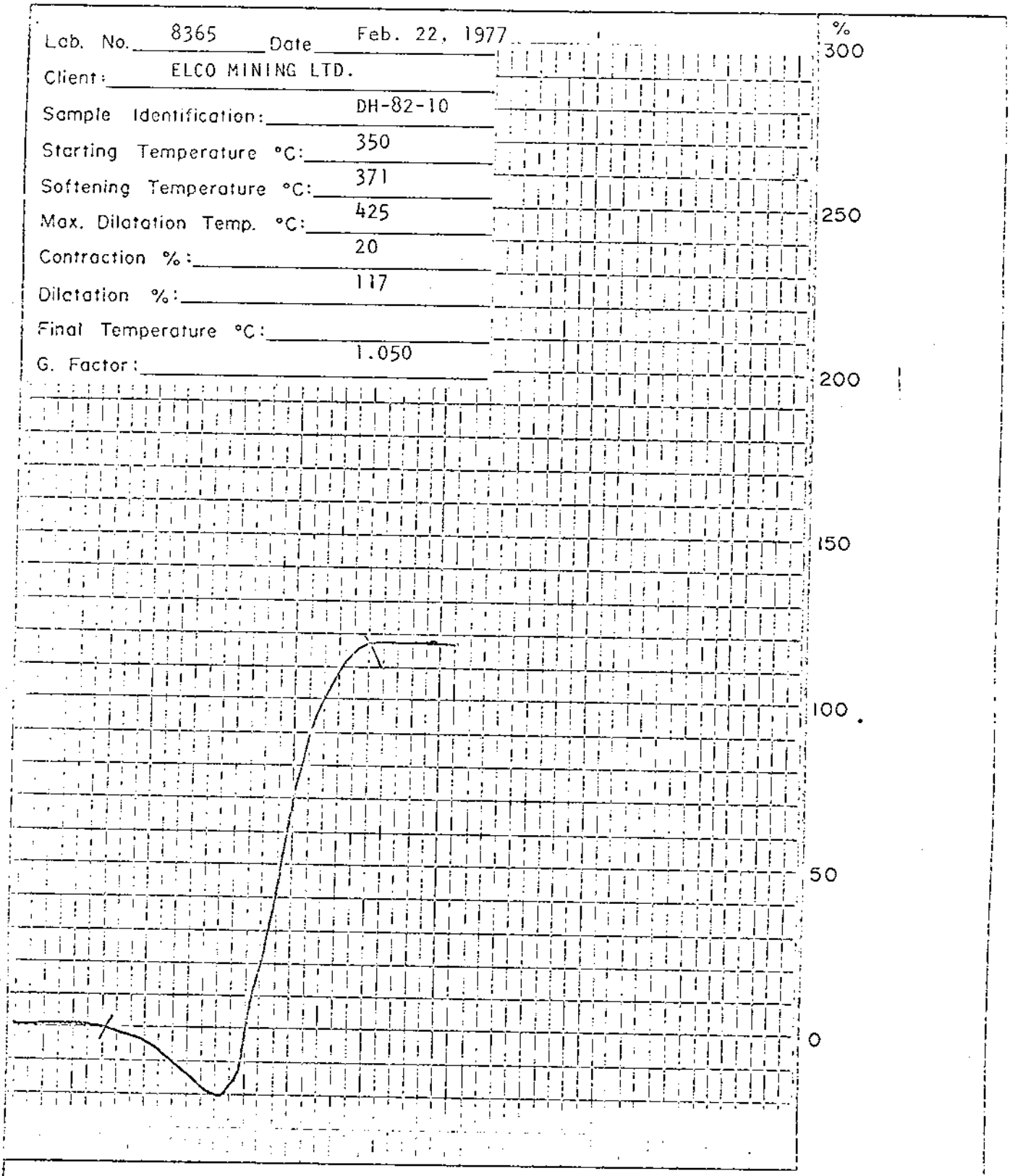
Max. Dilatation Temp. °C: 425

Contraction %: 20

Dilatation %: 117

Final Temperature °C:

G. Factor: 1.050



BINTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 11 LAB. NO. 8366 DATE: FEB./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.3	12.8	28.8	57.1	0.48	109	Air Dried Basis
	13.0	29.2	57.8	0.49	---	Dry Basis

SIZE/RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	85.1	2.1	12.8	0.50	85.1	12.8	0.50	A.D.B.
	84.9		13.1	0.51	84.9	13.1	0.51	D.B.
65M x 0	14.9	1.2	12.2	0.41	100.0	12.7	0.49	A.D.B.
	15.1		12.3	0.41	100.0	13.0	0.49	D.B.

SINK-FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	82.4	2.1	2.5	31.1	64.3	0.51	82.4	2.5	A.D.B.
	82.4		2.6	31.8	65.6	0.52	82.4	2.6	D.B.
1.40-1.50	1.9	1.3	16.3	25.4	57.0	0.45	84.3	2.8	A.D.B.
	1.9		16.5	25.7	57.8	0.46	84.3	2.9	D.B.
1.50-1.60	2.1	1.4	27.1				86.4	3.4	A.D.B.
	2.1		27.5				86.4	3.5	D.B.
+1.60	13.6	2.6	69.1				100.0	12.3	A.D.B.
	13.6		70.9				100.0	12.7	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
8 1/2	.03	368	425	21	90	1.047

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8366 Date Feb. 22, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-11

Starting Temperature °C: 350

Softening Temperature °C: 368

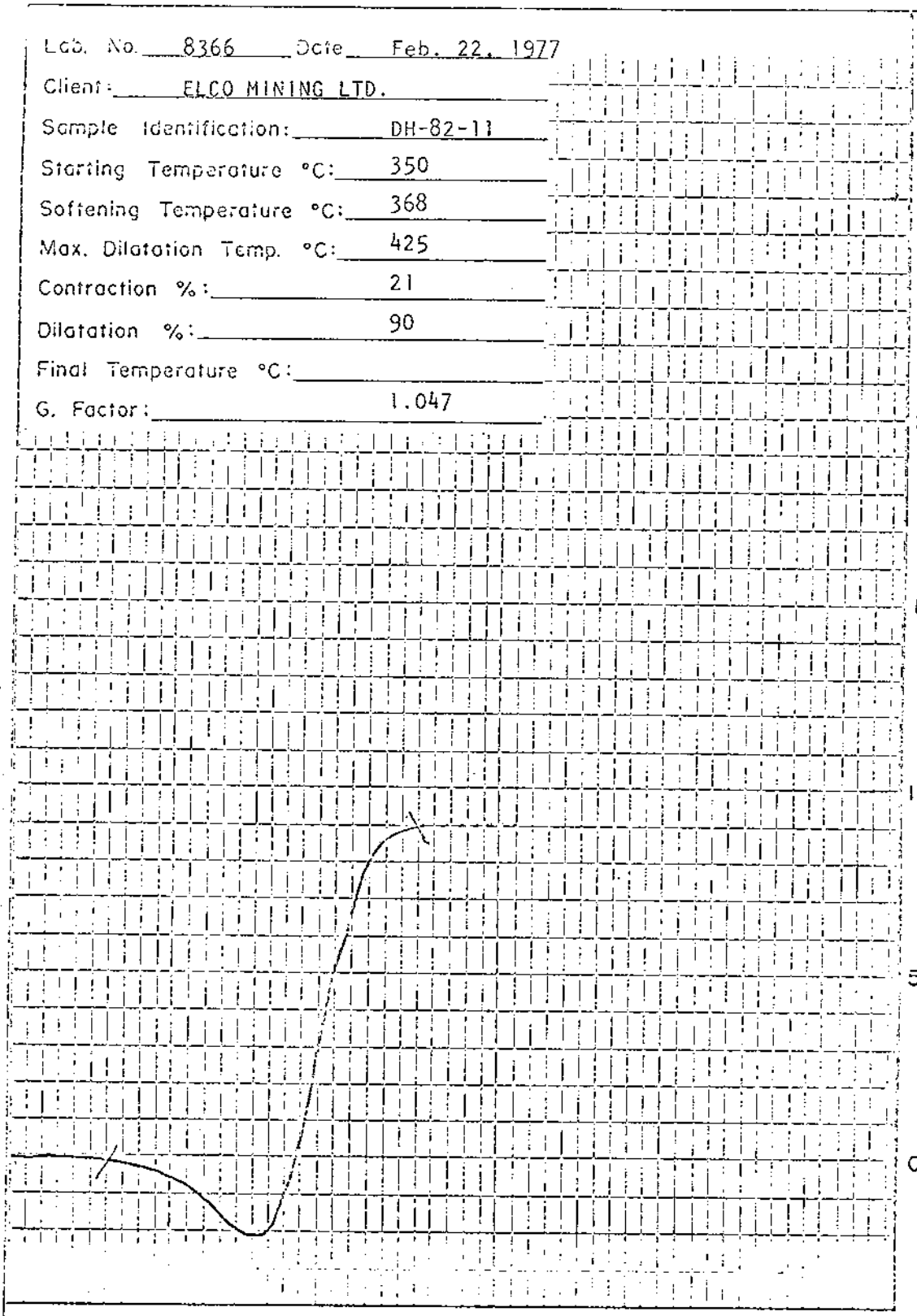
Max. Dilatation Temp. °C: 425

Contraction %: 21

Dilatation %: 90

Final Temperature °C:

G. Factor: 1.047



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn

ELCO MINING LTD.

CORE SAMPLE ANALYSIS

HOLE NO.: DH - 82 - 12 Lab. No. 8367 DATE: Feb./77

HEAD RAW ANALYSIS						
R.M. %	ASH %	V.M. %	F.C. %	S. %	H.G.I.	REMARKS
1.1	39.1	21.1	38.7	1.17	74	Air Dried Basis
	39.5	21.3	39.2	1.18	--	Dry Basis

SIZE / RAW ANALYSES								
SIZE FRACTION	WT. %	R.M. %	ASH %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	CUMULATIVE S. %	
1/4" x 65M	90.0	0.8	39.8	1.18	90.0	39.8	1.18	A.D.B.
	90.0		40.1	1.19	90.0	40.1	1.19	D.B.
65M x 0	10.0	1.2	36.4	1.30	100.0	39.5	1.19	A.D.B.
	10.0		36.8	1.32	100.0	39.8	1.20	D.B.

SINK - FLOAT ANALYSIS: 1/4" x 65M									
S. G.	WT. %	R.M. %	ASH %	V.M. %	F.C. %	S. %	CUMULATIVE WT. %	CUMULATIVE ASH %	
-1.40	43.5	0.7	4.0	29.9	65.4	1.26	43.5	4.0	A.D.B.
	43.5		4.0	30.1	65.9	1.27	43.5	4.0	D.B.
1.40-1.50	5.6	0.7	20.8	24.7	53.8	1.08	49.1	5.9	A.D.B.
	5.7		20.9	24.9	54.2	1.09	49.2	6.0	D.B.
1.50-1.60	4.7	0.8	29.8				53.8	8.0	A.D.B.
	4.7		30.0				53.9	8.1	D.B.
+1.60	46.2	1.0	76.9				100.0	39.8	A.D.B.
	46.1		77.7				100.0	40.2	D.B.

COMPOSITE 1/4" x 65M FLOATS @ 1.50 S.G., A.D.B.						
F.S.I.	P% ON COAL	DILATATION TEST				
		SOFTENING TEMP. (°C)	MAX. DIL. TEMP. (°C)	MAXIMUM CONTR. %	MAXIMUM DIL. %	G. NO.
8 1/2	.04	371	441	20	226	1.078

Birtley Engineering

Subsidiary of Great West Steel Industries

Lab. No. 8367 Date Feb. 23, 1977

Client: ELCO MINING LTD.

Sample Identification: DH-82-12

Starting Temperature °C: 350

Softening Temperature °C: 371

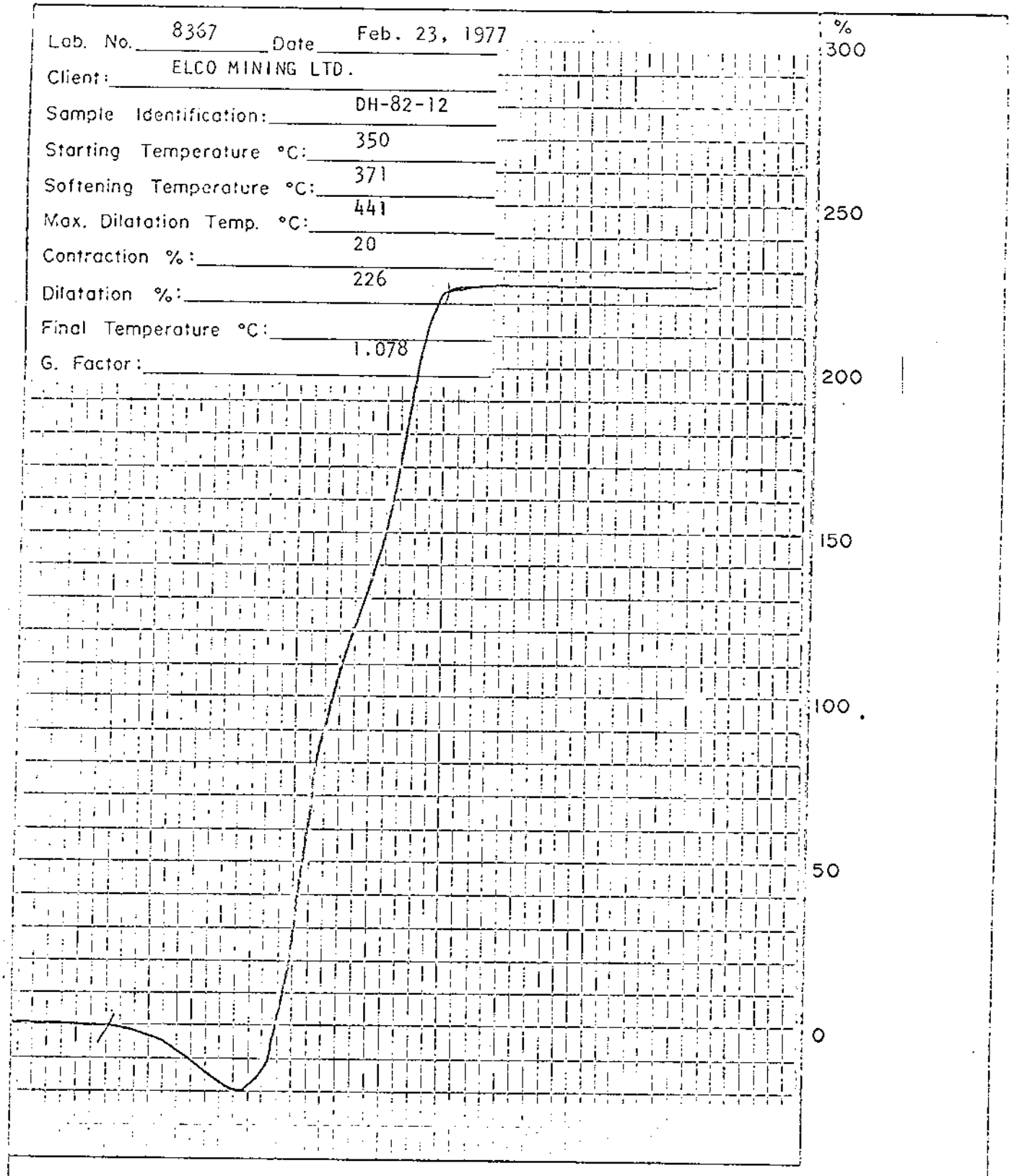
Max. Dilatation Temp. °C: 441

Contraction %: 20

Dilatation %: 226

Final Temperature °C:

G. Factor: 1.078



BIRTLEY ENGINEERING (CANADA) LTD.

Title

RUHR DILATOMETER TEST

Date

Drawn