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MOAGEM NÃO LINEAR EM MOINHO DE BARRAS

VALIDAÇÃO DE UM MÉTODO GLOBAL DE DETERMINAÇÃO DOS PARÂMETROS CINÉTICOS

VOLUME DE ANEXOS

1984

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PUBLICAÇÃO SUBSIDIADA PELO
INSTITUTO NACIONAL DE INVESTIGAÇÃO CIENTÍFICA N. N.º 2199

ANEXO I

AMOSTRA A 111

. XISTO GRAFITOSO DE NISA

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS FINAS (25 MM)

. ENCHIMENTO ALTO (40 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA A111✓ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	963	30.093	69.906	30.093
8	8.000	989	30.906	39.000	61.000
3	3.000	755	23.593	15.406	84.593
12	1.697	247	7.718	7.687	92.312
16	1.200	160	5.000	2.687	97.312
20	.848	86	2.687	.000	100.000

3200

ANALISE GRANULOMETRICA

AMOSTRA A111✓ 1 T= 40

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	273	8.531	91.468	8.531
3	3.000	194	6.062	85.406	14.593
12	1.697	144	4.500	80.906	19.093
16	1.200	179	5.593	75.312	24.687
20	.848	204	6.375	68.937	31.062
30	.600	192	6.000	62.937	37.062
40	.424	220	6.875	56.062	43.937
50	.300	148	4.625	51.437	48.562
70	.212	159	4.968	46.468	53.531
100	.150	112	3.500	42.968	57.031
140	.125	78	2.437	40.531	59.468
200	.084	94	2.937	37.593	62.406

ANALISE GRANULOMETRICA

AMOSTRA A111✓ 2 T= 60

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	107	3.343	96.656	3.343
3	3.000	60	1.875	94.781	5.218
12	1.697	50	1.562	93.218	6.781
16	1.200	92	2.875	90.343	9.656
20	.848	160	5.000	85.343	14.656
30	.600	205	6.406	78.937	21.062
40	.424	278	8.687	70.250	29.750
50	.300	195	6.093	64.156	35.843
70	.212	208	6.500	57.656	42.343
100	.150	144	4.500	53.156	46.843
140	.125	107	3.343	49.812	50.187
200	.084	126	3.937	45.875	54.125

ANALISE GRANULOMETRICA

AMOSTRA A111/ 3 T= 80

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	47	1.468	98.531	1.468
3	3.000	8	.250	98.281	1.718
12	1.697	8	.250	98.031	1.968
16	1.200	23	.718	97.312	2.687
20	.848	71	2.218	95.093	4.906
30	.600	144	4.500	90.593	9.406
40	.424	276	8.625	81.968	18.031
50	.300	220	6.875	75.093	24.906
70	.212	248	7.750	67.343	32.656
100	.150	168	5.250	62.093	37.906
140	.125	123	3.843	58.250	41.750
200	.084	156	4.875	53.375	46.625

ANALISE GRANULOMETRICA

AMOSTRA A111/ 4 T= 80

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	61	1.906	98.093	1.906
3	3.000	20	.625	97.468	2.531
12	1.697	14	.437	97.031	2.968
16	1.200	36	1.125	95.906	4.093
20	.848	98	3.062	92.843	7.156
30	.600	167	5.218	87.625	12.375
40	.424	278	8.687	78.937	21.062
50	.300	191	5.968	72.968	27.031
70	.212	225	7.031	65.937	34.062
100	.150	165	5.156	60.781	39.218
140	.125	100	3.125	57.656	42.343
200	.084	151	4.718	52.937	47.062

ANALISE GRANULOMETRICA

AMOSTRA A111/ 5 T= 100

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	30	.937	99.062	.937
3	3.000	3	.093	98.968	1.031
12	1.697	2	.062	98.906	1.093
16	1.200	7	.218	98.687	1.312
20	.848	20	.625	98.062	1.937
30	.600	67	2.093	95.968	4.031
40	.424	206	6.437	89.531	10.468
50	.300	209	6.531	83.000	17.000
70	.212	279	8.718	74.281	25.718
100	.150	203	6.343	67.937	32.062
140	.125	145	4.531	63.406	36.593
200	.084	133	4.156	59.250	40.750

ANALISE GRANULOMETRICA

AMOSTRA A111/ 6 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	10	.312	99.687	.312
3	3.000	2	.062	99.625	.375
12	1.697	2	.062	99.562	.437
16	1.200	3	.093	99.468	.531
20	.848	9	.281	99.187	.812
30	.600	36	1.125	98.062	1.937
40	.424	146	4.562	93.500	6.500
50	.300	176	5.500	88.000	12.000
70	.212	273	8.531	79.468	20.531
100	.150	220	6.875	72.593	27.406
140	.125	106	3.312	69.281	30.718
200	.084	247	7.718	61.562	38.437

ANALISE GRANULOMETRICA

AMOSTRA A111/ 7 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	17	.531	99.468	.531
3	3.000	5	.156	99.312	.687
12	1.697	3	.093	99.218	.781
16	1.200	3	.093	99.125	.875
20	.848	13	.406	98.718	1.281
30	.600	47	1.468	97.250	2.750
40	.424	169	5.281	91.968	8.031
50	.300	187	5.843	86.125	13.875
70	.212	288	9.000	77.125	22.875
100	.150	195	6.093	71.031	28.968
140	.125	141	4.406	66.625	33.375
200	.084	210	6.562	60.062	39.937

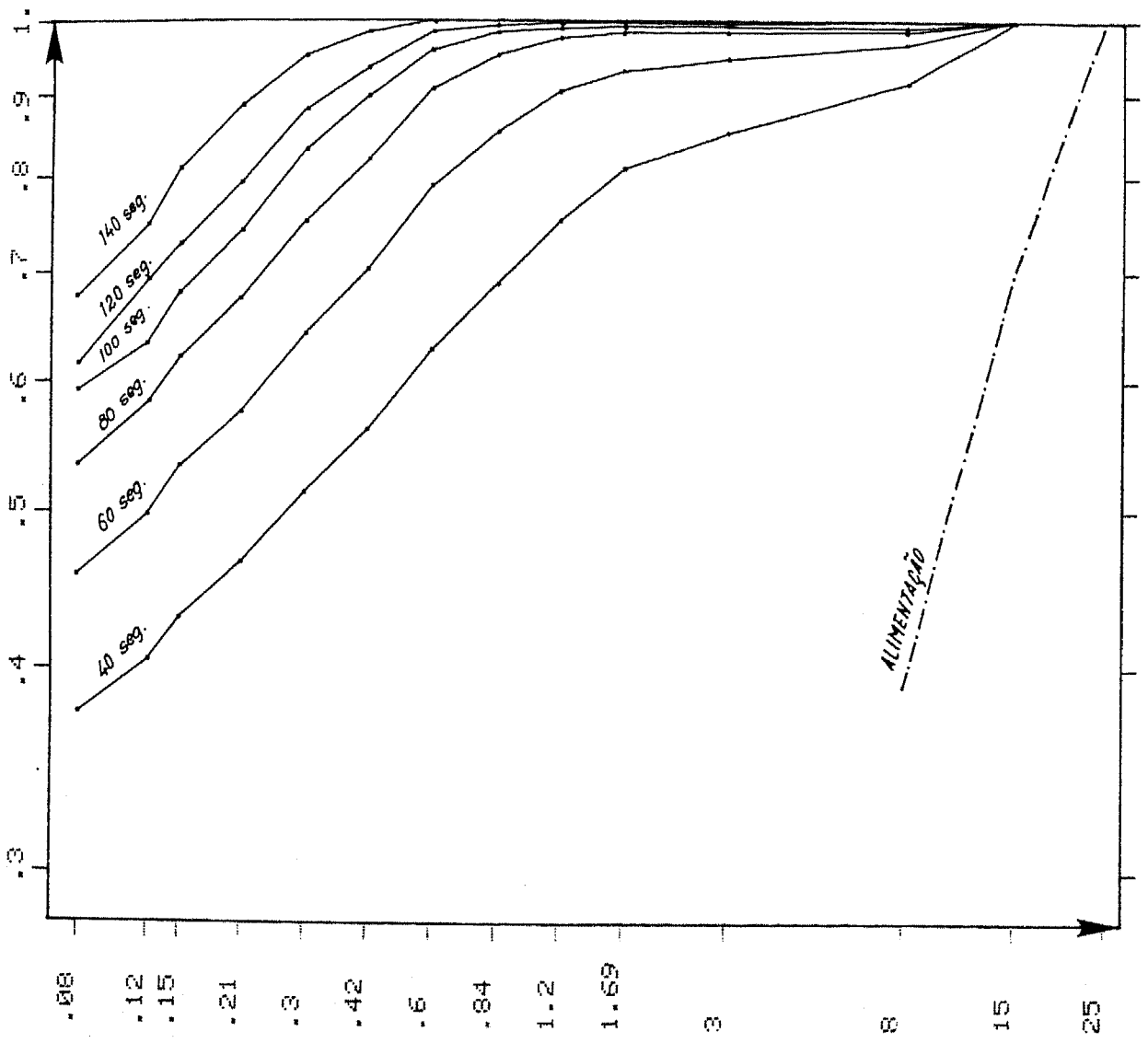
ANALISE GRANULOMETRICA

AMOSTRA A111/ 8 T= 140

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.697	0	.000	100.000	.000
16	1.200	1	.031	99.968	.031
20	.848	2	.062	99.906	.093
30	.600	6	.187	99.718	.281
40	.424	43	1.343	98.375	1.625
50	.300	102	3.187	95.187	4.812
70	.212	220	6.875	88.312	11.687
100	.150	234	7.312	81.000	19.000
140	.125	196	6.125	74.875	25.125
200	.084	232	7.250	67.625	32.375

CUMULATIVOS INFERIORES

AMOSTRA A111/ N



ENSAIO A111/N

RESULTADOS DO MODELO

A	K	W	G	TØ
.208	.796	.482	2.265	18.542

FE= 0
JØ= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	40.000	60.000	80.000	100.000	120.000	140.000
8	97.721	99.858	99.990	99.999	99.999	99.999
3	89.857	97.954	99.547	99.897	99.976	99.994
1.68	81.434	93.659	97.476	98.912	99.510	99.774
1.19	74.313	88.958	94.564	97.140	98.439	99.129
.841	67.532	83.681	90.791	94.510	96.625	97.885
.595	62.039	78.663	86.733	91.348	94.201	96.042
.42	56.276	72.903	81.669	87.072	90.658	93.136
.297	50.545	66.756	75.902	81.893	86.100	89.172
.21	44.996	60.461	69.683	76.028	80.691	84.247
.149	39.807	54.298	63.340	69.810	74.739	78.629
.125	37.293	51.225	60.093	66.547	71.542	75.542
.084	32.000	44.580	52.901	59.159	64.149	68.258

MATRIZ [S]

.208 .133 .073 .037 .025 .019 .014 .011 .008 .006 .004 .003

MATRIZ [B]

.047
.199 .109
.132 .126 .040
.073 .079 .057 .014
.068 .077 .072 .043 .014
.062 .073 .078 .063 .043 .014
.056 .067 .080 .075 .064 .043 .014
.049 .061 .077 .079 .075 .063 .043 .014
.043 .054 .072 .079 .079 .075 .063 .043 .014
.037 .047 .065 .075 .078 .078 .074 .062 .042 .014
.017 .022 .031 .036 .039 .040 .040 .037 .030 .018
.034 .045 .064 .077 .083 .088 .091 .089 .081 .064 .036 .019

ENSAIO A111/N

RESULTADOS DO MODELO

A	K	W	G	T0
.090	.268	.266	.924	10.752

PE= 2.197
J0= 6

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS -->	40.000	60.000	80.000	100.000	120.000	140.000
8	93.488	98.601	99.700	99.936	99.986	99.997
3	85.260	95.641	98.726	99.631	99.893	99.969
1.68	78.875	92.388	97.267	99.020	99.648	99.873
1.19	74.293	89.708	95.877	98.345	99.334	99.731
.841	69.999	86.851	94.225	97.457	98.878	99.504
.595	63.463	78.750	88.631	94.463	97.351	98.736
.42	57.590	71.442	80.578	88.840	94.143	96.992
.297	52.329	64.901	73.173	80.678	87.794	93.051
.21	47.573	58.993	66.496	73.287	79.808	86.591
.149	43.309	53.697	60.516	66.679	72.586	79.161
.125	41.282	51.181	57.676	63.543	69.162	75.408
.084	37.047	45.926	51.746	56.999	62.024	67.599

MATRIZ [S]

.090 .077 .063 .050 .044 .040 .037 .033 .030 .028 .025 .023 .022

MATRIZ [B]

.177
.200 .257
.092 .112 .165
.047 .057 .079 .105
.043 .052 .070 .087 .106
.039 .047 .063 .076 .086 .105
.036 .043 .057 .068 .076 .087 .106
.032 .038 .051 .061 .068 .076 .086 .106
.029 .035 .046 .055 .061 .068 .076 .087 .106
.026 .031 .041 .049 .054 .060 .067 .075 .086 .105
.012 .015 .019 .023 .025 .028 .031 .035 .039 .045 .057
.026 .031 .041 .048 .053 .059 .066 .073 .082 .092 .106 .119

AMOSTRA A111

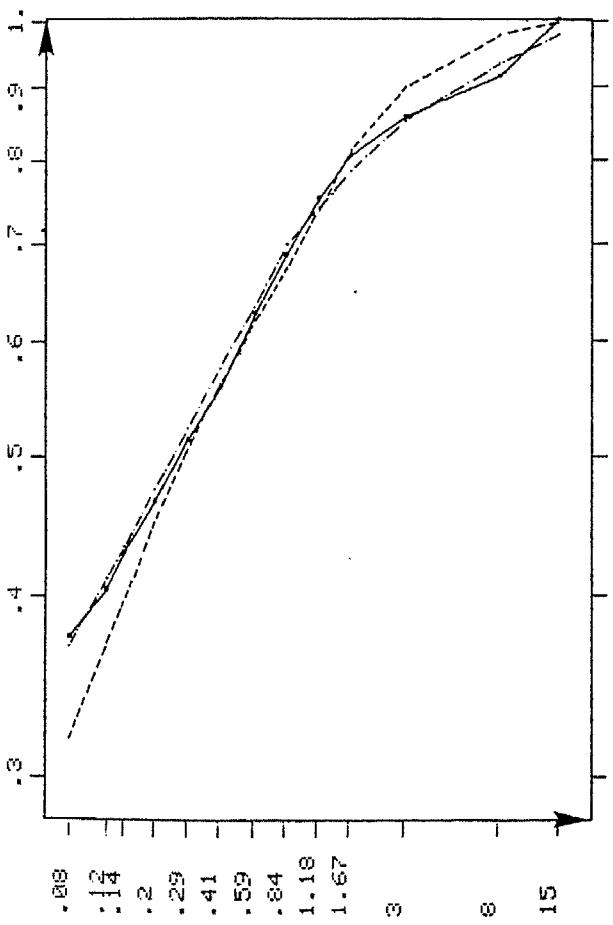
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

	PA	PK	PW	PG	T0	PE	J0
LINEAR	.208	.796	.482	2.265	18.542	.000	0
N LINEAR	.090	.268	.266	.924	10.752	2.197	6

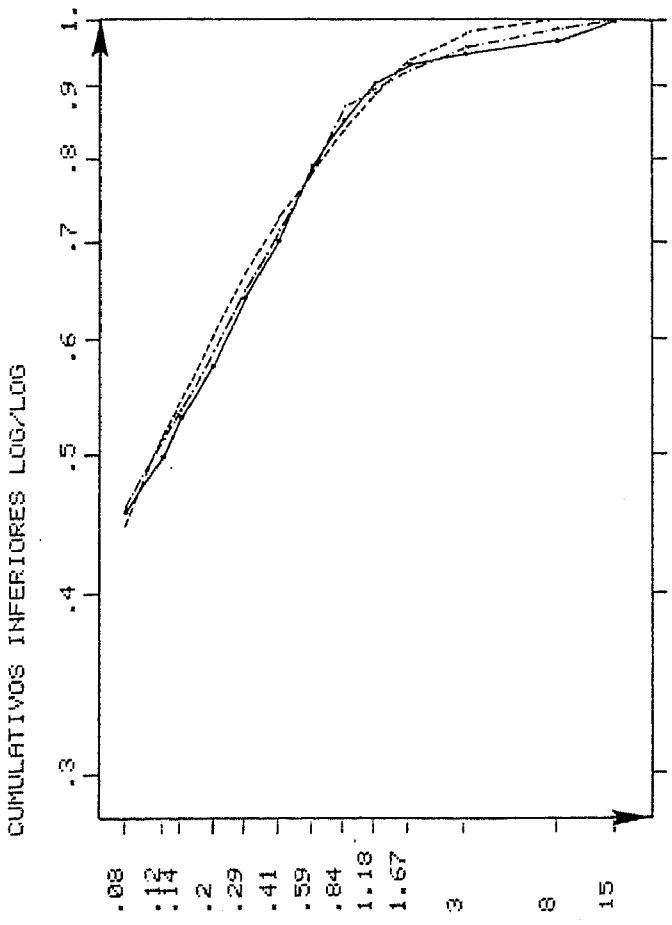
ENSAIO REAL
ENSAIO SIMULADO LINEAR
ENSAIO SIMULADO N LINEAR C/ ESCUDO

TEMPO RESIDENCIA 40



CALIBRE
MM

TEMPO RESIDENCIA 60



CALIBRE
MM

AMOSTRA A111

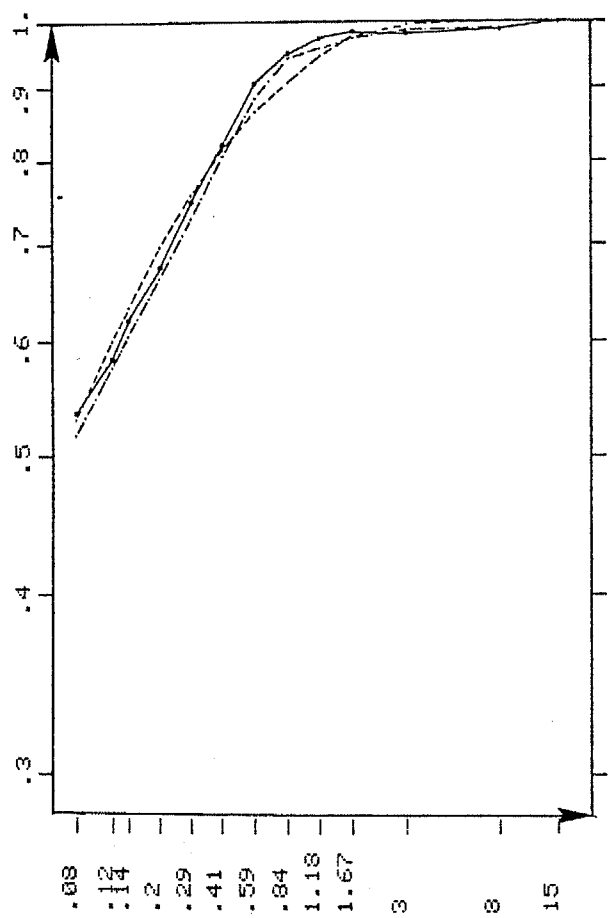
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

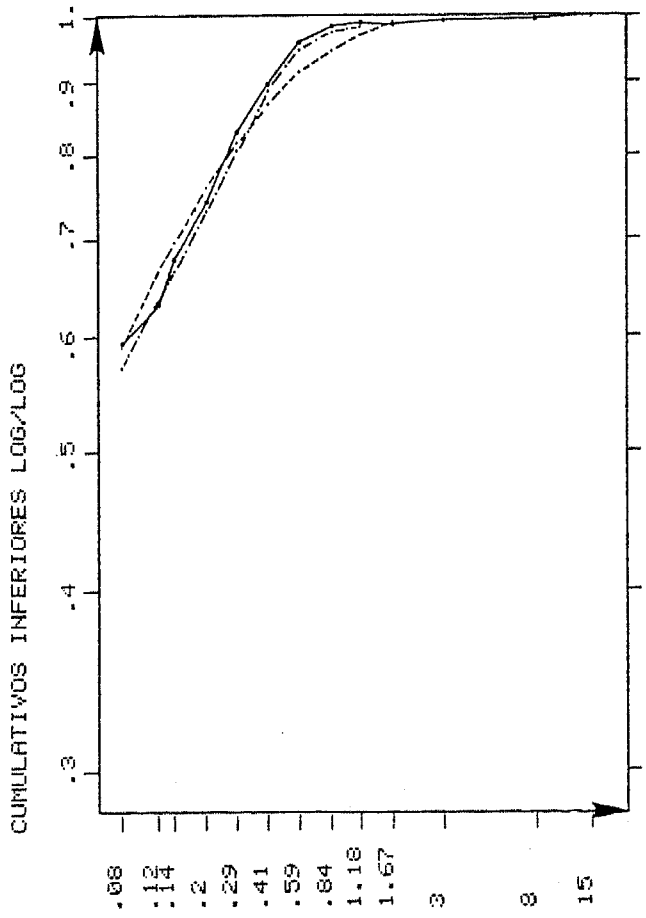
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.208	.796	.482	2.265	18.542	.000	0
N LINEAR	.090	.268	.266	.924	10.752	2.197	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <- - - - ->
ENSAIO SIMULADO N LINEAR C/ ESCUDO <-.-.->

TEMPO RESIDENCIA 80



TEMPO RESIDENCIA 100



AMOSTRA A111

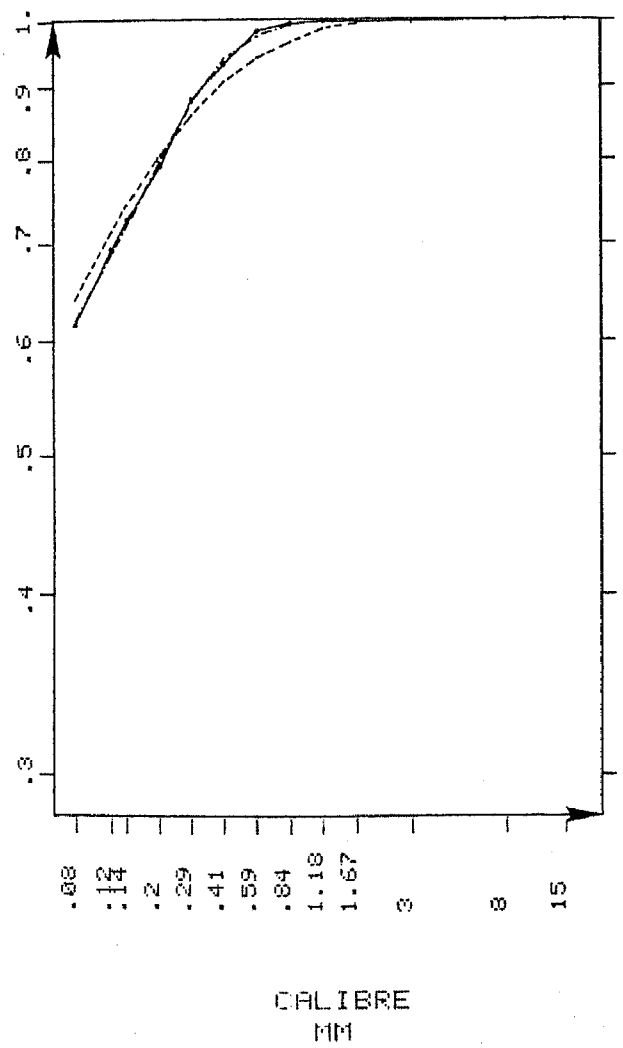
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

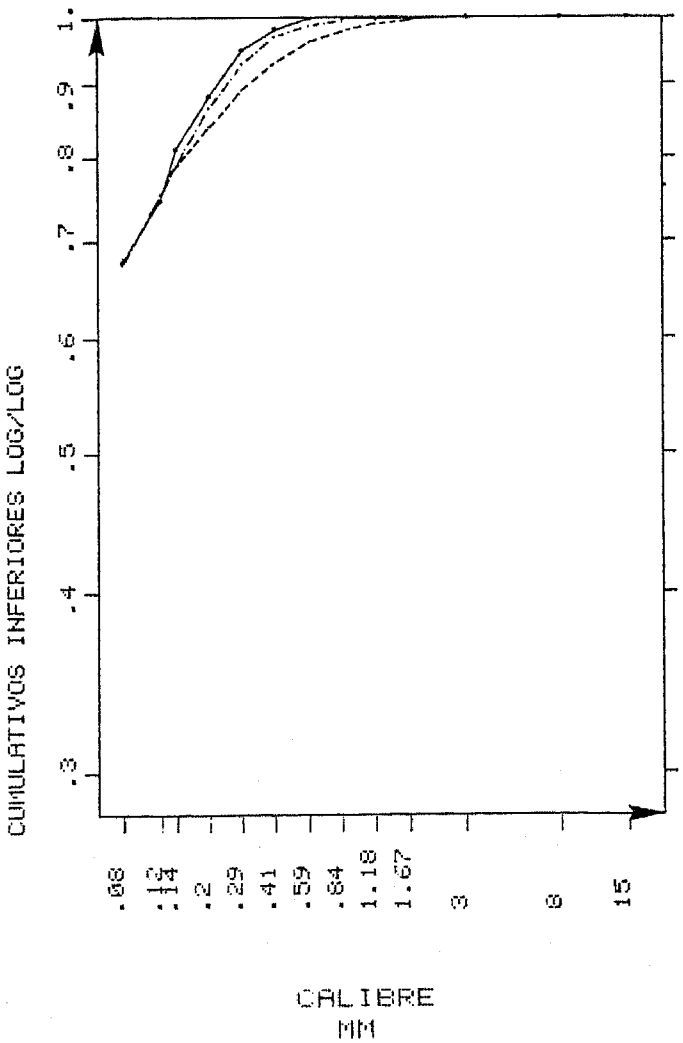
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.208	.796	.482	2.265	18.542	.000	0
N LINEAR	.090	.268	.266	.924	10.752	2.197	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <- - - ->
ENSAIO SIMULADO N LINEAR C/ ESCUDO <-.-.->

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 140



ANEXO II

AMOSTRA A 121

. XISTO GRAFITOSO DE NISA

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS FINAS (25 MM)

. ENCHIMENTO BAIXO (25 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA A112/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	602	30.100	69.900	30.100
8	8.000	618	30.900	39.000	61.000
3	3.000	472	23.600	15.400	84.600
12	1.697	154	7.700	7.700	92.300
16	1.200	100	5.000	2.700	97.300
20	.848	54	2.700	.000	100.000

2000

ANALISE GRANULOMETRICA

AMOSTRA A112/ 1 T= 40

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	254	12.700	87.300	12.700
3	3.000	157	7.850	79.450	20.550
12	1.697	82	4.100	75.350	24.650
16	1.200	89	4.450	70.900	29.100
20	.848	101	5.050	65.850	34.150
30	.600	98	4.900	60.950	39.050
40	.424	120	6.000	54.950	45.050
50	.300	79	3.950	51.000	49.000
70	.212	87	4.350	46.650	53.350
100	.150	71	3.550	43.100	56.900
140	.125	46	2.300	40.800	59.200
200	.084	67	3.350	37.450	62.550

ANALISE GRANULOMETRICA

AMOSTRA A112/ 2 T= 40

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	247	12.350	87.650	12.350
3	3.000	176	8.800	78.850	21.150
12	1.697	68	3.400	75.450	24.550
16	1.200	87	4.350	71.100	28.900
20	.848	96	4.800	66.300	33.700
30	.600	95	4.750	61.550	38.450
40	.424	115	5.750	55.800	44.200
50	.300	75	3.750	52.050	47.950
70	.212	81	4.050	48.000	52.000
100	.150	66	3.300	44.700	55.300
140	.125	37	1.850	42.850	57.150
200	.084	86	4.300	38.550	61.450

ANALISE GRANULOMETRICA

AMOSTRA A112/ 3 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	63	3.150	96.850	3.150
3	3.000	26	1.300	95.550	4.450
12	1.697	21	1.050	94.500	5.500
16	1.200	40	2.000	92.500	7.500
20	.848	75	3.750	88.750	11.250
30	.600	106	5.300	83.450	16.550
40	.424	163	8.150	75.300	24.700
50	.300	109	5.450	69.850	30.150
70	.212	128	6.400	63.450	36.550
100	.150	102	5.100	58.350	41.650
140	.125	66	3.300	55.050	44.950
200	.084	89	4.450	50.600	49.400

ANALISE GRANULOMETRICA

AMOSTRA A112/ 4 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	45	2.250	97.750	2.250
3	3.000	43	2.150	95.600	4.400
12	1.697	29	1.450	94.150	5.850
16	1.200	56	2.800	91.350	8.650
20	.848	96	4.800	86.550	13.450
30	.600	124	6.200	80.350	19.650
40	.424	176	8.800	71.550	28.450
50	.300	111	5.550	66.000	34.000
70	.212	129	6.450	59.550	40.450
100	.150	100	5.000	54.550	45.450
140	.125	62	3.100	51.450	48.550
200	.084	108	5.400	46.050	53.950

ANALISE GRANULOMETRICA

AMOSTRA A112/ 5 T= 80

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	97	4.850	95.150	4.850
3	3.000	18	.900	94.250	5.750
12	1.697	12	.600	93.650	6.350
16	1.200	22	1.100	92.550	7.450
20	.848	43	2.150	90.400	9.600
30	.600	76	3.800	86.600	13.400
40	.424	134	6.700	79.900	20.100
50	.300	96	4.800	75.100	24.900
70	.212	121	6.050	69.050	30.950
100	.150	97	4.850	64.200	35.800
140	.125	65	3.250	60.950	39.050
200	.084	99	4.950	56.000	44.000

ANALISE GRANULOMETRICA

AMOSTRA A112/ 6 T= 80

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	76	3.800	96.200	3.800
3	3.000	19	.950	95.250	4.750
12	1.697	8	.400	94.850	5.150
16	1.200	15	.750	94.100	5.900
20	.848	37	1.850	92.250	7.750
30	.600	71	3.550	88.700	11.300
40	.424	142	7.100	81.600	18.400
50	.300	114	5.700	75.900	24.100
70	.212	137	6.850	69.050	30.950
100	.150	111	5.550	63.500	36.500
140	.125	73	3.650	59.850	40.150
200	.084	108	5.400	54.450	45.550

ANALISE GRANULOMETRICA

AMOSTRA A112/ 7 T= 100

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	49	2.450	97.550	2.450
3	3.000	6	.300	97.250	2.750
12	1.697	4	.200	97.050	2.950
16	1.200	6	.300	96.750	3.250
20	.848	15	.750	96.000	4.000
30	.600	35	1.750	94.250	5.750
40	.424	94	4.700	89.550	10.450
50	.300	96	4.800	84.750	15.250
70	.212	132	6.600	78.150	21.850
100	.150	113	5.650	72.500	27.500
140	.125	71	3.550	68.950	31.050
200	.084	113	5.650	63.300	36.700

ANALISE GRANULOMETRICA

AMOSTRA A112/ 8 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	7	.350	99.650	.350
3	3.000	2	.100	99.550	.450
12	1.697	2	.100	99.450	.550
16	1.200	3	.150	99.300	.700
20	.848	4	.200	99.100	.900
30	.600	14	.700	98.400	1.600
40	.424	57	2.850	95.550	4.450
50	.300	76	3.800	91.750	8.250
70	.212	128	6.400	85.350	14.650
100	.150	120	6.000	79.350	20.650
140	.125	72	3.600	75.750	24.250
200	.084	149	7.450	68.300	31.700

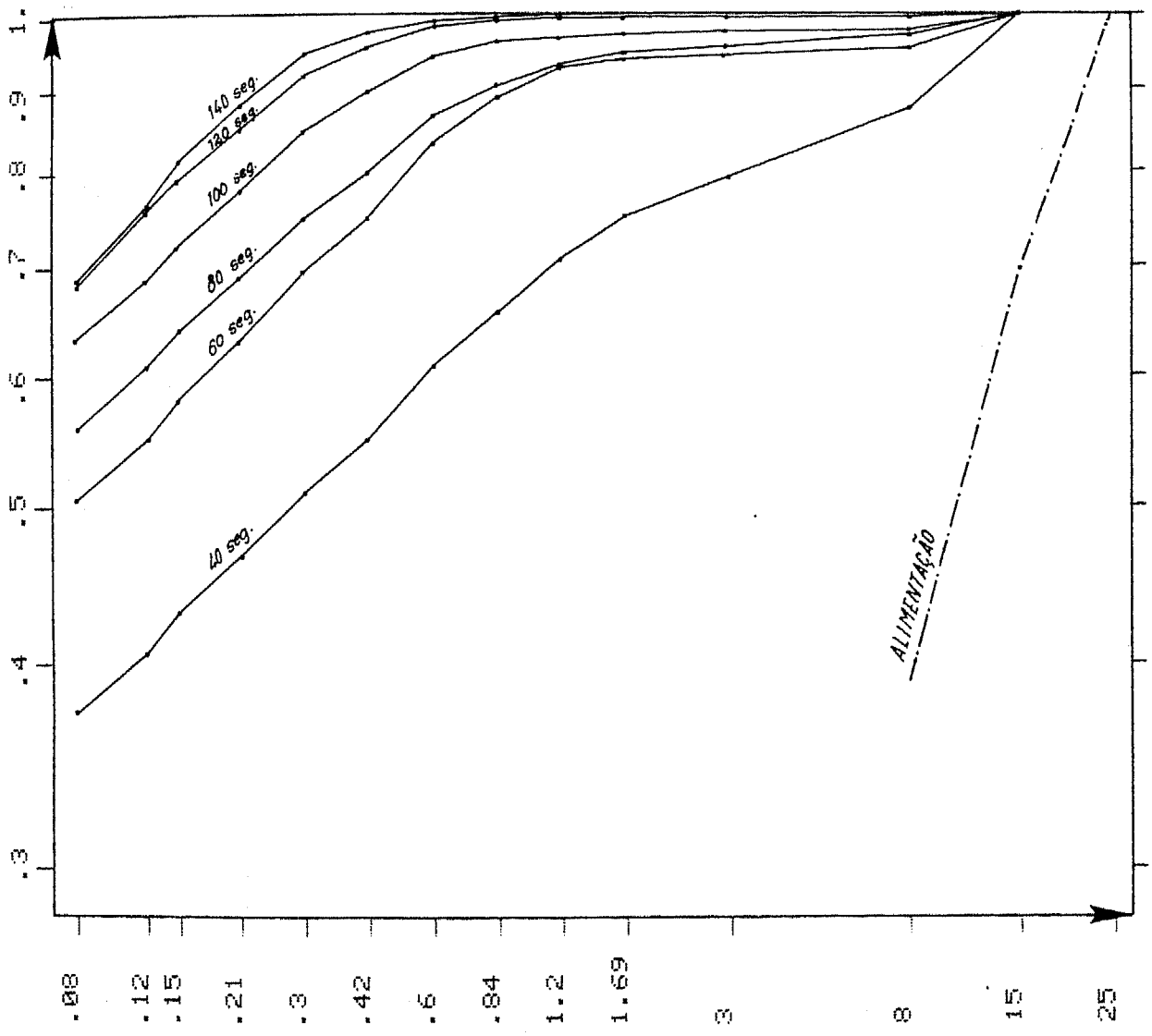
ANALISE GRANULOMETRICA

AMOSTRA A112/ 9 T= 140

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	4	.200	99.800	.200
12	1.697	1	.050	99.750	.250
16	1.200	3	.150	99.600	.400
20	.848	3	.150	99.450	.550
30	.600	6	.300	99.150	.850
40	.424	34	1.700	97.450	2.550
50	.300	60	3.000	94.450	5.550
70	.212	126	6.300	88.150	11.850
100	.150	136	6.800	81.350	18.650
140	.125	100	5.000	76.350	23.650
200	.084	150	7.500	68.850	31.150

CUMULATIVOS INFERIORES

AMOSTRA A112/ N



ENSAIO A112/N

RESULTADOS DO MODELO

A	K	W	G	T0
.101	.644	.744	11.964	16.663

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	40.000	60.000	80.000	100.000	120.000	140.000
8	91.195	98.168	99.595	99.906	99.977	99.994
3	82.386	94.436	98.019	99.242	99.697	99.876
1.68	76.823	90.939	95.888	97.954	98.920	99.408
1.19	71.742	87.215	93.281	96.148	97.673	98.547
.841	66.987	83.317	90.314	93.928	96.021	97.319
.595	63.181	79.787	87.415	91.613	94.188	95.871
.42	58.522	75.219	83.460	88.292	91.423	93.578
.297	53.283	69.823	78.570	84.004	87.705	90.369
.21	47.696	63.806	72.896	78.844	83.074	86.238
.149	42.075	57.504	66.740	73.066	77.735	81.340
.125	39.238	54.231	63.465	69.924	74.774	78.573
.084	33.081	46.922	55.970	62.583	67.723	71.867

MATRIZ [S]

.101 .070 .043 .025 .018 .014 .011 .009 .007 .006 .004 .004

MATRIZ [B]

.013
.060 .010
.066 .025 .000
.085 .047 .002 .000
.096 .070 .011 .000 .000
.099 .088 .028 .004 .000 .000
.094 .097 .051 .016 .004 .000 .000
.085 .098 .074 .036 .016 .004 .000 .000
.074 .092 .089 .058 .035 .015 .004 .000 .000
.033 .043 .049 .038 .027 .015 .006 .001 .000 .000
.065 .089 .113 .102 .082 .056 .030 .011 .002 .000 .000

ENSAIO A112/N

RESULTADOS DO MODELO

A	K	W	G	T0
.084	.309	.337	1.886	16.182

PE= 1.0552
J0= 6

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS ->	40.000	60.000	80.000	100.000	120.000	140.000
8	89.856	97.713	99.477	99.879	99.971	99.993
3	80.748	94.240	98.233	99.448	99.825	99.944
1.68	74.860	91.151	96.777	98.793	99.538	99.820
1.19	70.393	88.507	95.370	98.080	99.185	99.648
.841	66.386	85.785	93.760	97.182	98.700	99.390
.595	61.705	79.996	89.429	94.601	97.237	98.573
.42	56.932	73.974	83.210	90.180	94.500	96.938
.297	52.264	68.029	76.693	83.669	89.618	93.711
.21	47.763	62.263	70.319	76.911	83.211	88.834
.149	43.530	56.814	64.260	70.429	76.438	82.868
.125	41.461	54.142	61.278	67.223	73.050	79.464
.084	37.036	48.417	54.869	60.300	65.686	71.704

MATRIZ [S]

.084 .070 .055 .043 .037 .033 .030 .027 .024 .021 .019 .018 .016

MATRIZ [B]

.044
.149 .091
.099 .093 .038
.058 .059 .045 .015
.056 .059 .053 .036 .015
.053 .057 .058 .048 .036 .015
.050 .055 .060 .055 .048 .036 .015
.046 .052 .059 .058 .055 .048 .036 .015
.042 .049 .057 .059 .058 .055 .048 .036 .015
.039 .045 .054 .058 .059 .058 .055 .048 .035 .015
.018 .021 .026 .029 .030 .030 .029 .027 .023 .016
.039 .046 .057 .063 .066 .068 .068 .066 .060 .050 .033 .019

AMOSTRA A112

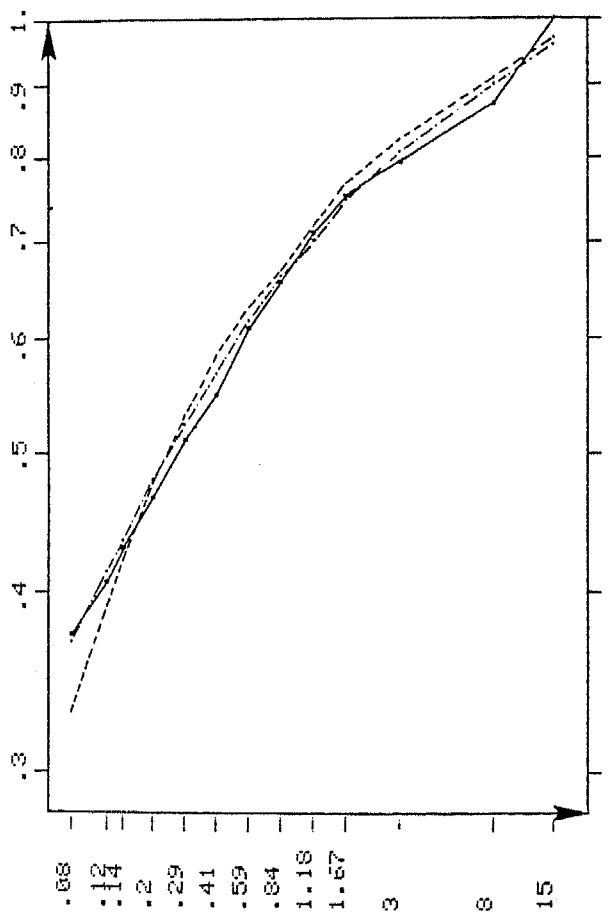
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

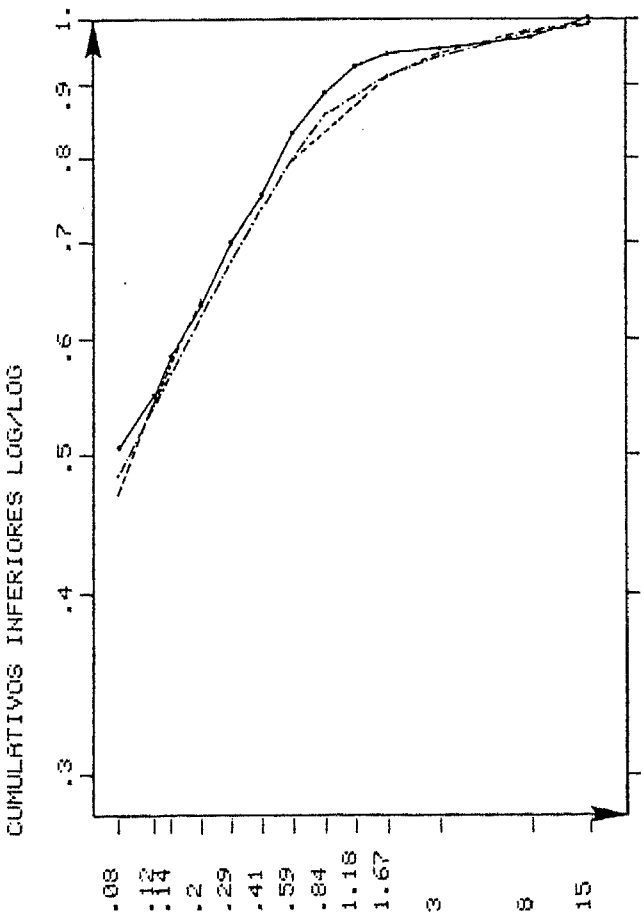
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.101	.644	.744	11.964	16.663	.000	0
N LINEAR	.084	.309	.337	1.886	16.182	1.055	6

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (- - - - -)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (—.—.—)

TEMPO RESIDENCIA 40



TEMPO RESIDENCIA 60



AMOSTRA A112

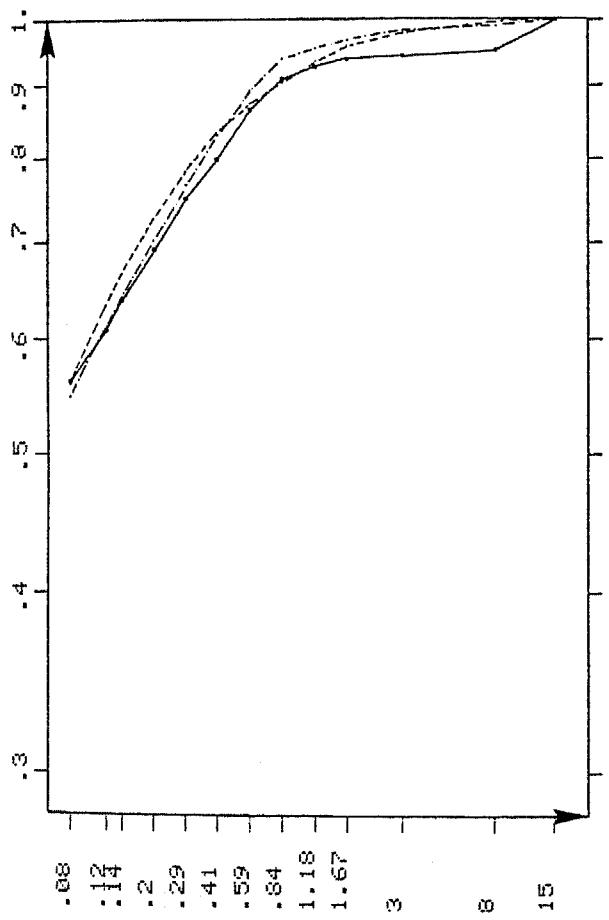
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

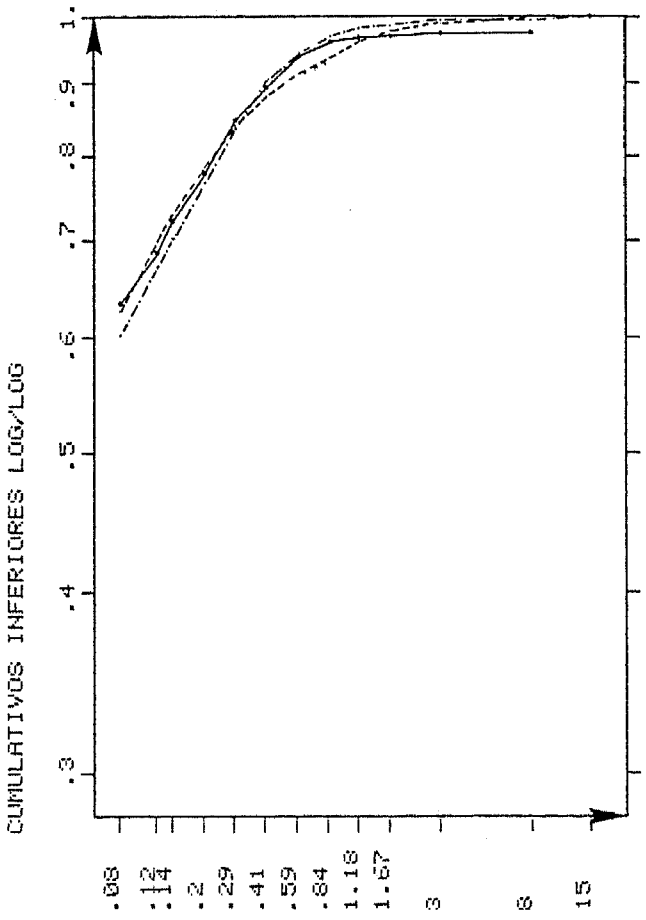
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.101	.644	.744	11.964	16.663	.000	0
N LINEAR	.084	.309	.337	1.886	16.182	1.055	6

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (–.–.–)

TEMPO RESIDENCIA 80



TEMPO RESIDENCIA 100



AMOSTRA A112

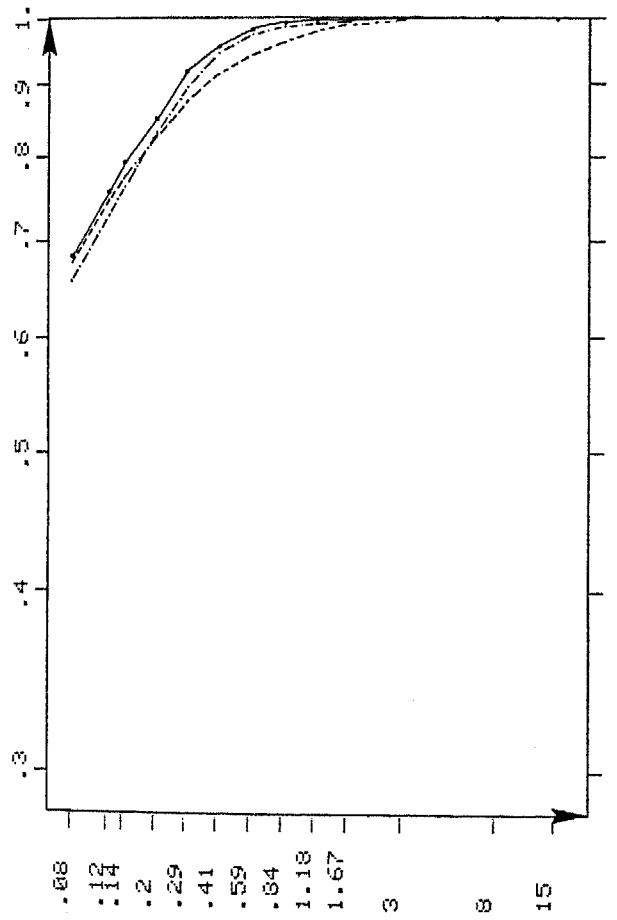
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

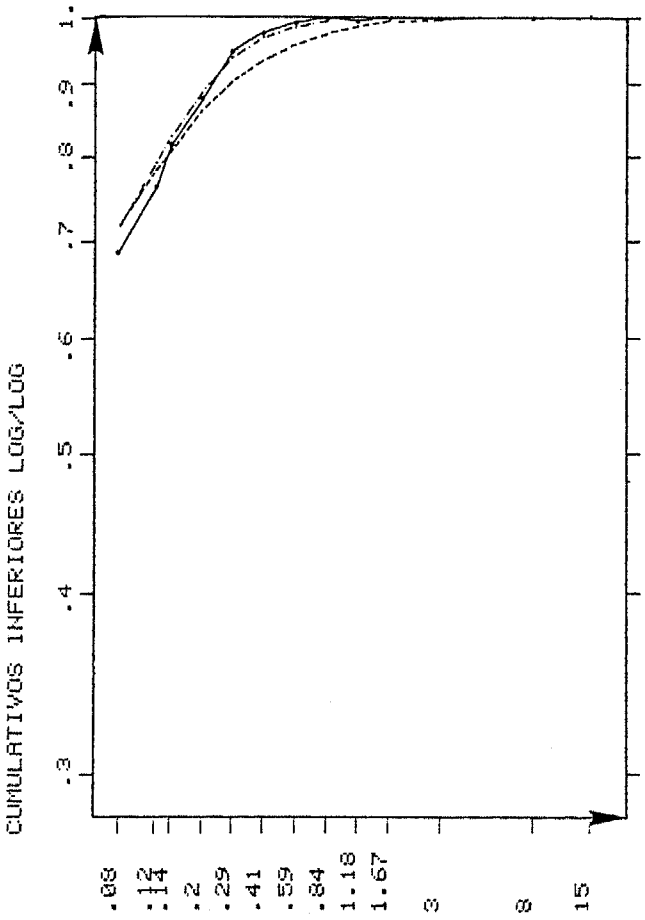
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.101	.644	.744	11.964	16.663	.000	0
N LINEAR	.084	.309	.337	1.886	16.182	1.055	6

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (- - - -)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (—.—.—)

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 140



ANEXO III

AMOSTRA A 121

. XISTO GRAFITOSO DE NISA

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS GROSSAS (35 MM)

. ENCHIMENTO ALTO (40 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA A121/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	963	30.093	69.906	30.093
8	8.000	989	30.906	39.000	61.000
3	3.000	755	23.593	15.406	84.593
12	1.697	247	7.718	7.687	92.312
16	1.200	160	5.000	2.687	97.312
20	.848	86	2.687	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA A121/ 1 T= 40

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	254	7.937	92.062	7.937
3	3.000	92	2.875	89.187	10.812
12	1.697	178	5.562	83.625	16.375
16	1.200	227	7.093	76.531	23.468
20	.848	236	7.375	69.156	30.843
30	.600	200	6.250	62.906	37.093
40	.424	214	6.687	56.218	43.781
50	.300	121	3.781	52.437	47.562
70	.212	133	4.156	48.281	51.718
100	.150	106	3.312	44.968	55.031
140	.125	65	2.031	42.937	57.062
200	.084	125	3.906	39.031	60.968

ANALISE GRANULOMETRICA

AMOSTRA A121/ 2 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	37	1.156	98.843	1.156
3	3.000	35	1.093	97.750	2.250
12	1.697	55	1.718	96.031	3.968
16	1.200	130	4.062	91.968	8.031
20	.848	208	6.500	85.468	14.531
30	.600	231	7.218	78.250	21.750
40	.424	280	8.750	69.500	30.500
50	.300	163	5.093	64.406	35.593
70	.212	175	5.468	58.937	41.062
100	.150	136	4.250	54.687	45.312
140	.125	86	2.687	52.000	48.000
200	.084	153	4.781	47.218	52.781

ANALISE GRANULOMETRICA

AMOSTRA A121/ 3 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	34	1.062	98.937	1.062
3	3.000	37	1.156	97.781	2.218
12	1.697	57	1.781	96.000	4.000
16	1.200	124	3.875	92.125	7.875
20	.848	197	6.156	85.968	14.031
30	.600	220	6.875	79.093	20.906
40	.424	266	8.312	70.781	29.218
50	.300	176	5.500	65.281	34.718
70	.212	178	5.562	59.718	40.281
100	.150	135	4.218	55.500	44.500
140	.125	84	2.625	52.875	47.125
200	.084	132	4.125	48.750	51.250

ANALISE GRANULOMETRICA

AMOSTRA A121/ 4 T= 80

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	8	.250	99.750	.250
3	3.000	3	.093	99.656	.343
12	1.697	5	.156	99.500	.500
16	1.200	22	.687	98.812	1.187
20	.848	78	2.437	96.375	3.625
30	.600	153	4.781	91.593	8.406
40	.424	284	8.875	82.718	17.281
50	.300	208	6.500	76.218	23.781
70	.212	233	7.281	68.937	31.062
100	.150	178	5.562	63.375	36.625
140	.125	114	3.562	59.812	40.187
200	.084	180	5.625	54.187	45.812

ANALISE GRANULOMETRICA

AMOSTRA A121/ 5 T= 100

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	4	.125	99.875	.125
3	3.000	2	.062	99.812	.187
12	1.697	4	.125	99.687	.312
16	1.200	20	.625	99.062	.937
20	.848	76	2.375	96.687	3.312
30	.600	157	4.906	91.781	8.218
40	.424	290	9.062	82.718	17.281
50	.300	211	6.593	76.125	23.875
70	.212	225	7.031	69.093	30.906
100	.150	166	5.187	63.906	36.093
140	.125	91	2.843	61.062	38.937
200	.084	196	6.125	54.937	45.062

ANALISE GRANULOMETRICA

AMOSTRA A121/ 6 T= 100

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	3	.093	99.906	.093
3	3.000	4	.125	99.781	.218
12	1.697	3	.093	99.687	.312
16	1.200	7	.218	99.468	.531
20	.848	29	.906	98.562	1.437
30	.600	78	2.437	96.125	3.875
40	.424	193	6.031	90.093	9.906
50	.300	186	5.812	84.281	15.718
70	.212	219	6.843	77.437	22.562
100	.150	169	5.281	72.156	27.843
140	.125	93	2.906	69.250	30.750
200	.084	207	6.468	62.781	37.218

ANALISE GRANULOMETRICA

AMOSTRA A121/ 7 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	4	.125	99.875	.125
12	1.697	3	.093	99.781	.218
16	1.200	5	.156	99.625	.375
20	.848	20	.625	99.000	1.000
30	.600	63	1.968	97.031	2.968
40	.424	173	5.406	91.625	8.375
50	.300	180	5.625	86.000	14.000
70	.212	235	7.343	78.656	21.343
100	.150	194	6.062	72.593	27.406
140	.125	111	3.468	69.125	30.875
200	.084	234	7.312	61.812	38.187

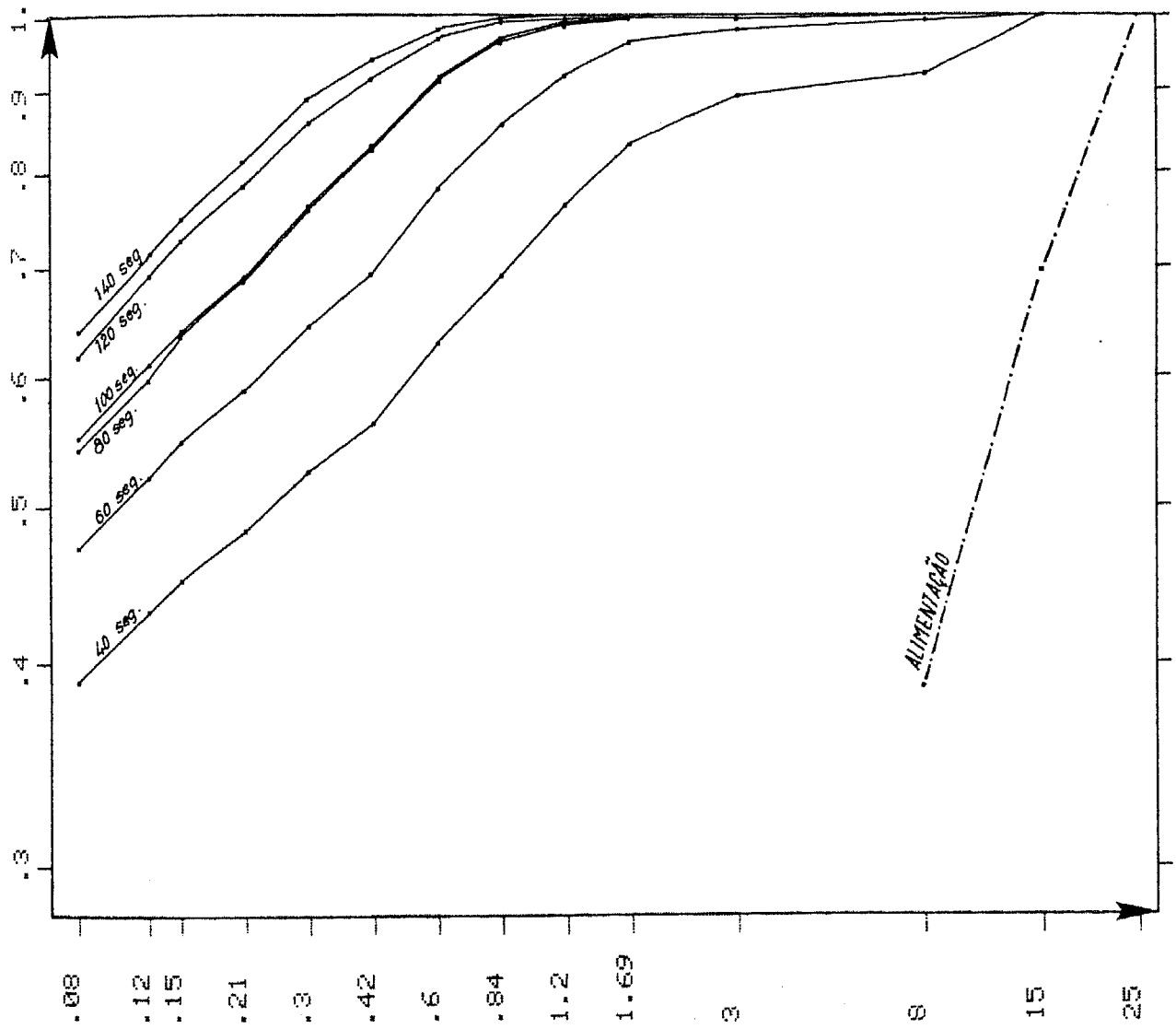
ANALISE GRANULOMETRICA

AMOSTRA A121/ 8 T= 140

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	4	.125	99.875	.125
12	1.697	2	.062	99.812	.187
16	1.200	3	.093	99.718	.281
20	.848	10	.312	99.406	.593
30	.600	39	1.218	98.187	1.812
40	.424	137	4.281	93.906	6.093
50	.300	163	5.093	88.812	11.187
70	.212	237	7.406	81.406	18.593
100	.150	207	6.468	74.937	25.062
140	.125	121	3.781	71.156	28.843
200	.084	231	7.218	63.937	36.062

CUMULATIVOS INFERIORES

AMOSTRA A121/ N



ENSAIO A121/N

RESULTADOS DO MODELO

A	K	W	G	T0
.640	1.151	.318	1.182	26.612

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	40.000	60.000	80.000	100.000	120.000	140.000
8	99.577	99.999	99.999	100.000	100.000	100.000
3	93.417	99.664	99.982	99.999	99.999	99.999
1.68	83.232	95.858	98.677	99.557	99.850	99.949
1.19	74.839	90.660	95.729	97.920	98.951	99.458
.841	67.266	84.631	91.430	94.946	96.924	98.088
.595	61.663	79.118	86.777	91.182	93.940	95.751
.42	56.177	73.157	81.235	86.248	89.640	92.050
.297	50.995	67.134	75.253	80.565	84.357	87.201
.21	46.151	61.240	69.131	74.486	78.452	81.538
.149	41.718	55.672	63.168	68.384	72.344	75.505
.125	39.590	52.951	60.201	65.294	69.199	72.345
.084	35.122	47.163	53.813	58.562	62.262	65.291

MATRIZ [S]

.640 .339 .146 .054 .030 .020 .013 .009 .006 .004 .002 .002

MATRIZ [B]

.132
.206 .210
.103 .118 .121
.054 .063 .076 .068
.049 .059 .073 .078 .069
.045 .053 .068 .076 .078 .069
.041 .049 .063 .072 .076 .078 .069
.037 .044 .058 .066 .071 .076 .078 .069
.033 .040 .052 .061 .066 .071 .076 .078 .069
.029 .036 .047 .055 .060 .066 .071 .075 .077 .068
.014 .017 .022 .026 .029 .031 .034 .037 .039 .039 .031
.029 .035 .047 .055 .061 .067 .073 .079 .084 .088 .088 .080

ENSAIO A121/N

RESULTADOS DO MODELO

A	K	W	G	T0
.209	.546	.262	1.174	23.517

PE= 23.9294
J0= 5

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS -->	40.000	60.000	80.000	100.000	120.000	140.000
8	96.027	99.835	99.992	99.999	99.999	99.999
3	88.047	98.609	99.824	99.977	99.997	99.999
1.68	81.058	96.191	99.105	99.773	99.940	99.983
1.19	75.602	93.624	98.057	99.364	99.784	99.924
.841	67.360	84.730	93.678	97.392	98.904	99.534
.595	62.093	78.176	87.763	94.127	97.189	98.642
.42	57.115	71.953	80.865	87.071	92.436	95.825
.297	52.495	66.165	74.412	80.176	85.194	89.173
.21	48.204	60.778	68.390	73.721	78.377	82.084
.149	44.267	55.832	62.850	67.773	72.081	75.518
.125	42.369	53.444	60.173	64.896	69.032	72.335
.084	38.347	48.384	54.494	58.787	62.554	65.564

MATRIZ [S]

.209 .154 .101 .064 .049 .041 .034 .028 .023 .019 .016 .013 .011

MATRIZ [B]

.109
.176 .175
.092 .102 .100
.050 .056 .064 .056
.046 .053 .062 .064 .056
.043 .049 .059 .064 .064 .056
.040 .046 .056 .062 .064 .065 .057
.036 .042 .052 .058 .061 .064 .064 .056
.033 .039 .048 .055 .058 .061 .064 .064 .056
.030 .035 .044 .050 .054 .058 .061 .063 .064 .056
.014 .017 .021 .024 .026 .028 .030 .031 .032 .032 .026
.031 .036 .046 .052 .056 .060 .064 .068 .072 .074 .072 .066

AMOSTRA A121

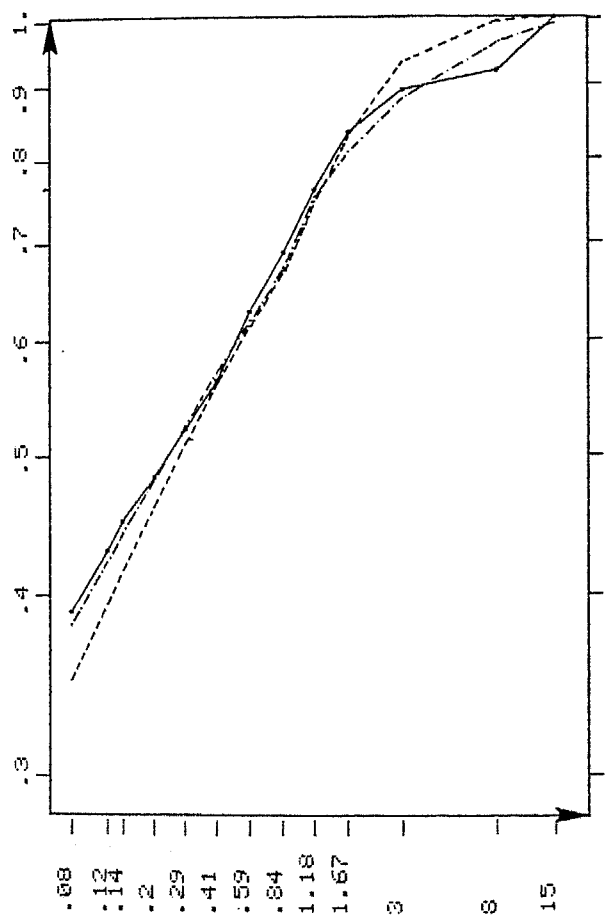
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

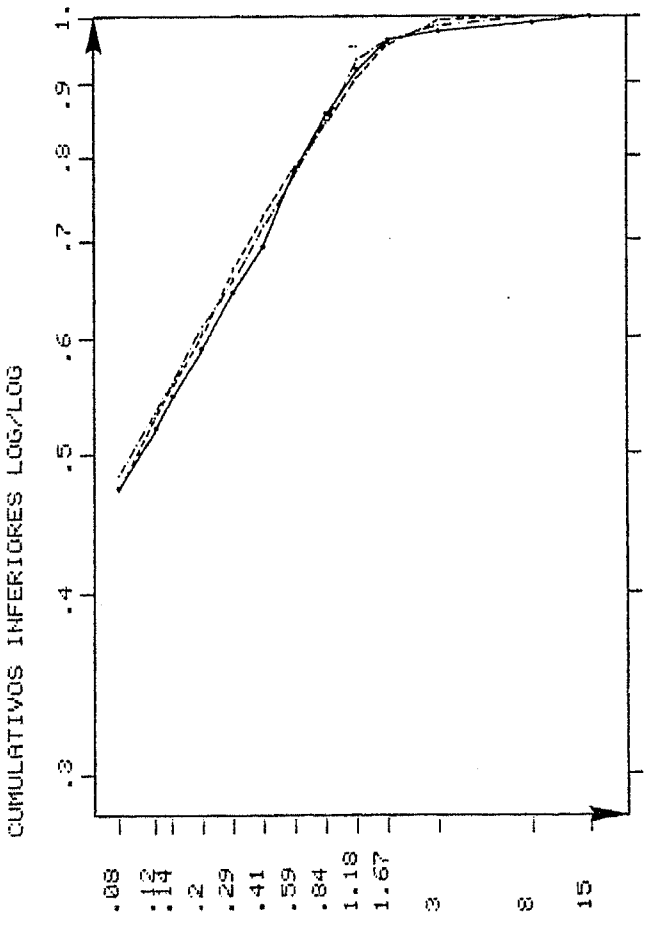
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.640	1.151	.318	1.182	26.612	.000	0
N LINEAR	.209	.546	.262	1.174	23.517	23.929	5

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 40



TEMPO RESIDENCIA 60



AMOSTRA A121

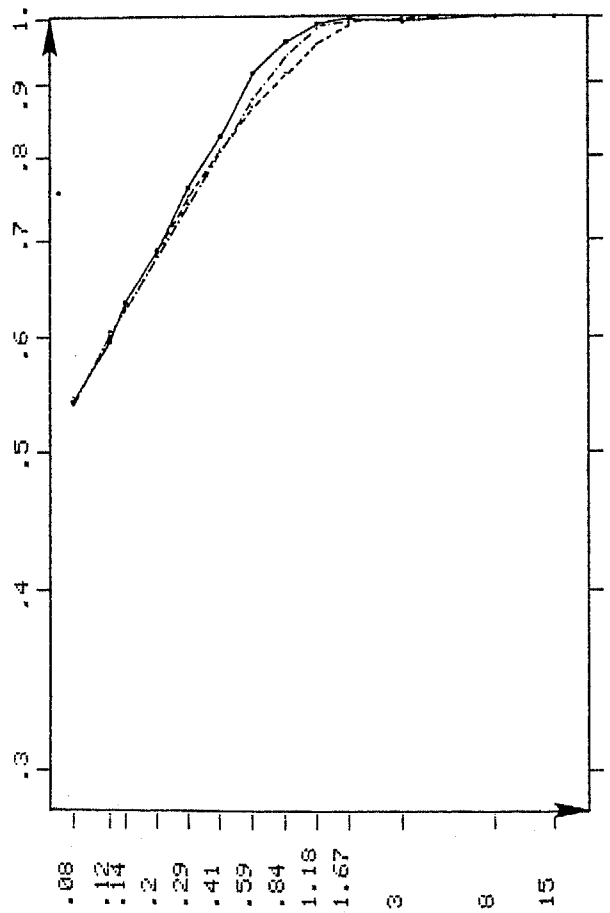
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

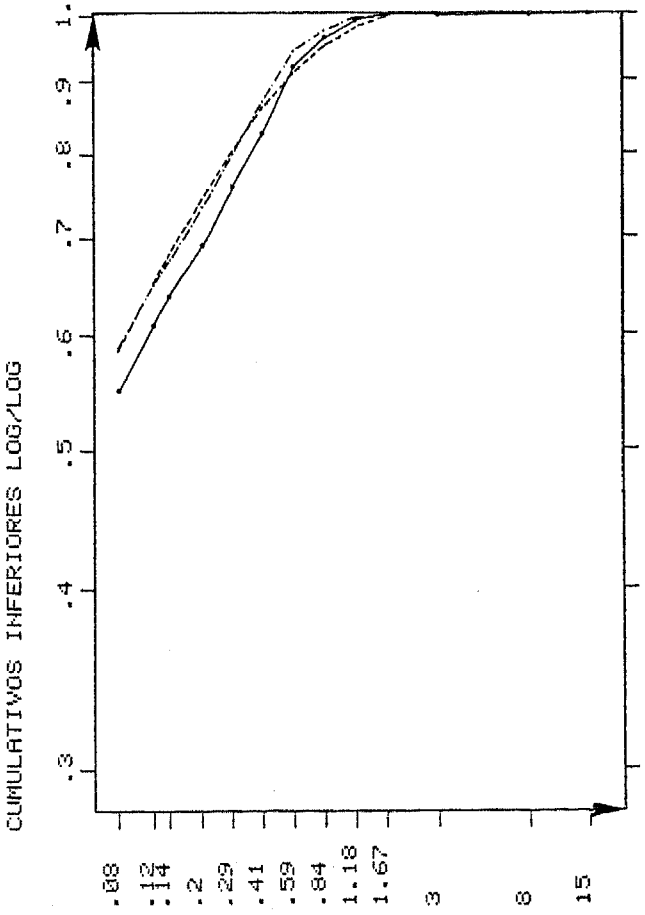
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.640	1.151	.318	1.182	26.612	.000	0
N LINEAR	.209	.546	.262	1.174	23.517	23.929	5

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (—.—.—)

TEMPO RESIDENCIA 80



TEMPO RESIDENCIA 100



AMOSTRA A121

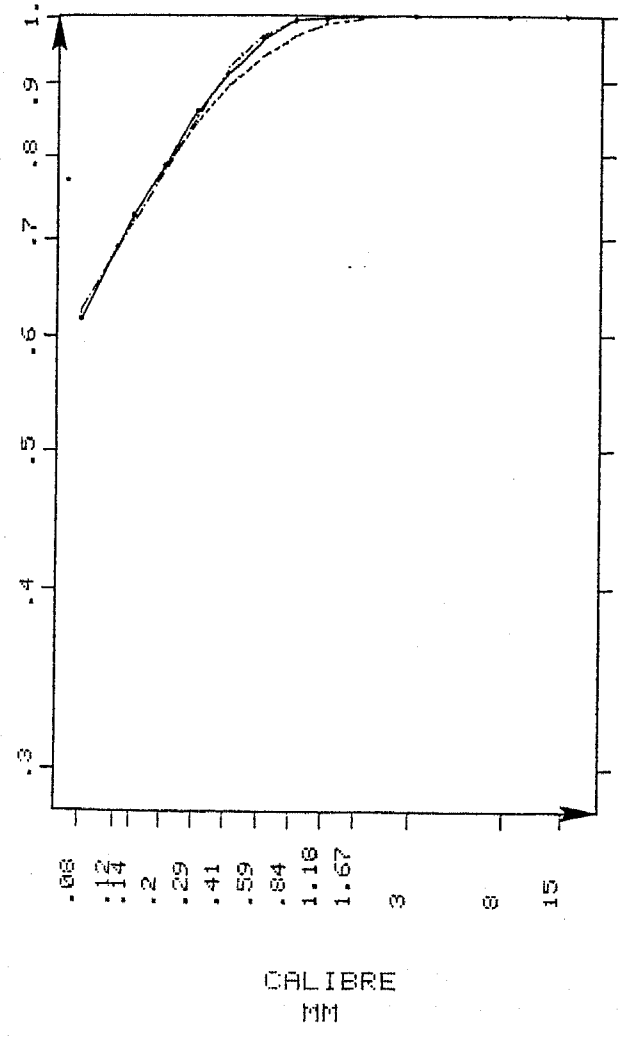
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

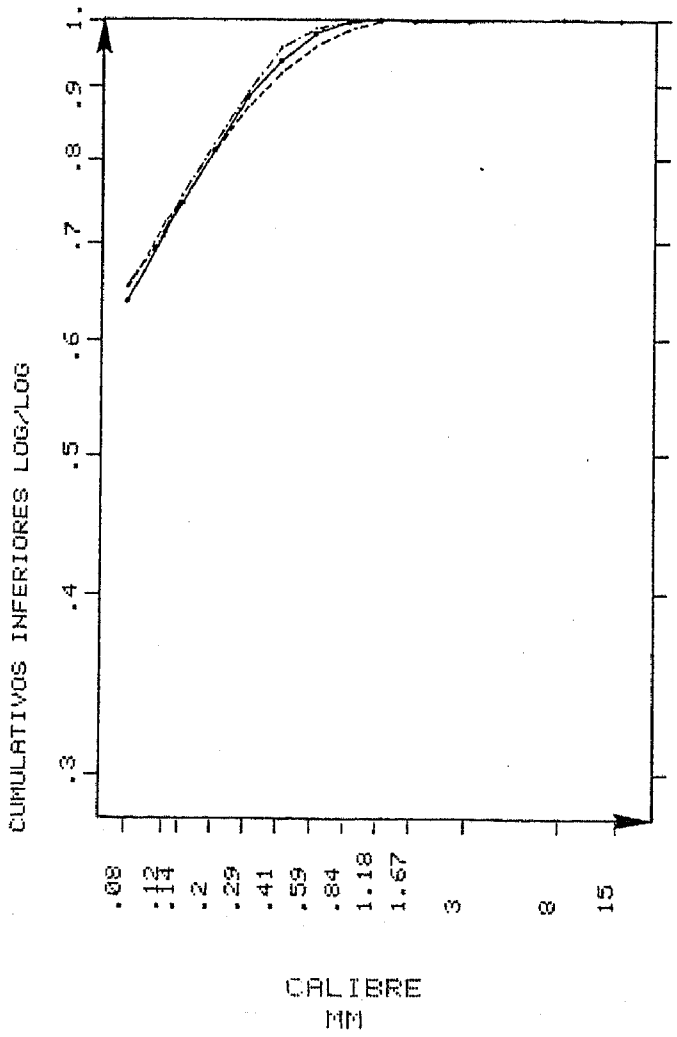
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.640	1.151	.318	1.182	26.612	.000	0
N LINEAR	.209	.546	.262	1.174	23.517	23.929	5

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (–.–.–)

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 140



ANEXO IV

AMOSTRA A 122

- XISTO GRAFITOSO DE NISA
- ALIMENTAÇÃO COM O LOTE 25/15 MM
- BARRAS GROSSAS (35 MM)
- ENCHIMENTO BAIXO (25 %)

- ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS
- SIMULAÇÕES MODELO LINEAR - CUMULOS INFERIORES
  MATRIZES DESTRUIÇÃO E FORMAÇÃO
- SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
  CUMULOS INFERIORES
  MATRIZES DESTRUIÇÃO E FORMAÇÃO
- QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA A122/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	602	30.100	69.900	30.100
8	8.000	618	30.900	39.000	61.000
3	3.000	472	23.600	15.400	84.600
12	1.697	154	7.700	7.700	92.300
16	1.200	100	5.000	2.700	97.300
20	.848	54	2.700	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA A122/ 1 T= 40

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	285	14.250	85.750	14.250
3	3.000	227	11.350	74.400	25.600
12	1.697	101	5.050	69.350	30.650
16	1.200	108	5.400	63.950	36.050
20	.848	114	5.700	58.250	41.750
30	.600	99	4.950	53.300	46.700
40	.424	112	5.600	47.700	52.300
50	.300	68	3.400	44.300	55.700
70	.212	72	3.600	40.700	59.300
100	.150	57	2.850	37.850	62.150
140	.125	36	1.800	36.050	63.950
200	.084	60	3.000	33.050	66.950

ANALISE GRANULOMETRICA

AMOSTRA A122/ 2 T= 60

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	123	6.150	93.850	6.150
3	3.000	111	5.550	88.300	11.700
12	1.697	63	3.150	85.150	14.850
16	1.200	83	4.150	81.000	19.000
20	.848	108	5.400	75.600	24.400
30	.600	115	5.750	69.850	30.150
40	.424	144	7.200	62.650	37.350
50	.300	93	4.650	58.000	42.000
70	.212	99	4.950	53.050	46.950
100	.150	77	3.850	49.200	50.800
140	.125	43	2.150	47.050	52.950
200	.084	82	4.100	42.950	57.050

ANALISE GRANULOMETRICA

AMOSTRA A122/ 3 T= 80

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	30	1.500	98.500	1.500
3	3.000	32	1.600	96.900	3.100
12	1.697	27	1.350	95.550	4.450
16	1.200	51	2.550	93.000	7.000
20	.848	86	4.300	88.700	11.300
30	.600	113	5.650	83.050	16.950
40	.424	158	7.900	75.150	24.850
50	.300	110	5.500	69.650	30.350
70	.212	120	6.000	63.650	36.350
100	.150	91	4.550	59.100	40.900
140	.125	54	2.700	56.400	43.600
200	.084	98	4.900	51.500	48.500

ANALISE GRANULOMETRICA

AMOSTRA A122/ 4 T= 80

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	52	2.600	97.400	2.600
3	3.000	38	1.900	95.500	4.500
12	1.697	22	1.100	94.400	5.600
16	1.200	43	2.150	92.250	7.750
20	.848	74	3.700	88.550	11.450
30	.600	105	5.250	83.300	16.700
40	.424	154	7.700	75.600	24.400
50	.300	109	5.450	70.150	29.850
70	.212	123	6.150	64.000	36.000
100	.150	98	4.900	59.100	40.900
140	.125	61	3.050	56.050	43.950
200	.084	103	5.150	50.900	49.100

ANALISE GRANULOMETRICA

AMOSTRA A122/ 5 T= 100

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	55	2.750	97.250	2.750
3	3.000	16	.800	96.450	3.550
12	1.697	12	.600	95.850	4.150
16	1.200	23	1.150	94.700	5.300
20	.848	50	2.500	92.200	7.800
30	.600	86	4.300	87.900	12.100
40	.424	157	7.850	80.050	19.950
50	.300	127	6.350	73.700	26.300
70	.212	142	7.100	66.600	33.400
100	.150	113	5.650	60.950	39.050
140	.125	67	3.350	57.600	42.400
200	.084	112	5.600	52.000	48.000

ANALISE GRANULOMETRICA

AMOSTRA A122/ 6 T= 100

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	4	.200	99.800	.200
12	1.697	6	.300	99.500	.500
16	1.200	14	.700	98.800	1.200
20	.848	38	1.900	96.900	3.100
30	.600	75	3.750	93.150	6.850
40	.424	152	7.600	85.550	14.450
50	.300	127	6.350	79.200	20.800
70	.212	143	7.150	72.050	27.950
100	.150	114	5.700	66.350	33.650
140	.125	64	3.200	63.150	36.850
200	.084	139	6.950	56.200	43.800

ANALISE GRANULOMETRICA

AMOSTRA A122/ 7 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	10	.500	99.500	.500
3	3.000	10	.500	99.000	1.000
12	1.697	7	.350	98.650	1.350
16	1.200	12	.600	98.050	1.950
20	.848	29	1.450	96.600	3.400
30	.600	62	3.100	93.500	6.500
40	.424	130	6.500	87.000	13.000
50	.300	116	5.800	81.200	18.800
70	.212	137	6.850	74.350	25.650
100	.150	110	5.500	68.850	31.150
140	.125	61	3.050	65.800	34.200
200	.084	123	6.150	59.650	40.350

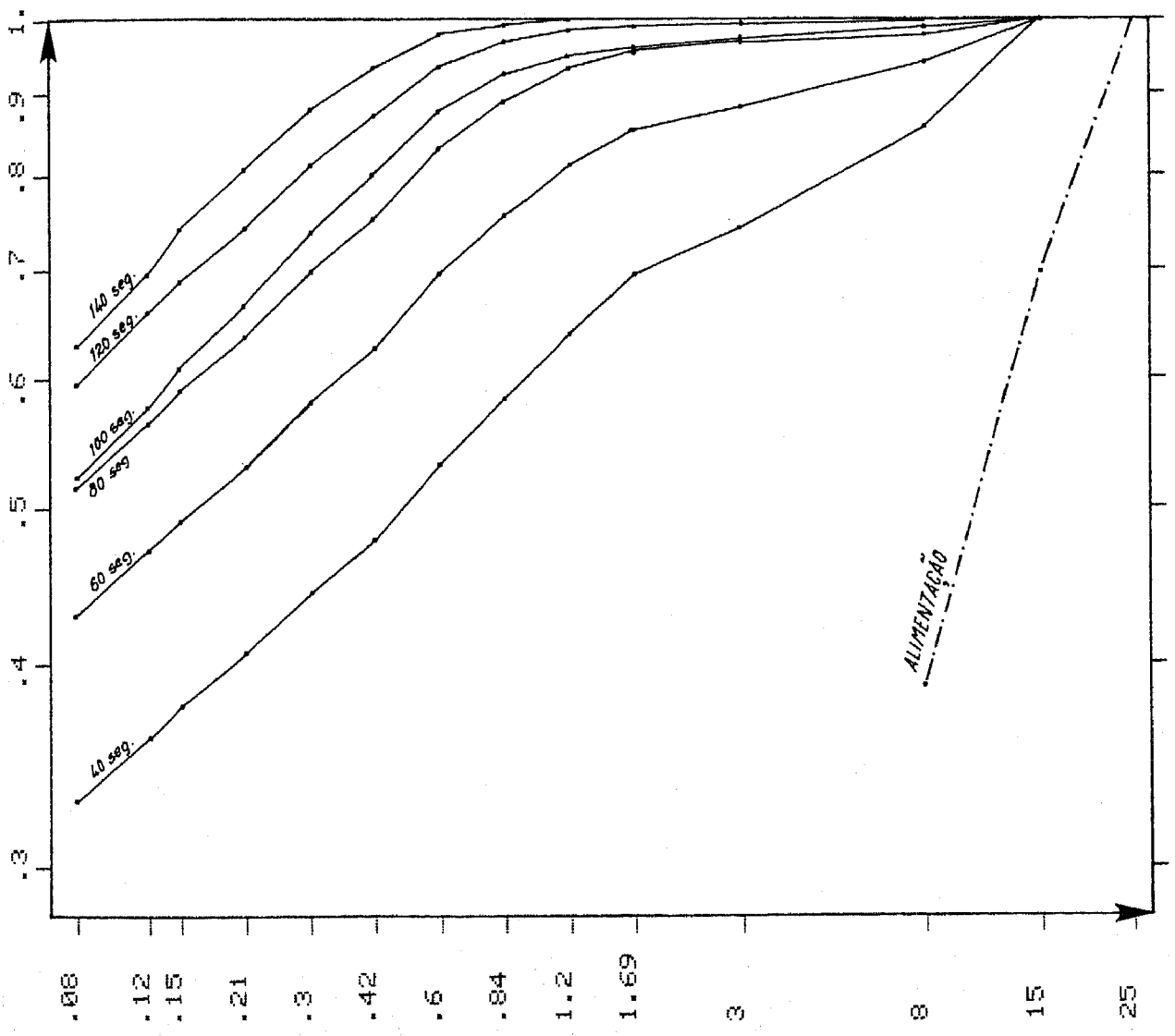
ANALISE GRANULOMETRICA

AMOSTRA A122/ 8 T= 140

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.697	2	.100	99.900	.100
16	1.200	4	.200	99.700	.300
20	.848	9	.450	99.250	.750
30	.600	30	1.500	97.750	2.250
40	.424	94	4.700	93.050	6.950
50	.300	104	5.200	87.850	12.150
70	.212	145	7.250	80.600	19.400
100	.150	129	6.450	74.150	25.850
140	.125	87	4.350	69.800	30.200
200	.084	137	6.850	62.950	37.050

CUMULATIVOS INFERIORES

AMOSTRA A122/ N



ENSAIO A122/N

RESULTADOS DO MODELO

A	K	W	G	T0
.098	.711	.660	7.150	18.250

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	40.000	60.000	80.000	100.000	120.000	140.000
8	89.196	97.580	99.420	99.854	99.962	99.990
3	78.227	92.424	97.029	98.751	99.454	99.755
1.68	70.791	87.194	93.547	96.466	97.961	98.782
1.19	64.500	82.117	89.707	93.610	95.847	97.220
.841	58.870	77.054	85.564	90.299	93.222	95.145
.595	54.637	72.716	81.732	87.040	90.485	92.859
.42	49.860	67.551	76.936	82.765	86.731	89.583
.297	44.812	61.829	71.391	77.623	82.043	85.344
.21	39.686	55.771	65.299	71.782	76.552	80.230
.149	34.725	49.690	58.985	65.554	70.540	74.493
.125	32.281	46.616	55.724	62.274	67.320	71.370
.084	27.085	39.913	48.459	54.833	59.890	64.053

MATRIZ [S]

.098 .066 .038 .021 .015 .011 .009 .007 .005 .004 .003 .002

MATRIZ [B]

.047
.098 .037
.079 .048 .003
.088 .068 .013 .000
.090 .082 .031 .005 .000
.087 .089 .053 .019 .005 .000
.080 .089 .071 .038 .019 .005 .000
.071 .085 .084 .059 .038 .019 .005 .000
.061 .077 .088 .075 .058 .038 .018 .005 .000
.028 .036 .045 .043 .036 .027 .016 .007 .001 .000
.055 .073 .100 .102 .095 .079 .058 .034 .014 .003 .000

ENSAIO A122/N

RESULTADOS DO MODELO

A	K	W	G	T0
.068	.238	.251	.936	13.836

PE= 1.0328
J0= 6

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS -->	40.000	60.000	80.000	100.000	120.000	140.000
8	86.744	95.892	98.731	99.609	99.879	99.963
3	74.852	90.202	96.218	98.551	99.447	99.790
1.68	67.373	85.427	93.527	97.134	98.734	99.441
1.19	62.293	81.872	91.311	95.840	98.008	99.046
.841	57.888	78.389	88.931	94.333	97.098	98.514
.595	52.823	71.500	82.327	89.950	94.478	96.996
.42	48.228	65.263	75.121	83.066	89.669	93.977
.297	44.078	59.638	68.634	75.865	82.350	88.371
.21	40.302	54.521	62.737	69.332	75.236	81.210
.149	36.894	49.905	57.420	63.447	68.836	74.278
.125	35.267	47.701	54.881	60.638	65.784	70.977
.084	31.850	43.076	49.556	54.748	59.385	64.061

MATRIZ [S]

.068 .059 .049 .040 .036 .033 .030 .028 .026 .024 .022 .020 .019

MATRIZ [B]

.165
.191 .241
.090 .107 .154
.047 .056 .075 .097
.043 .051 .067 .082 .098
.039 .046 .061 .072 .081 .097
.036 .042 .055 .065 .073 .082 .098
.032 .038 .050 .059 .065 .072 .082 .097
.029 .035 .045 .053 .059 .065 .072 .082 .097
.027 .031 .041 .048 .053 .058 .064 .072 .081 .097
.012 .015 .019 .023 .025 .027 .030 .034 .038 .042 .052
.027 .032 .041 .048 .053 .058 .064 .071 .078 .087 .099 .110

AMOSTRA A122

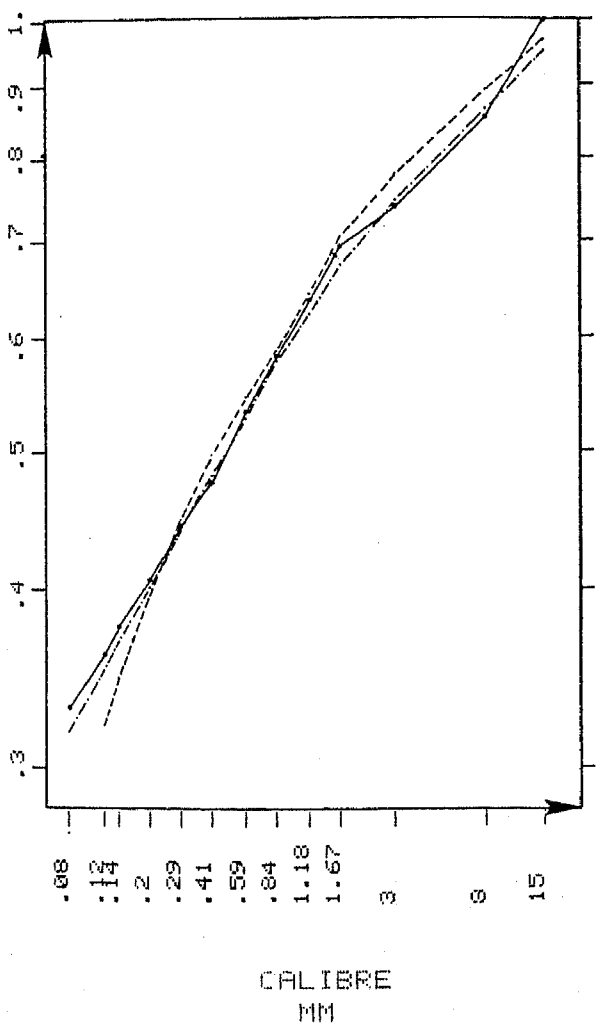
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

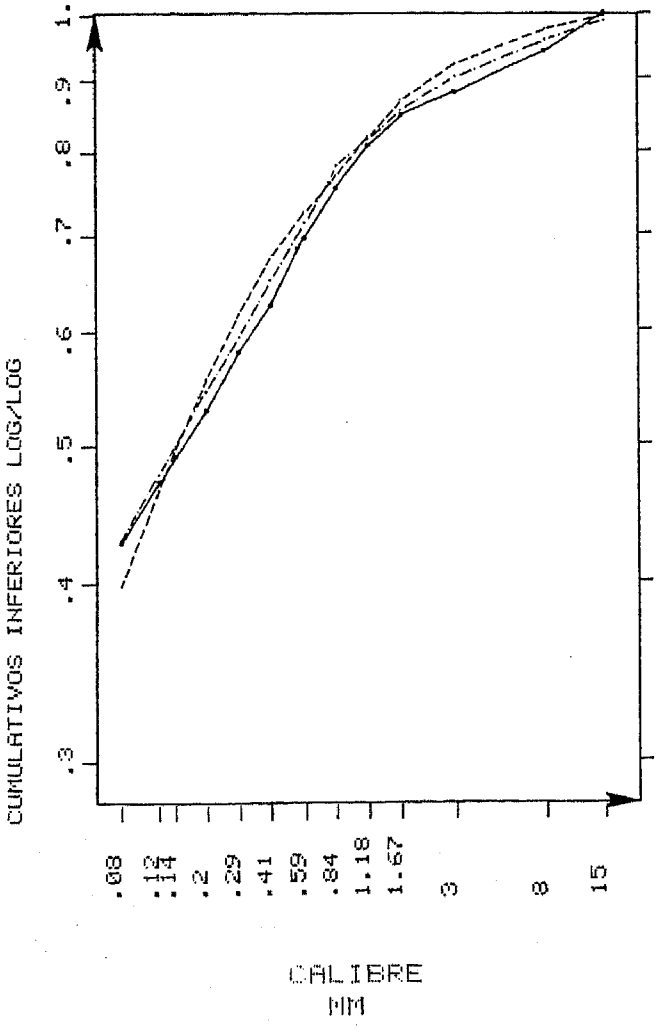
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.098	.711	.660	7.150	18.250	.000	0
N LINEAR	.068	.238	.251	.936	13.836	1.032	6

ENSAIO REAL
ENSAIO SIMULADO LINEAR
ENSAIO SIMULADO N LINEAR C/ ESCUDO

TEMPO RESIDENCIA 40



TEMPO RESIDENCIA 60



AMOSTRA A122

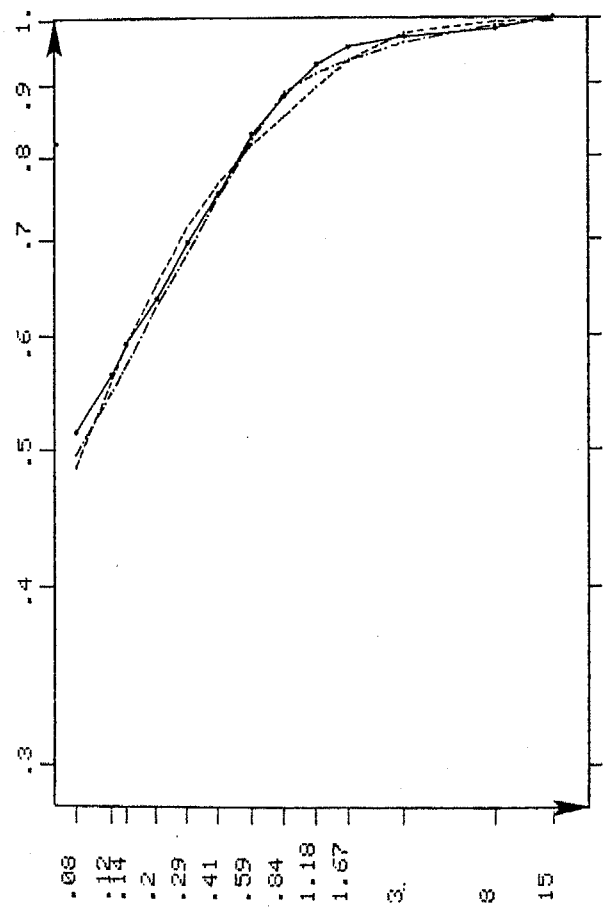
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

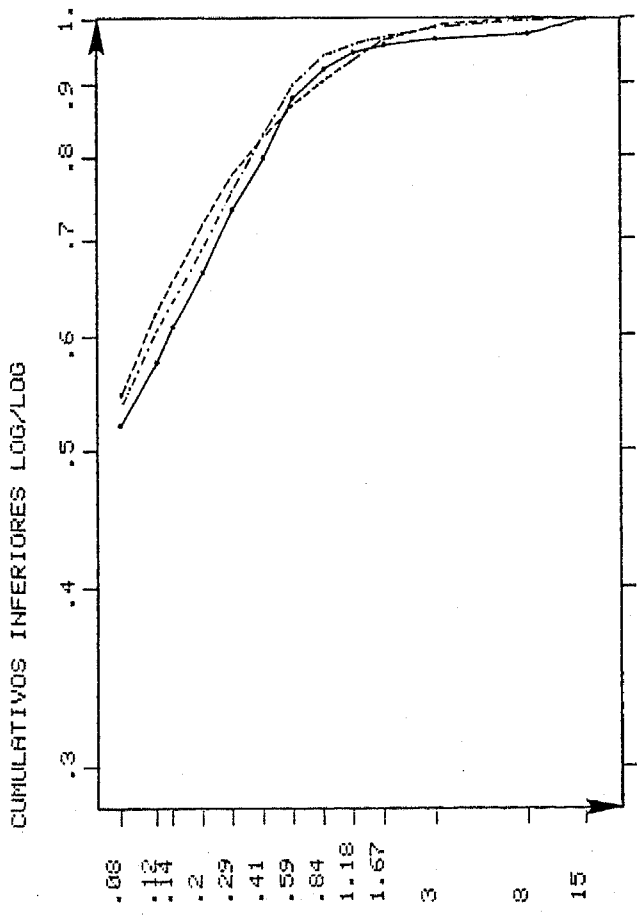
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.098	.711	.660	7.150	18.250	.000	0
N LINEAR	.068	.238	.251	.936	13.836	1.032	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 80



TEMPO RESIDENCIA 100



AMOSTRA A122

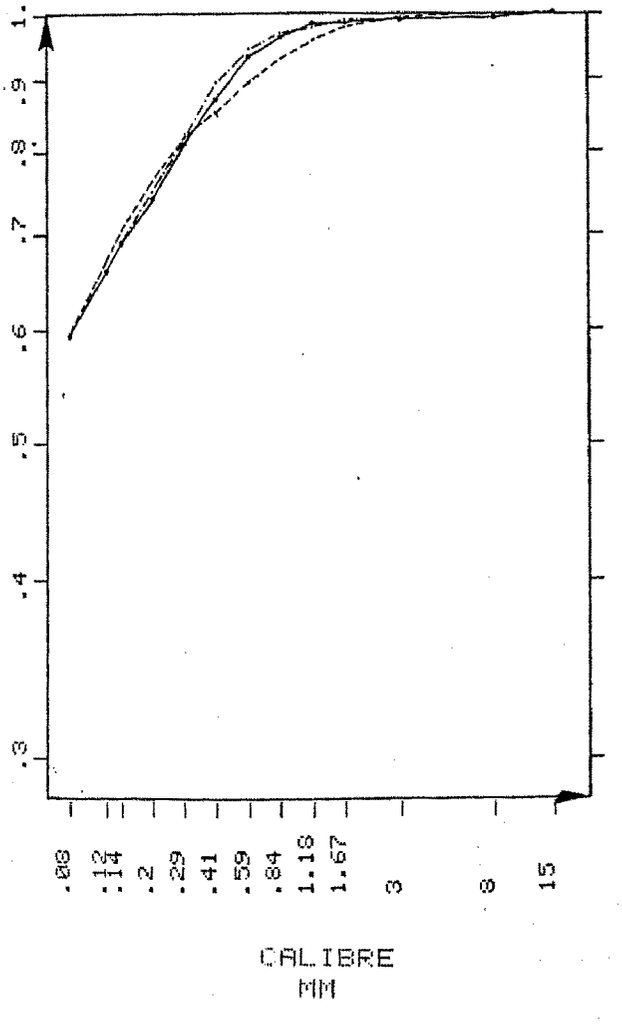
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

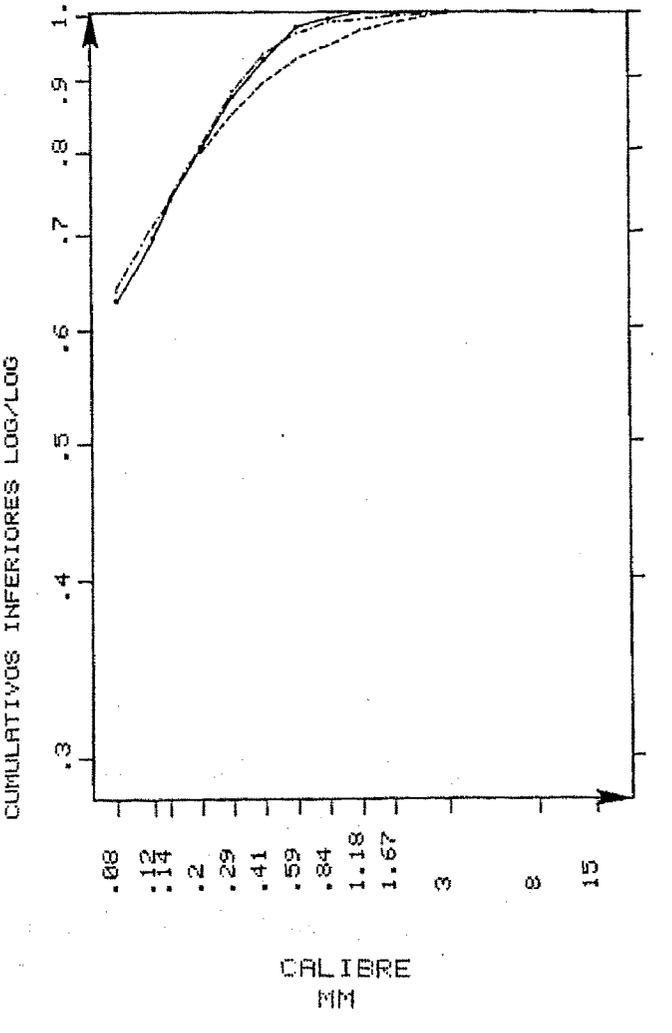
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.098	.711	.660	7.150	18.250	.000	0
N LINEAR	.068	.238	.251	.936	13.836	1.032	6

ENSAIO REAL
ENSAIO SIMULADO LINEAR
ENSAIO SIMULADO N LINEAR C/ ESCUDO

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 140



ANEXO V

AMOSTRA B 111

. XISTO BRECHÓIDE DE NISA

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS FINAS (25 MM)

. ENCHIMENTO ALTO (40 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO E COM ESCUDO+COLCHÃO
CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA B111/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	1015	31.718	68.281	31.718
8	8.000	1037	32.406	35.875	64.125
3	3.000	791	24.718	11.156	88.843
12	1.697	172	5.375	5.781	94.218
16	1.200	97	3.031	2.750	97.250
20	.848	88	2.750	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA B111/ 1 T= 60

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	97	3.031	100.000	3.031
8	8.000	200	6.250	96.968	9.281
3	3.000	296	9.250	90.718	18.531
12	1.697	79	2.468	81.468	21.000
16	1.200	98	3.062	79.000	24.062
20	.848	116	3.625	75.937	27.687
30	.600	127	3.968	72.312	31.656
40	.424	176	5.500	68.343	37.156
50	.300	128	4.000	62.843	41.156
70	.212	179	5.593	58.843	46.750
100	.150	167	5.218	53.250	51.968
140	.125	109	3.406	48.031	55.375
200	.084	177	5.531	44.625	60.906

ANALISE GRANULOMETRICA

AMOSTRA B111/ 2 T= 90

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	119	3.718	100.000	3.718
8	8.000	106	3.312	96.281	7.031
3	3.000	88	2.750	92.968	9.781
12	1.697	23	.718	90.218	10.500
16	1.200	32	1.000	89.500	11.500
20	.848	58	1.812	88.500	13.312
30	.600	95	2.968	86.687	16.281
40	.424	187	5.843	83.718	22.125
50	.300	163	5.093	77.875	27.218
70	.212	241	7.531	72.781	34.750
100	.150	226	7.062	65.250	41.812
140	.125	149	4.656	58.187	46.468
200	.084	197	6.156	53.531	52.625

ANALISE GRANULOMETRICA

AMOSTRA B111/ 3 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	136	4.250	100.000	4.250
8	8.000	124	3.875	95.750	8.125
3	3.000	102	3.187	91.875	11.312
12	1.697	27	.843	88.687	12.156
16	1.200	32	1.000	87.843	13.156
20	.848	52	1.625	86.843	14.781
30	.600	81	2.531	85.218	17.312
40	.424	156	4.875	82.687	22.187
50	.300	135	4.218	77.812	26.406
70	.212	210	6.562	73.593	32.968
100	.150	204	6.375	67.031	39.343
140	.125	109	3.406	60.656	42.750
200	.084	238	7.437	57.250	50.187

ANALISE GRANULOMETRICA

AMOSTRA B111/ 4 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	47	1.468	100.000	1.468
8	8.000	66	2.062	98.531	3.531
3	3.000	36	1.125	96.468	4.656
12	1.697	7	.218	95.343	4.875
16	1.200	6	.187	95.125	5.062
20	.848	13	.406	94.937	5.468
30	.600	34	1.062	94.531	6.531
40	.424	124	3.875	93.468	10.406
50	.300	165	5.156	89.593	15.562
70	.212	265	8.281	84.437	23.843
100	.150	259	8.093	76.156	31.937
140	.125	132	4.125	68.062	36.062
200	.084	303	9.468	63.937	45.531

ANALISE GRANULOMETRICA

AMOSTRA B111/ 5 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	28	.875	100.000	.875
8	8.000	64	2.000	99.125	2.875
3	3.000	21	.656	97.125	3.531
12	1.697	5	.156	96.468	3.687
16	1.200	4	.125	96.312	3.812
20	.848	6	.187	96.187	4.000
30	.600	16	.500	96.000	4.500
40	.424	84	2.625	95.500	7.125
50	.300	140	4.375	92.875	11.500
70	.212	284	8.875	88.500	20.375
100	.150	293	9.156	79.625	29.531
140	.125	165	5.156	70.468	34.687
200	.084	293	9.156	65.312	43.843

ANALISE GRANULOMETRICA

AMOSTRA B111/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	93	2.906	100.000	2.906
8	8.000	81	2.531	97.093	5.437
3	3.000	16	.500	94.562	5.937
12	1.697	4	.125	94.062	6.062
16	1.200	3	.093	93.937	6.156
20	.848	4	.125	93.843	6.281
30	.600	9	.281	93.718	6.562
40	.424	56	1.750	93.437	8.312
50	.300	114	3.562	91.687	11.875
70	.212	267	8.343	88.125	20.218
100	.150	289	9.031	79.781	29.250
140	.125	159	4.968	70.750	34.218
200	.084	321	10.031	65.781	44.250

ANALISE GRANULOMETRICA

AMOSTRA B111/ 7 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	65	2.031	100.000	2.031
8	8.000	40	1.250	97.968	3.281
3	3.000	18	.562	96.718	3.843
12	1.697	4	.125	96.156	3.968
16	1.200	4	.125	96.031	4.093
20	.848	4	.125	95.906	4.218
30	.600	8	.250	95.781	4.468
40	.424	44	1.375	95.531	5.843
50	.300	105	3.281	94.156	9.125
70	.212	248	7.750	90.875	16.875
100	.150	279	8.718	83.125	25.593
140	.125	140	4.375	74.406	29.968
200	.084	315	9.843	70.031	39.812

ANALISE GRANULOMETRICA

AMOSTRA B111/ 8 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	57	1.781	100.000	1.781
8	8.000	57	1.781	98.218	3.562
3	3.000	8	.250	96.437	3.812
12	1.697	2	.062	96.187	3.875
16	1.200	3	.093	96.125	3.968
20	.848	3	.093	96.031	4.062
30	.600	3	.093	95.937	4.156
40	.424	17	.531	95.843	4.687
50	.300	52	1.625	95.312	6.312
70	.212	189	5.906	93.687	12.218
100	.150	277	8.656	87.781	20.875
140	.125	163	5.093	79.125	25.968
200	.084	333	10.406	74.031	36.375

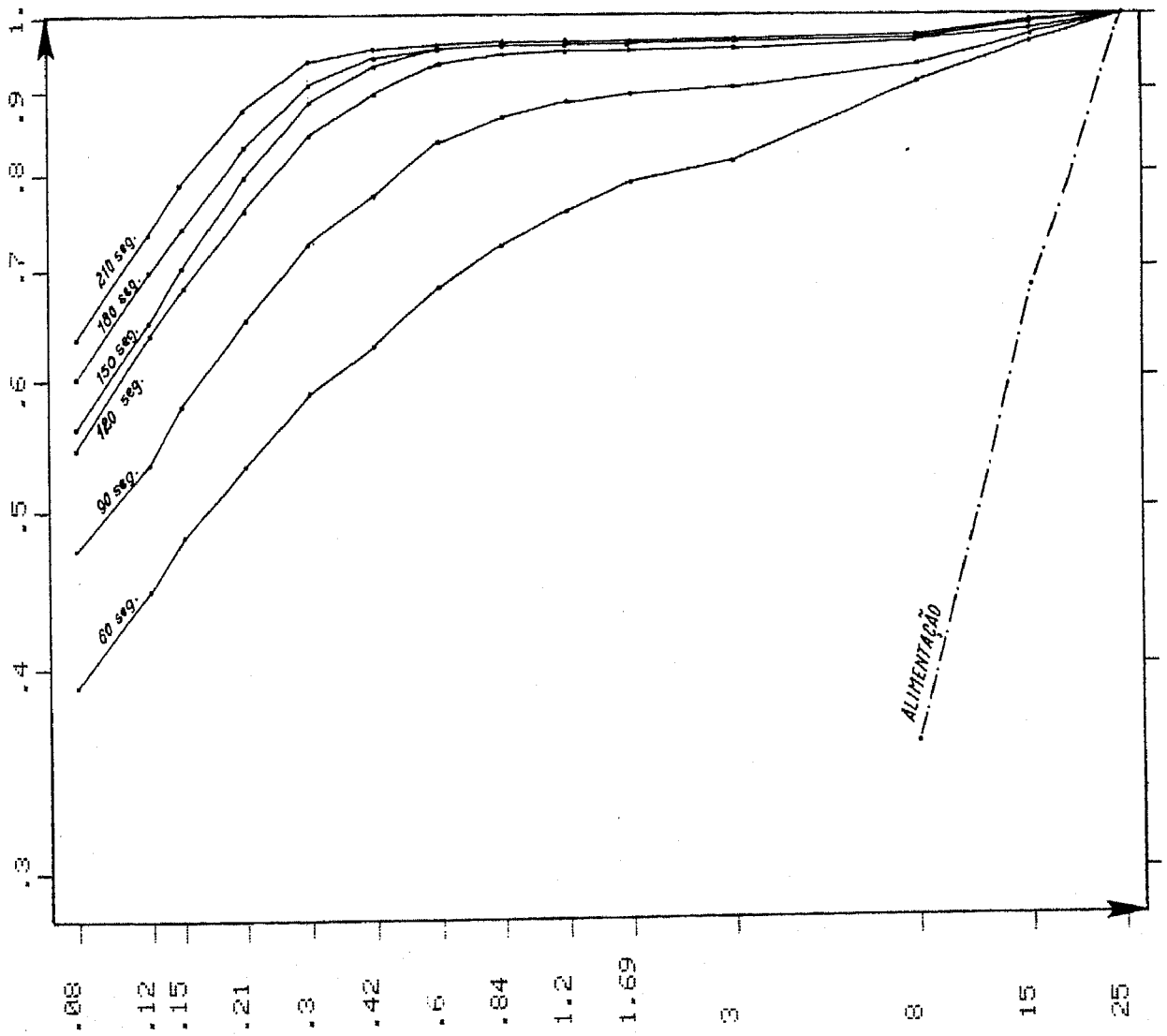
ANALISE GRANULOMETRICA

AMOSTRA B111/ 9 T= 210

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	61	1.906	100.000	1.906
8	8.000	54	1.687	98.093	3.593
3	3.000	14	.437	96.406	4.031
12	1.697	3	.093	95.968	4.125
16	1.200	3	.093	95.875	4.218
20	.848	4	.125	95.781	4.343
30	.600	5	.156	95.656	4.500
40	.424	24	.750	95.500	5.250
50	.300	69	2.156	94.750	7.406
70	.212	224	7.000	92.593	14.406
100	.150	292	9.125	85.593	23.531
140	.125	166	5.187	76.468	28.718
200	.084	299	9.343	71.281	38.062

CUMULATIVOS INFERIORES

AMOSTRA B111/ N



ENSAIO B111/N

RESULTADOS DO MODELO

A	K	W	G	T0
.042	.639	1.198	124.026	10.220

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
15	96.195	98.939	99.704	99.917	99.977	99.993
8	88.843	95.933	98.474	99.414	99.771	99.909
3	78.918	90.206	95.170	97.507	98.671	99.274
1.68	75.775	87.931	93.524	96.317	97.809	98.651
1.19	73.687	86.281	92.223	95.291	97.001	98.014
.841	71.313	84.279	90.557	93.912	95.860	97.071
.595	69.961	82.971	89.391	92.898	94.987	96.321
.42	66.894	79.899	86.563	90.361	92.731	94.321
.297	61.861	74.704	81.642	85.827	88.595	90.562
.21	55.256	67.706	74.857	79.439	82.644	85.044
.149	47.928	59.748	66.974	71.872	75.470	78.277
.125	44.080	55.490	62.686	67.697	71.462	74.452
.084	35.533	45.827	52.786	57.917	61.952	65.276

MATRIZ [S]

.042 .029 .018 .010 .007 .006 .005 .004 .003 .002 .002 .001

MATRIZ [B]

.000
.000 .000
.002 .000 .000 .000
.016 .000 .000 .000 .000
.054 .003 .000 .000 .000 .000
.106 .021 .000 .000 .000 .000 .000
.142 .063 .000 .000 .000 .000 .000 .000
.151 .114 .004 .000 .000 .000 .000 .000 .000
.136 .145 .026 .000 .000 .000 .000 .000 .000 .000
.060 .077 .029 .002 .000 .000 .000 .000 .000 .000 .000
.109 .162 .116 .027 .004 .000 .000 .000 .000 .000 .000 .000

ENSAIO B111/N
RESULTADOS DO MODELO

A	K	W	G	T0
.028	.275	.873	22.024	-2.202

PE= 6.6172
J0= 9

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
15	94.476	97.622	98.976	99.559	99.810	99.918
8	87.215	94.093	97.261	98.725	99.405	99.721
3	79.779	89.929	94.930	97.421	98.675	99.312
1.68	77.308	88.307	93.881	96.749	98.247	99.041
1.19	75.122	86.708	92.754	95.972	97.719	98.685
.841	72.140	84.370	91.017	94.718	96.829	98.060
.595	69.488	82.040	89.157	93.301	95.777	97.291
.42	65.911	78.815	86.510	91.227	94.192	96.097
.297	61.609	74.835	83.157	88.527	92.071	94.455
.21	54.973	67.240	75.096	80.237	83.668	86.367
.149	48.220	59.463	66.805	71.686	74.982	77.610
.125	44.793	55.496	62.560	67.295	70.513	73.100
.084	37.334	46.799	53.204	57.580	60.600	63.075

MATRIZ [S]

.028 .024 .019 .015 .013 .012 .011 .010 .009 .008 .007 .007

MATRIZ [B]

.002
.027 .001
.048 .008 .000
.078 .026 .000 .000
.101 .054 .002 .000 .000
.113 .083 .010 .000 .000 .000
.111 .104 .030 .003 .000 .000 .000
.102 .113 .059 .015 .003 .000 .000 .000
.087 .109 .086 .039 .015 .003 .000 .000 .000
.039 .052 .052 .031 .016 .005 .001 .000 .000 .000
.074 .105 .128 .097 .065 .032 .010 .001 .000 .000 .000

ENSAIO B111/N

RESULTADOS DO MODELO

A	K	W	G	T0
.127	.747	.879	31.423	31.022

PE= .1339 J0= 7
PC= .0447 I0= 10

AJUSTE NAO LINEAR - COM 'ESCUDO E COLCHAO ' CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
8	87.940	94.533	96.426	97.214	97.844	98.519
3	79.432	91.032	94.902	96.537	97.545	98.388
1.68	76.761	89.781	94.317	96.264	97.415	98.325
1.19	74.556	88.450	93.527	95.794	97.133	98.150
.841	71.651	86.418	92.152	94.869	96.501	97.708
.595	69.553	84.663	90.810	93.862	95.736	97.110
.42	65.589	80.661	87.226	90.748	93.058	94.832
.297	60.404	74.892	81.708	85.724	88.566	90.868
.21	54.323	67.960	74.642	78.988	82.322	85.177
.149	47.782	60.397	66.803	71.343	75.073	78.412
.125	44.353	56.384	62.601	67.173	71.053	74.598
.084	36.687	47.285	52.999	57.462	61.524	65.406

MATRIZ [S]

.127 .083 .047 .025 .017 .013 .010 .008 .006 .004 .003 .003

MATRIZ [B]

.000
.006 .000
.020 .001 .000
.046 .007 .000 .000
.075 .024 .000 .000 .000
.100 .052 .001 .000 .000 .000
.111 .081 .009 .000 .000 .000 .000
.112 .102 .028 .003 .000 .000 .000 .000
.102 .111 .056 .014 .003 .000 .000 .000 .000
.047 .057 .039 .015 .005 .001 .000 .000 .000 .000
.093 .121 .112 .061 .030 .010 .001 .000 .000 .000 .000

AMOSTRA B111

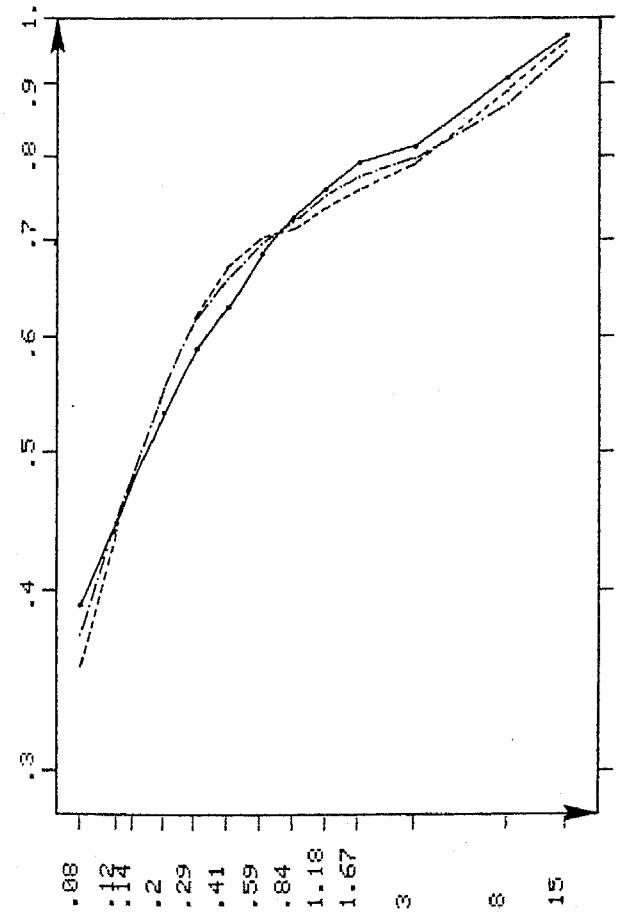
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

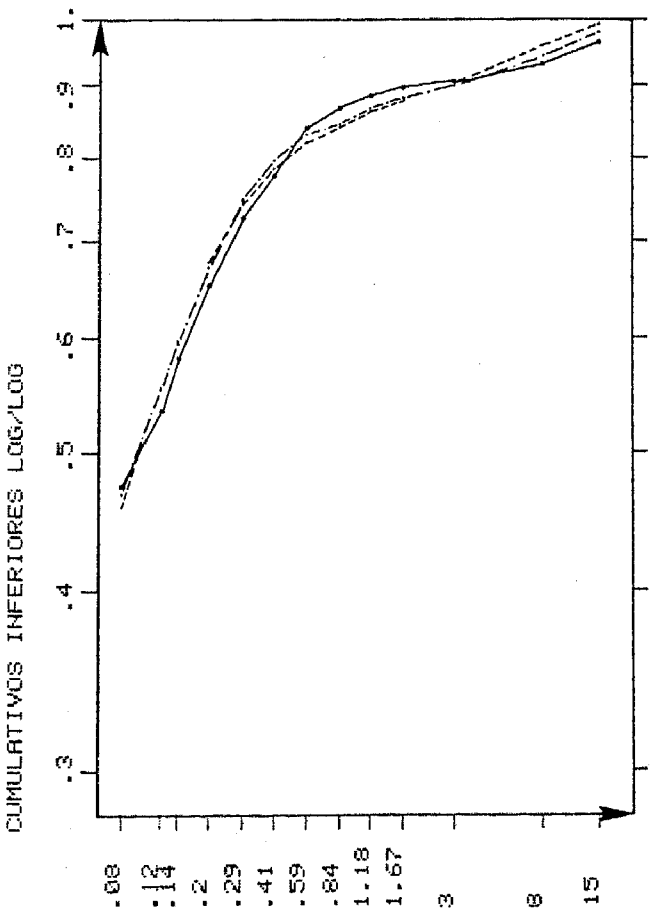
	PA	PK	PN	PG	T0	PE	J0
LINEAR	.042	.639	1.198	124.026	10.220	.000	0
N LINEAR	.028	.275	.873	22.024	-2.202	6.617	9

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA B111

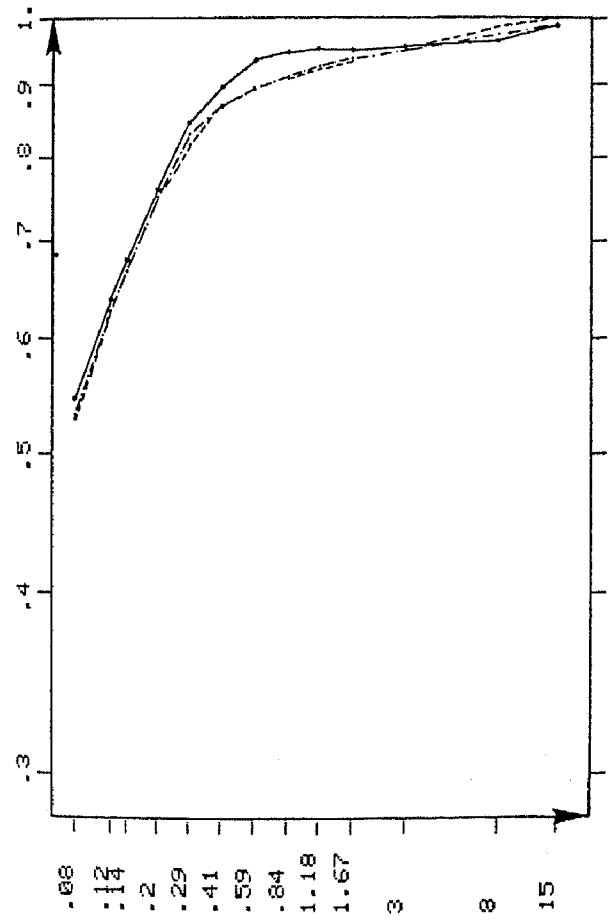
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

	PA	PK	PW	PG	T0	PE	J0
LINEAR	.042	.639	1.198	124.026	10.220	.000	0
N LINEAR	.028	.275	.873	22.024	-2.202	6.617	9

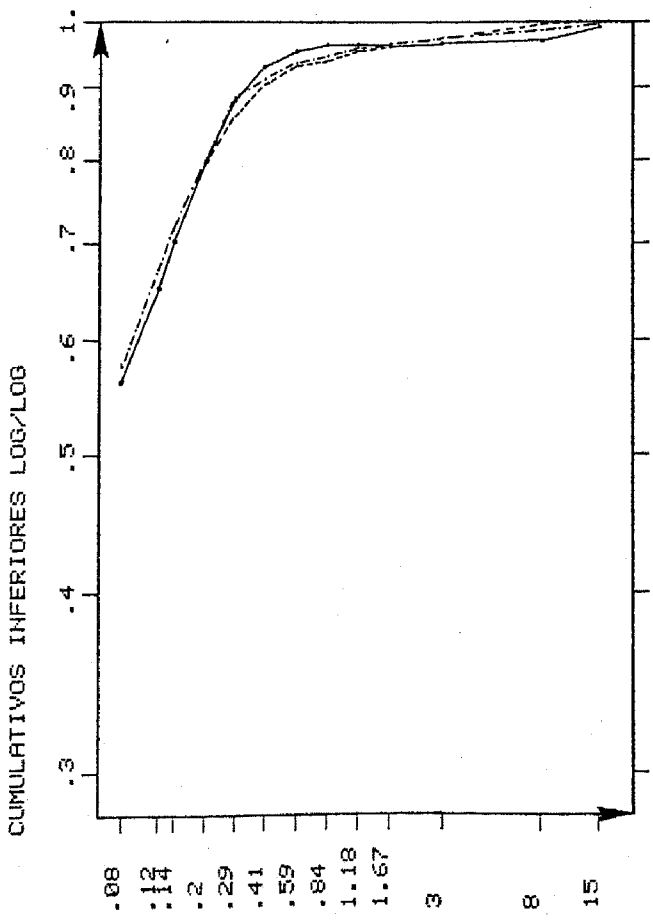
ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (–.–.–)

TEMPO RESIDENCIA 120



CALIBRE
MM

TEMPO RESIDENCIA 150



CALIBRE
MM

AMOSTRA B111

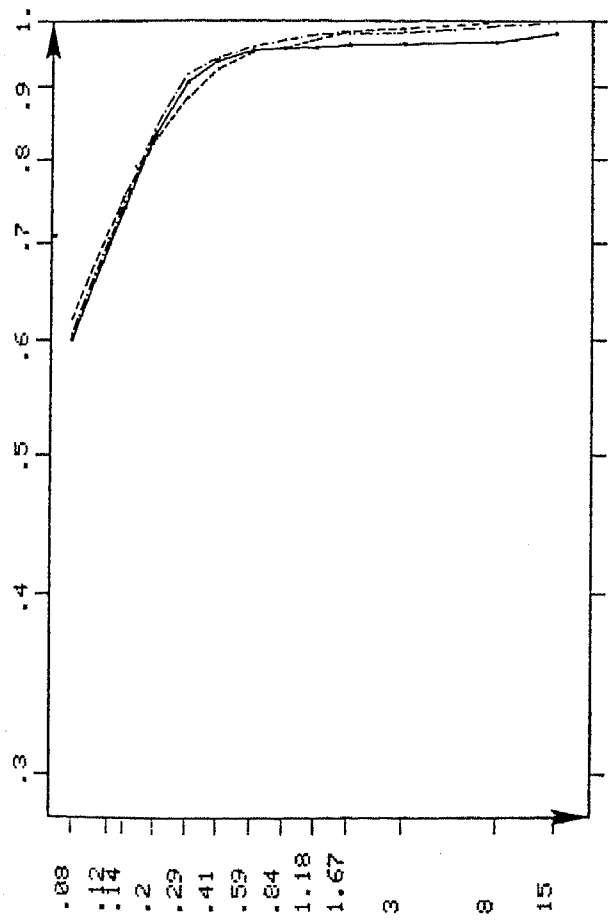
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

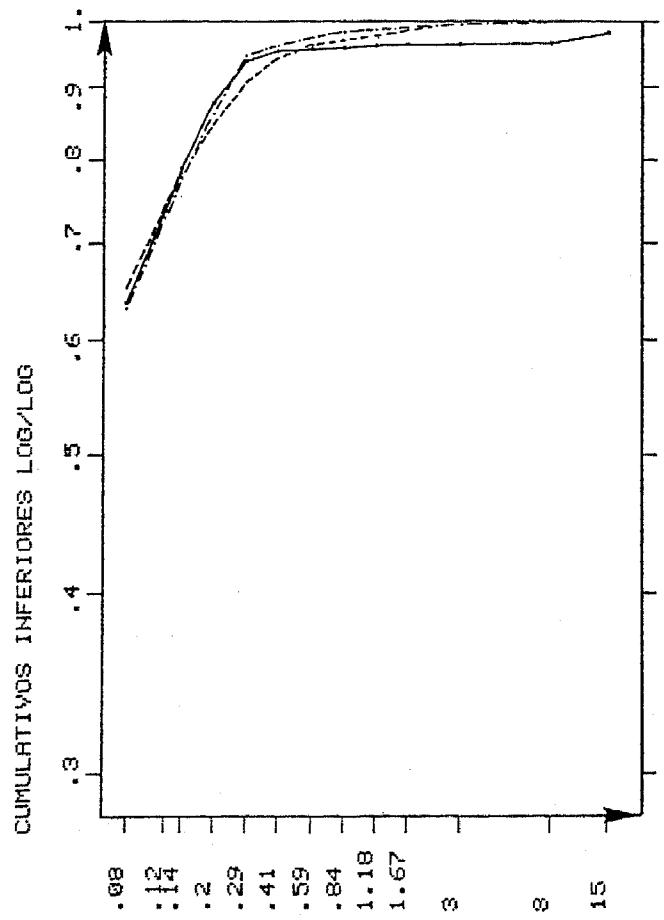
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.042	.639	1.198	124.026	10.220	.000	0
N LINEAR	.028	.275	.873	22.024	-2.202	6.617	9

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (–.–.–)

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



AMOSTRA B111

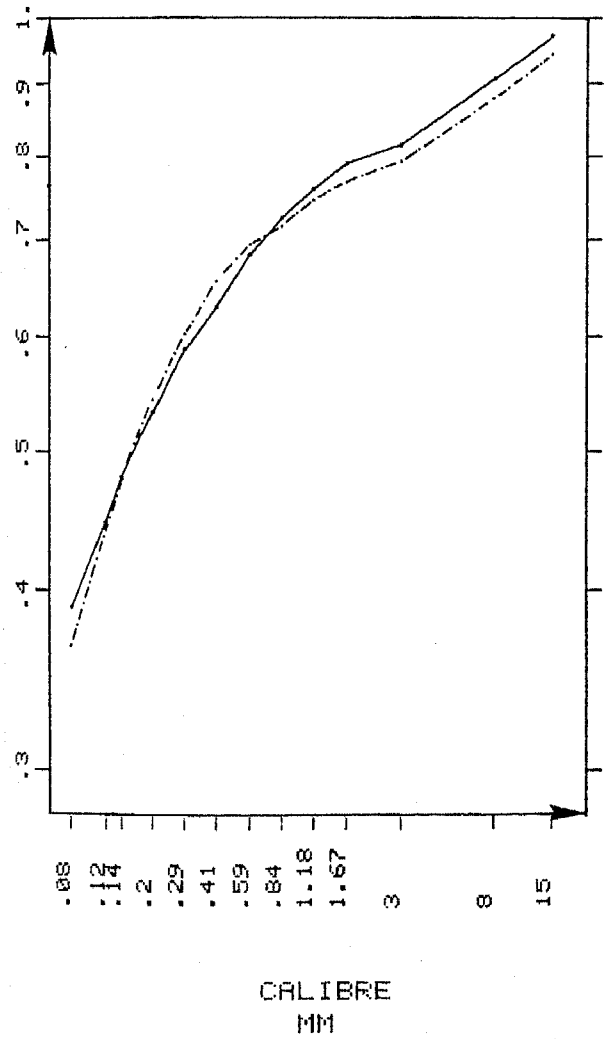
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

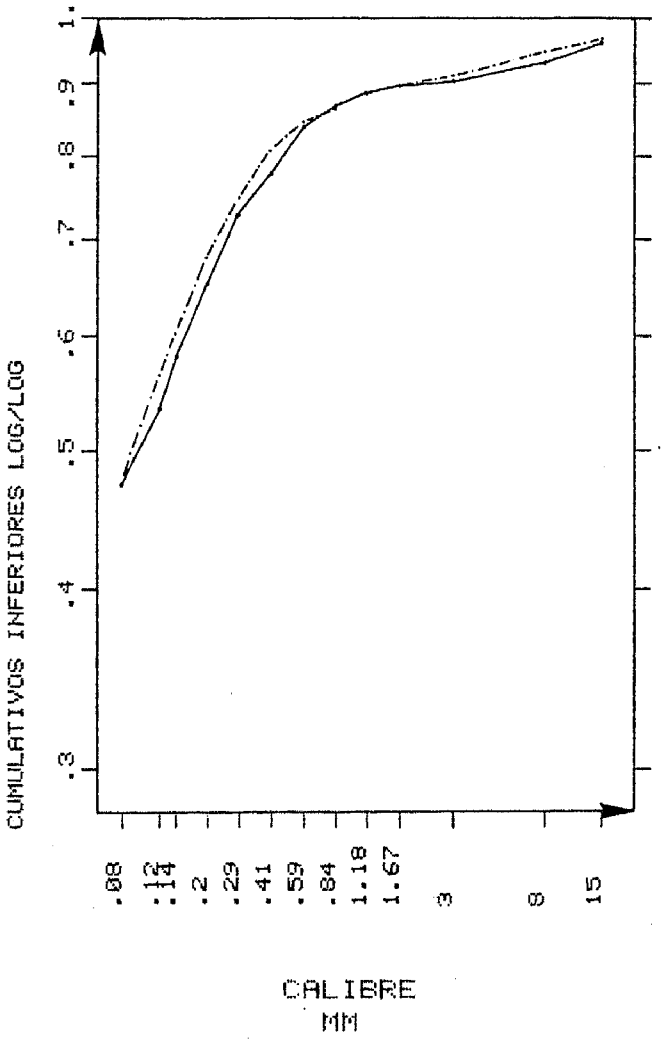
PA	PK	PW	PG	T0	PE	PC	J0	I0
.127	.747	.879	31.423	31.022	.133	.044	7	10

ENSAIO REAL (———)
ENSAIO SIMULADO (_._._)

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA B111

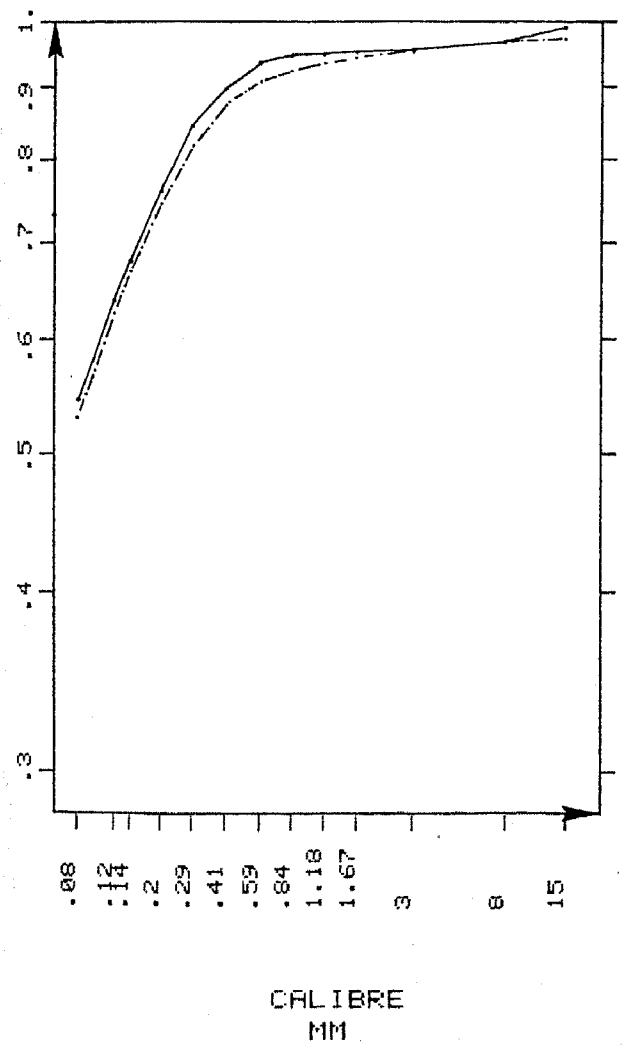
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [illegible]

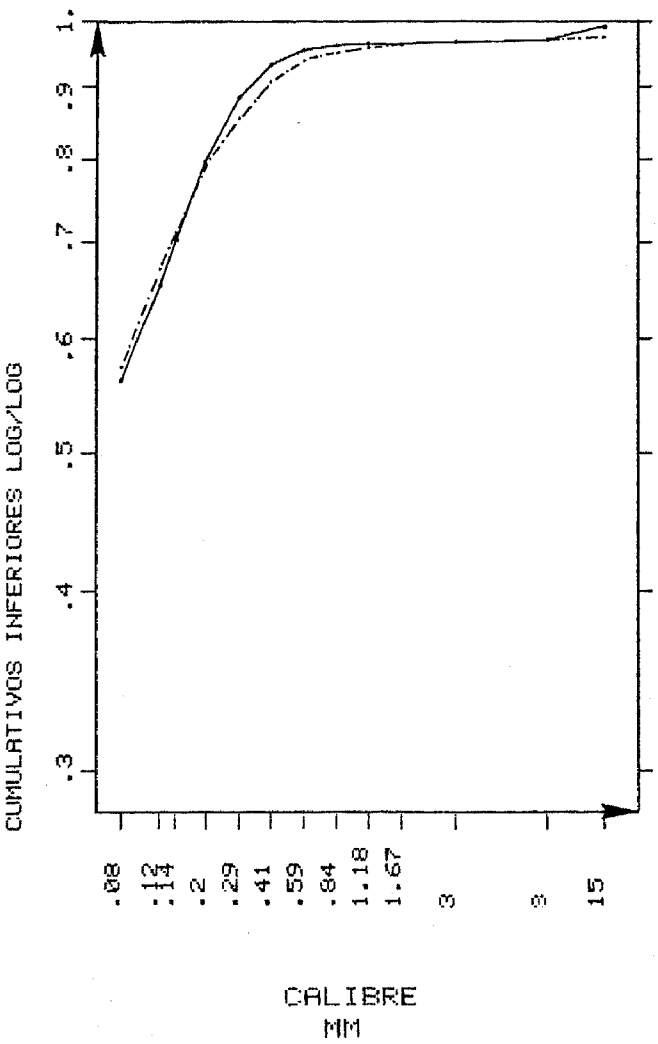
PA	PK	PW	PG	T0	PE	PC	J0	I0
.127	.747	.879	31.423	31.022	.133	.044	7	10

ENSAIO REAL (———)
ENSAIO SIMULADO (–.–.–)

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA B111

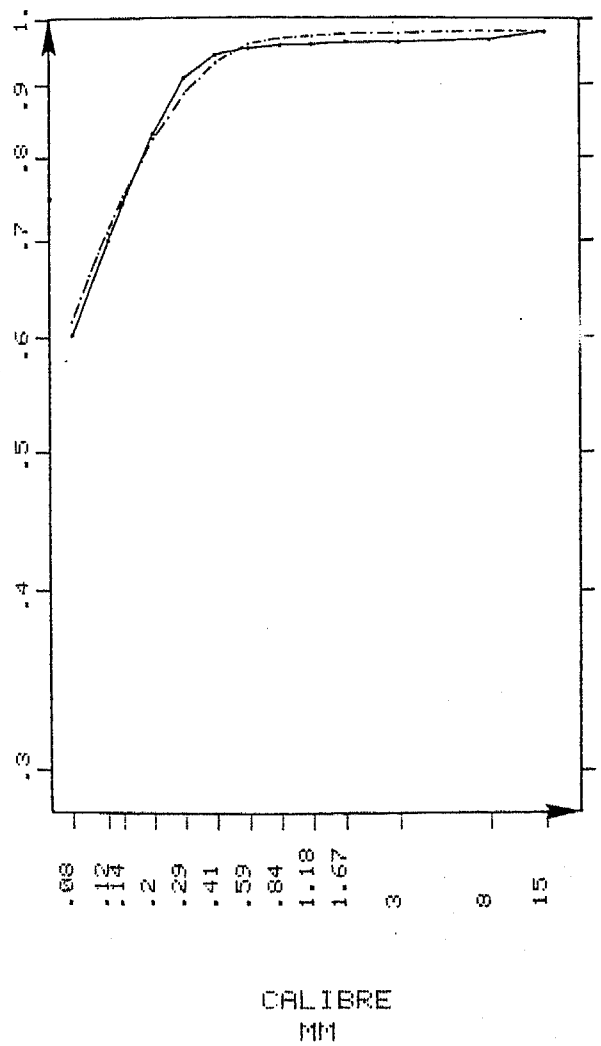
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

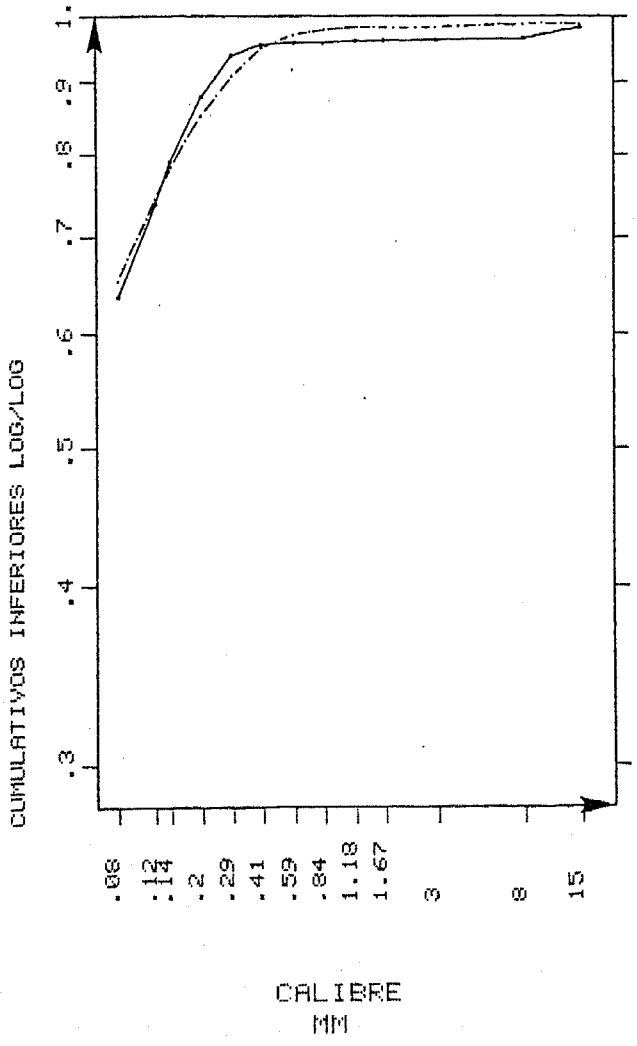
PA	PK	PN	PG	T0	PE	PC	J0	I0
.127	.747	.879	31.423	31.022	.133	.044	7	10

ENSAIO REAL (————)
ENSAIO SIMULADO (—.—.—)

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



ANEXO VI

AMOSTRA B 112

. XISTO BRECHÓIDE DE NISA

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS FINAS (25 MM)

. ENCHIMENTO BAIXO (25 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÃO MODELO LINEAR - CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÃO MODELO NÃO LINEAR COM ESCUDO E COM ESCUDO+COLCHÃO
. CUMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA B112/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	634	31.700	68.300	31.700
8	8.000	648	32.400	35.900	64.100
3	3.000	495	24.750	11.150	88.850
12	1.697	107	5.350	5.800	94.200
16	1.200	61	3.050	2.750	97.250
20	.848	55	2.750	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA B112/ 1 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	112	5.600	94.400	5.600
8	8.000	105	5.250	89.150	10.850
3	3.000	81	4.050	85.100	14.900
12	1.697	18	.900	84.200	15.800
16	1.200	23	1.150	83.050	16.950
20	.848	37	1.850	81.200	18.800
30	.600	55	2.750	78.450	21.550
40	.424	102	5.100	73.350	26.650
50	.300	92	4.600	68.750	31.250
70	.212	134	6.700	62.050	37.950
100	.150	129	6.450	55.600	44.400
140	.125	70	3.500	52.100	47.900
200	.084	130	6.500	45.600	54.400

ANALISE GRANULOMETRICA

AMOSTRA B112/ 2 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	23	1.150	98.850	1.150
8	8.000	37	1.850	97.000	3.000
3	3.000	23	1.150	95.850	4.150
12	1.697	5	.250	95.600	4.400
16	1.200	3	.150	95.450	4.550
20	.848	6	.300	95.150	4.850
30	.600	14	.700	94.450	5.550
40	.424	57	2.850	91.600	8.400
50	.300	87	4.350	87.250	12.750
70	.212	164	8.200	79.050	20.950
100	.150	171	8.550	70.500	29.500
140	.125	83	4.150	66.350	33.650
200	.084	179	8.950	57.400	42.600

ANALISE GRANULOMETRICA

AMOSTRA B112/ 3 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	71	3.550	96.450	3.550
8	8.000	78	3.900	92.550	7.450
3	3.000	40	2.000	90.550	9.450
12	1.697	7	.350	90.200	9.800
16	1.200	8	.400	89.800	10.200
20	.848	15	.750	89.050	10.950
30	.600	31	1.550	87.500	12.500
40	.424	82	4.100	83.400	16.600
50	.300	94	4.700	78.700	21.300
70	.212	155	7.750	70.950	29.050
100	.150	154	7.700	63.250	36.750
140	.125	87	4.350	58.900	41.100
200	.084	158	7.900	51.000	49.000

ANALISE GRANULOMETRICA

AMOSTRA B112/ 4 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	68	3.400	96.600	3.400
8	8.000	21	1.050	95.550	4.450
3	3.000	12	.600	94.950	5.050
12	1.697	3	.150	94.800	5.200
16	1.200	3	.150	94.650	5.350
20	.848	4	.200	94.450	5.550
30	.600	6	.300	94.150	5.850
40	.424	28	1.400	92.750	7.250
50	.300	63	3.150	89.600	10.400
70	.212	155	7.750	81.850	18.150
100	.150	186	9.300	72.550	27.450
140	.125	107	5.350	67.200	32.800
200	.084	211	10.550	56.650	43.350

ANALISE GRANULOMETRICA

AMOSTRA B112/ 5 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	45	2.250	97.750	2.250
8	8.000	48	2.400	95.350	4.650
3	3.000	17	.850	94.500	5.500
12	1.697	3	.150	94.350	5.650
16	1.200	2	.100	94.250	5.750
20	.848	3	.150	94.100	5.900
30	.600	4	.200	93.900	6.100
40	.424	17	.850	93.050	6.950
50	.300	44	2.200	90.850	9.150
70	.212	136	6.800	84.050	15.950
100	.150	182	9.100	74.950	25.050
140	.125	99	4.950	70.000	30.000
200	.084	220	11.000	59.000	41.000

ANALISE GRANULOMETRICA

AMOSTRA B112/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	54	2.700	97.300	2.700
8	8.000	37	1.850	95.450	4.550
3	3.000	16	.800	94.650	5.350
12	1.697	4	.200	94.450	5.550
16	1.200	3	.150	94.300	5.700
20	.848	4	.200	94.100	5.900
30	.600	6	.300	93.800	6.200
40	.424	25	1.250	92.550	7.450
50	.300	53	2.650	89.900	10.100
70	.212	141	7.050	82.850	17.150
100	.150	173	8.650	74.200	25.800
140	.125	92	4.600	69.600	30.400
200	.084	227	11.350	58.250	41.750

ANALISE GRANULOMETRICA

AMOSTRA B112/ 7 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	37	1.850	98.150	1.850
8	8.000	18	.900	97.250	2.750
3	3.000	9	.450	96.800	3.200
12	1.697	2	.100	96.700	3.300
16	1.200	3	.150	96.550	3.450
20	.848	2	.100	96.450	3.550
30	.600	3	.150	96.300	3.700
40	.424	7	.350	95.950	4.050
50	.300	23	1.150	94.800	5.200
70	.212	102	5.100	89.700	10.300
100	.150	181	9.050	80.650	19.350
140	.125	120	6.000	74.650	25.350
200	.084	234	11.700	62.950	37.050

ANALISE GRANULOMETRICA

AMOSTRA B112/ 8 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	27	1.350	98.650	1.350
8	8.000	14	.700	97.950	2.050
3	3.000	10	.500	97.450	2.550
12	1.697	3	.150	97.300	2.700
16	1.200	3	.150	97.150	2.850
20	.848	3	.150	97.000	3.000
30	.600	4	.200	96.800	3.200
40	.424	10	.500	96.300	3.700
50	.300	29	1.450	94.850	5.150
70	.212	111	5.550	89.300	10.700
100	.150	184	9.200	80.100	19.900
140	.125	119	5.950	74.150	25.850
200	.084	234	11.700	62.450	37.550

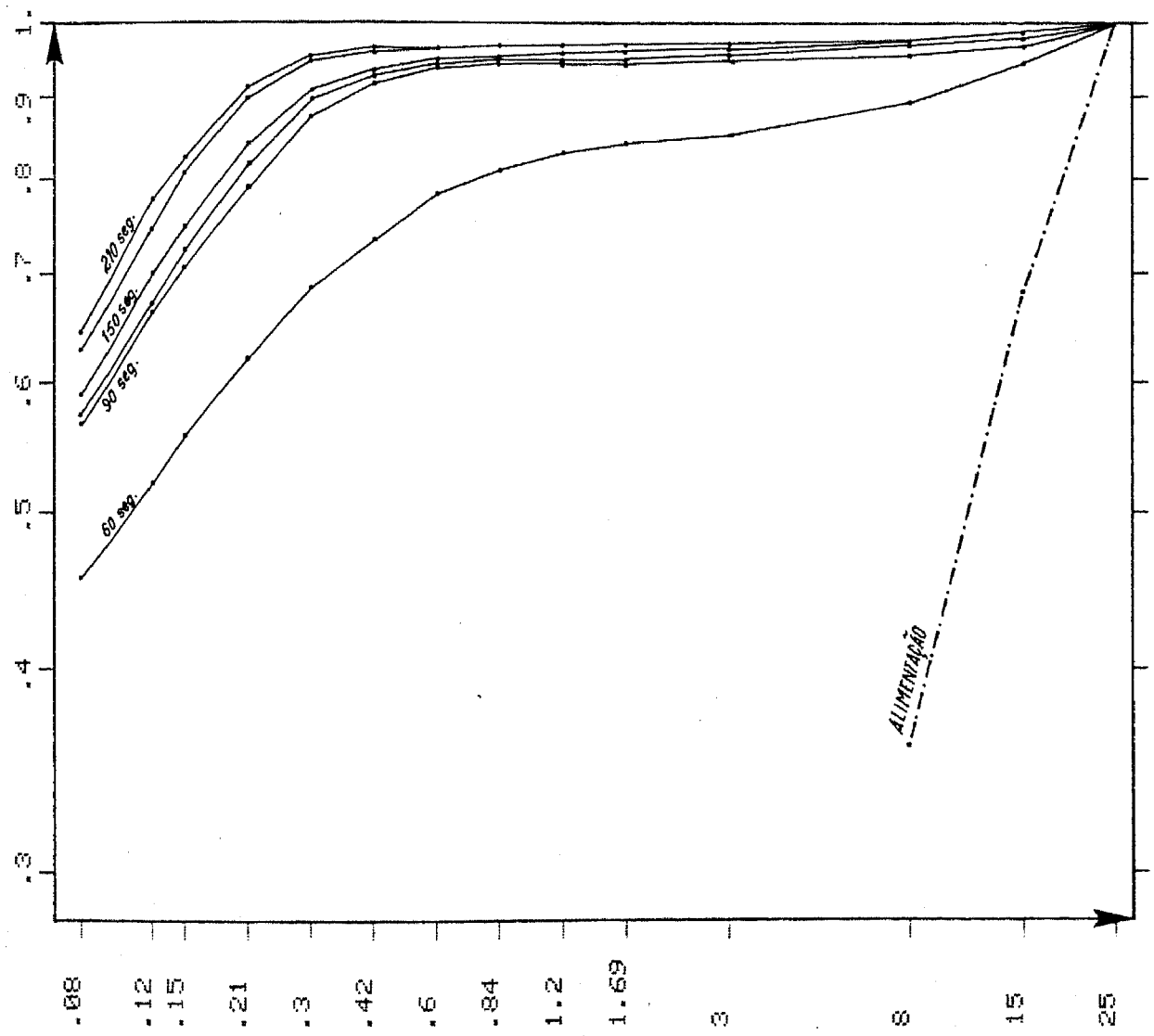
ANALISE GRANULOMETRICA

AMOSTRA B112/ 9 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	37	1.850	98.150	1.850
8	8.000	23	1.150	97.000	3.000
3	3.000	6	.300	96.700	3.300
12	1.697	2	.100	96.600	3.400
16	1.200	2	.100	96.500	3.500
20	.848	2	.100	96.400	3.600
30	.600	3	.150	96.250	3.750
40	.424	5	.250	96.000	4.000
50	.300	17	.850	95.150	4.850
70	.212	83	4.150	91.000	9.000
100	.150	168	8.400	82.600	17.400
140	.125	99	4.950	77.650	22.350
200	.084	265	13.250	64.400	35.600

CUMULATIVOS INFERIORES

AMOSTRA B112/ N



ENSAIO B112/N

RESULTADOS DO MODELO

A	K	W	G	T0
.054	.682	1.353	275.655	6.279

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
15	98.285	99.663	99.934	99.987	99.997	99.999
8	93.867	98.211	99.456	99.830	99.945	99.982
3	86.322	94.325	97.455	98.799	99.414	99.709
1.68	83.593	92.451	96.168	97.915	98.807	99.292
1.19	81.712	91.016	95.073	97.080	98.171	98.806
.841	79.758	89.434	93.795	96.047	97.337	98.133
.595	79.119	88.861	93.305	95.632	96.986	97.836
.42	76.904	86.803	91.477	94.027	95.579	96.605
.297	72.308	82.385	87.432	90.368	92.280	93.633
.21	65.299	75.442	80.909	84.326	86.708	88.500
.149	56.908	66.918	72.730	76.604	79.455	81.700
.125	52.418	62.271	68.202	72.272	75.336	77.793
.084	42.337	51.595	57.618	62.003	65.455	68.319

MATRIZ [S]

.054 .037 .022 .012 .009 .007 .005 .004 .003 .002 .002 .001

MATRIZ [B]

.000
.000
.000 .000 .000
.000 .000 .000 .000
.003 .000 .000 .000 .000
.026 .000 .000 .000 .000 .000
.082 .005 .000 .000 .000 .000 .000
.142 .034 .000 .000 .000 .000 .000 .000
.170 .094 .000 .000 .000 .000 .000 .000 .000
.159 .149 .007 .000 .000 .000 .000 .000 .000 .000
.070 .086 .014 .000 .000 .000 .000 .000 .000 .000 .000
.126 .189 .088 .007 .000 .000 .000 .000 .000 .000 .000 .000

ENSAIO B112/N

RESULTADOS DO MODELO

A	K	W	G	T0
.028	.169	.917	38.457	-8.596

PE= .8602
J0= 8

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS -->	60.000	90.000	120.000	150.000	180.000	210.000
15	95.419	98.034	99.156	99.637	99.844	99.933
8	89.831	95.443	97.955	99.081	99.586	99.813
3	84.509	92.726	96.567	98.372	99.224	99.628
1.68	83.066	91.917	96.115	98.119	99.083	99.550
1.19	81.983	91.257	95.718	97.883	98.944	99.468
.841	80.539	90.303	95.108	97.501	98.707	99.323
.595	79.298	89.351	94.440	97.053	98.415	99.136
.42	77.211	87.717	93.266	96.249	97.878	98.784
.297	71.899	81.857	87.291	91.340	94.338	96.369
.21	65.501	74.782	79.910	83.907	88.083	91.732
.149	58.462	66.977	71.753	75.587	79.977	85.063
.125	54.710	62.806	67.387	71.130	75.530	81.245
.084	46.157	53.272	57.387	60.907	65.219	72.024

MATRIZ [S]

.028 .025 .022 .019 .018 .017 .016 .015 .014 .013 .012 .012 .011

MATRIZ [B]

.000
.003 .000
.015 .000 .000
.039 .004 .000 .000
.070 .018 .000 .000 .000
.099 .045 .000 .000 .000 .000
.115 .077 .006 .000 .000 .000 .000
.117 .103 .022 .001 .000 .000 .000 .000
.108 .115 .049 .010 .001 .000 .000 .000 .000
.050 .059 .037 .012 .003 .000 .000 .000 .000 .000
.097 .128 .111 .054 .023 .006 .000 .000 .000 .000 .000

ENSAIO B112/N

RESULTADOS DO MODELO

A	K	W	G	T0
.280	.739	.923	35.379	34.876

PE= .208 J0= 8
PC= .0286 I0= 8

AJUSTE NAO LINEAR - COM 'ESCUDO E COLCHAO ' CUMULOS INFERIORES

LUZ \TEMPOS -->	60.000	90.000	120.000	150.000	180.000	210.000
8	91.119	94.852	95.765	96.417	97.877	99.465
3	85.719	93.318	95.281	96.261	97.830	99.453
1.68	83.772	92.642	95.038	96.172	97.792	99.435
1.19	82.107	91.944	94.744	96.042	97.719	99.384
.841	80.006	91.085	94.401	95.895	97.617	99.297
.595	78.179	90.112	93.913	95.633	97.409	99.111
.42	75.052	88.147	92.749	94.927	96.890	98.689
.297	69.224	82.506	87.637	90.330	92.923	95.666
.21	62.377	75.122	80.238	83.279	86.575	90.542
.149	55.019	67.080	72.018	75.212	79.094	84.200
.125	51.160	62.814	67.644	70.866	74.993	80.613
.084	42.521	53.138	57.679	60.874	65.416	72.003

MATRIZ [S]

.280 .185 .106 .057 .040 .031 .024 .018 .014 .011 .008 .007

MATRIZ [B]

.000
.006 .000
.021 .001 .000
.049 .007 .000 .000
.081 .025 .000 .000 .000
.107 .055 .001 .000 .000 .000
.118 .087 .009 .000 .000 .000 .000
.116 .109 .030 .003 .000 .000 .000 .000
.104 .117 .060 .014 .003 .000 .000 .000 .000
.047 .059 .042 .016 .005 .000 .000 .000 .000 .000
.091 .124 .120 .066 .031 .010 .001 .000 .000 .000 .000

AMOSTRA B112

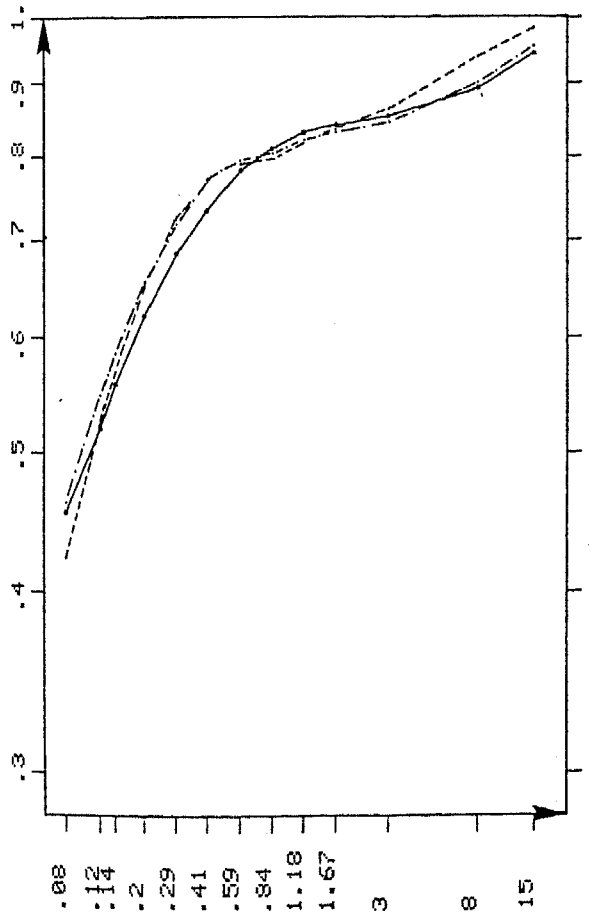
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

	PA	PK	PW	PG	T0	PE	J0
LINEAR	.054	.682	1.353	275.655	6.279	.000	0
N LINEAR	.028	.169	.917	38.457	-8.596	.860	0

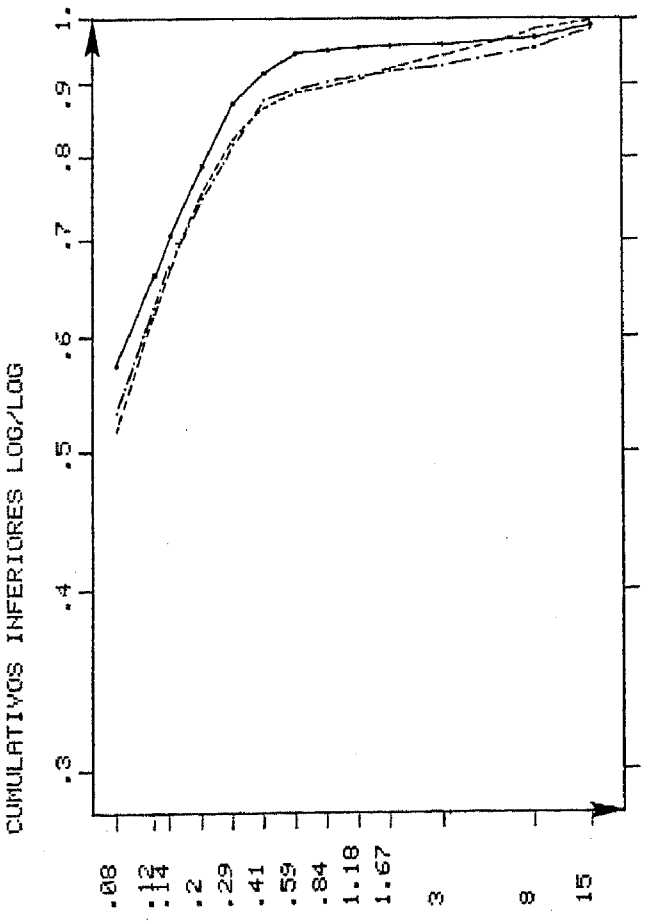
ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <- - - - ->
ENSAIO SIMULADO N LINEAR C/ ESCUDO <—.—.—>

TEMPO RESIDENCIA 60



CALIBRE
MM

TEMPO RESIDENCIA 90



CALIBRE
MM

AMOSTRA B112

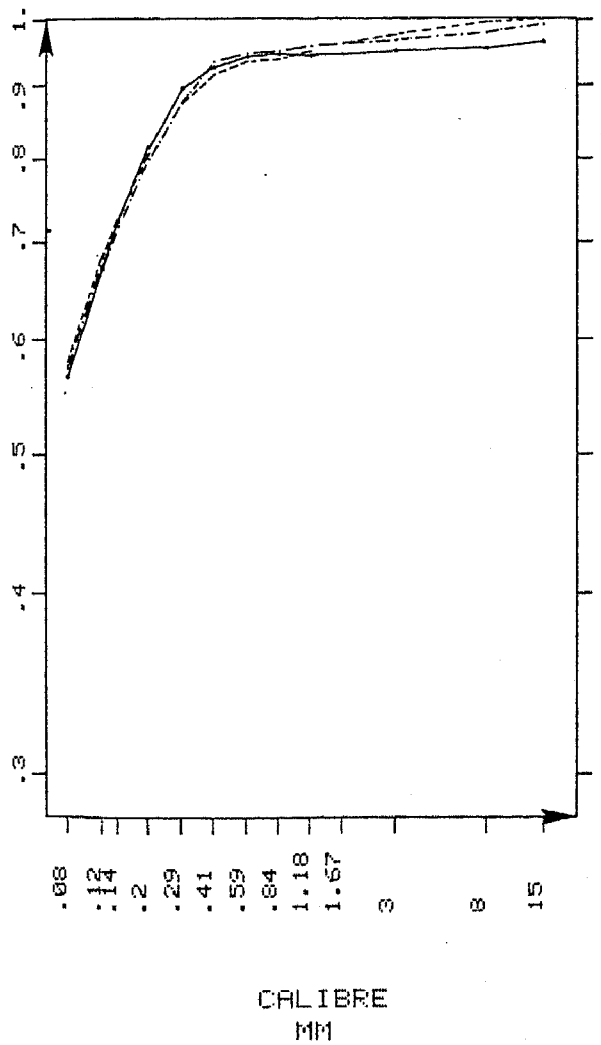
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

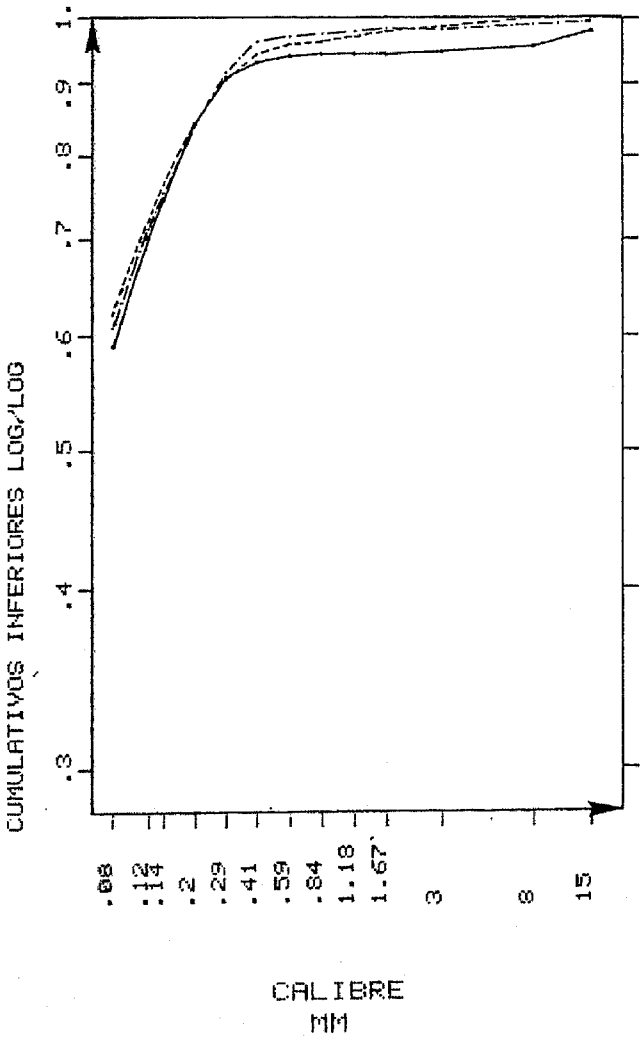
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.054	.682	1.353	275.655	6.279	.000	0
N LINEAR	.028	.169	.917	38.457	-8.596	.860	8

ENSAIO REAL
ENSAIO SIMULADO LINEAR
ENSAIO SIMULADO N LINEAR C/ ESCUDO

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA B112

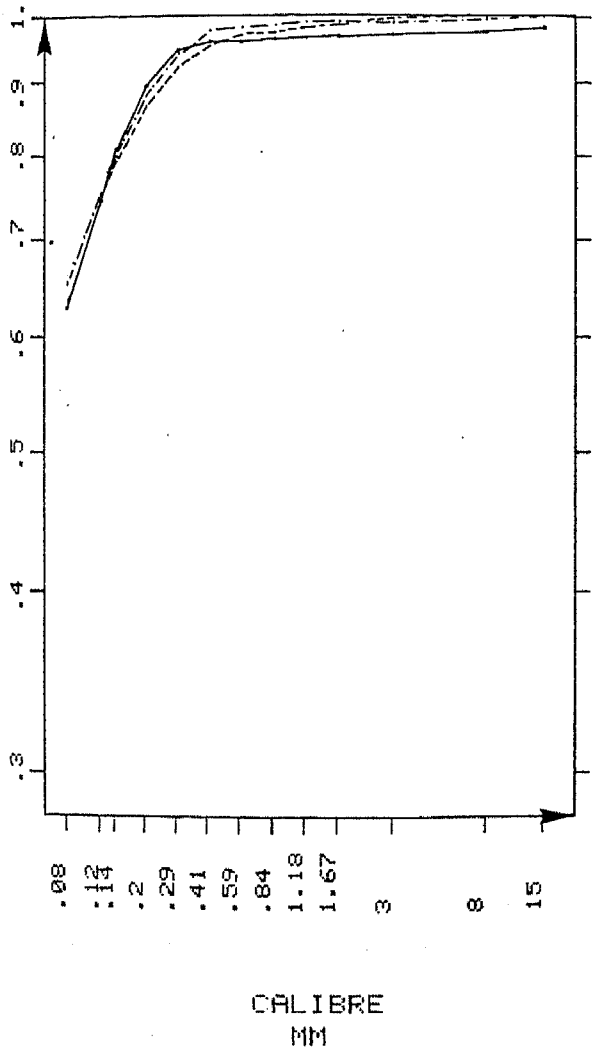
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

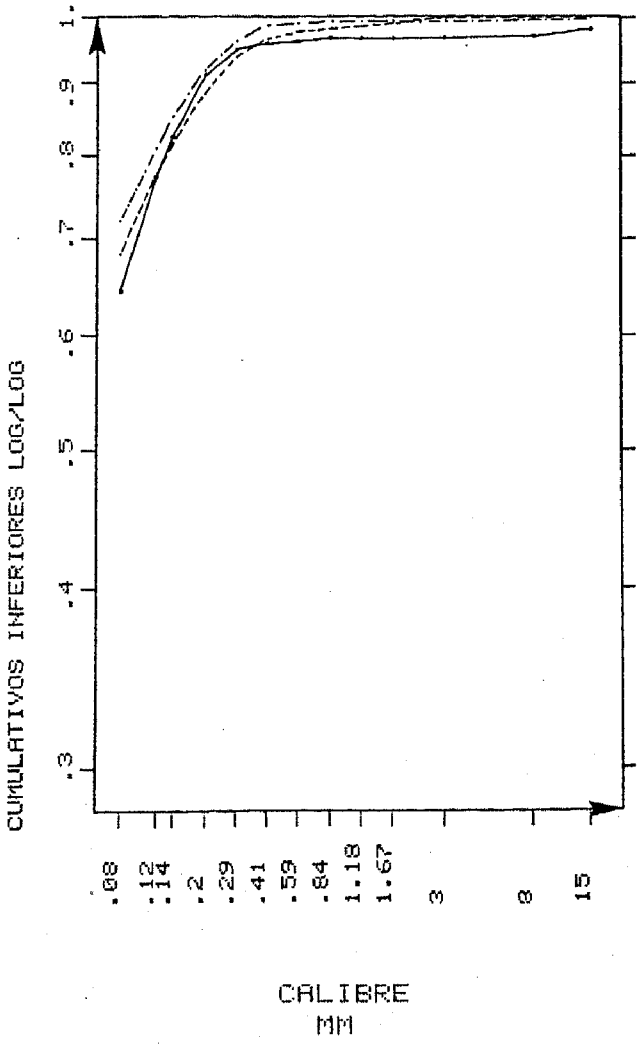
	PA	PK	PN	PG	T0	PE	J0
LINEAR	.054	.682	1.353	275.655	6.279	.000	0
N LINEAR	.028	.169	.917	38.457	-8.596	.860	0

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (_._._)

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



AMOSTRA B112

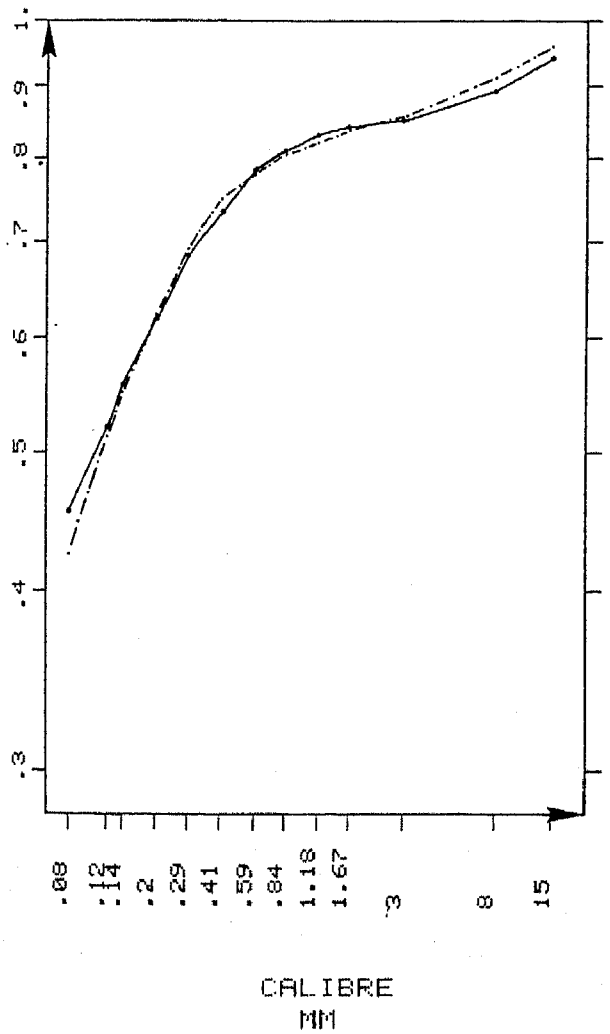
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [illegible]

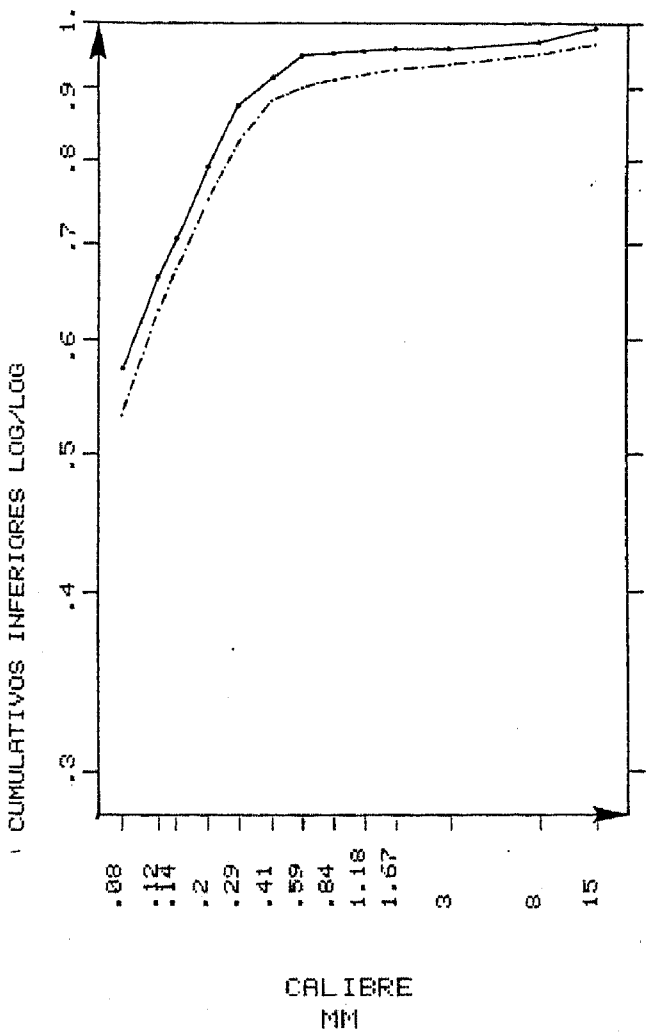
PA	PK	PW	PG	T0	PE	PC	J0	I0
.280	.739	.923	35.379	34.876	.208	.028	8	8

ENSAIO REAL <———>
ENSAIO SIMULADO <–.–.–>

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA B112

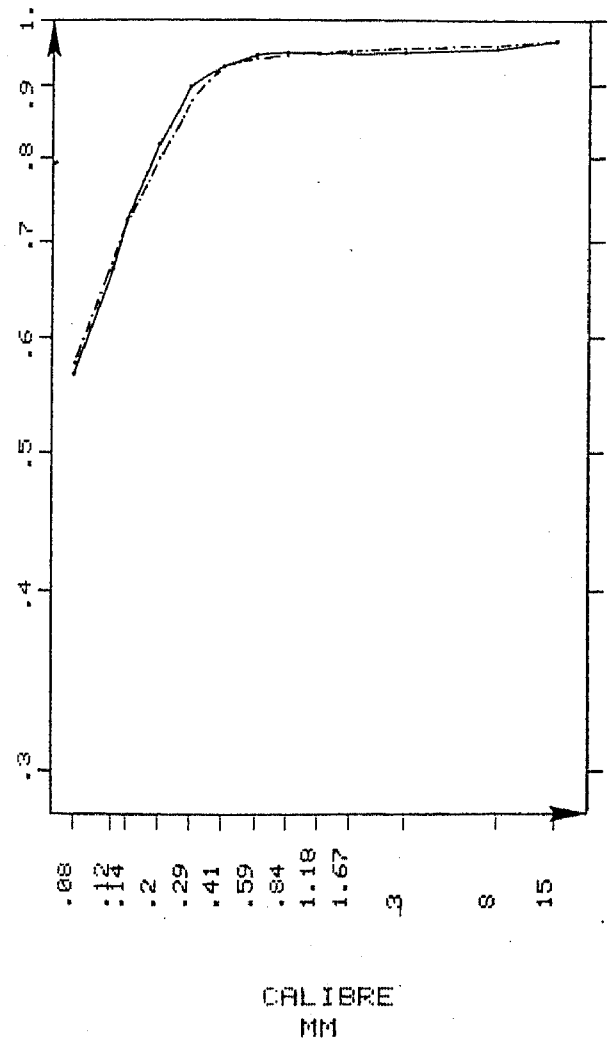
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

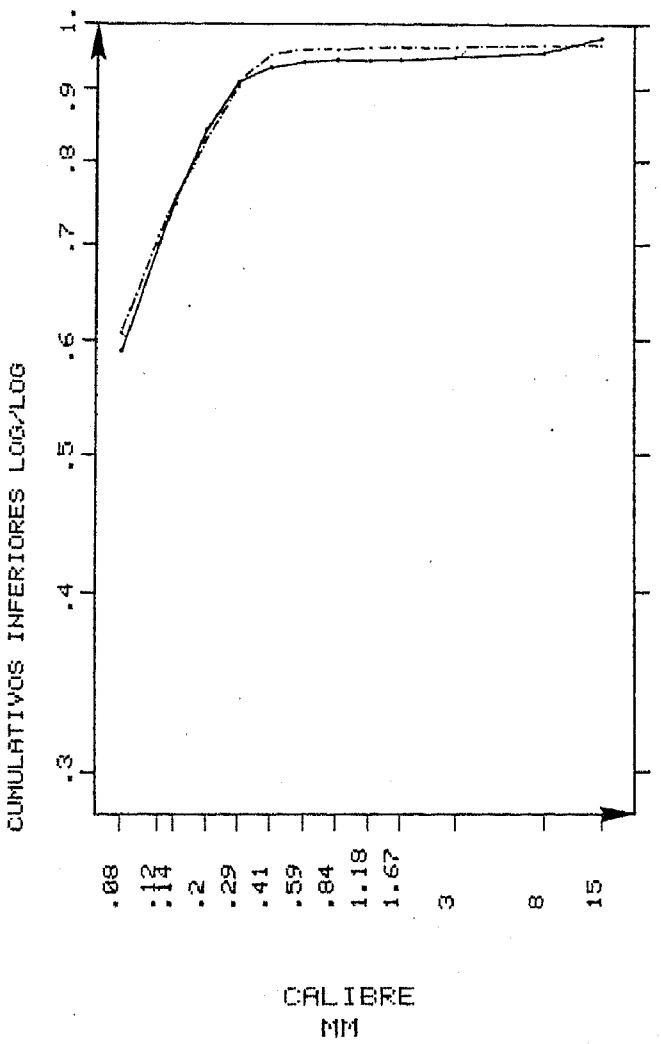
PA	PK	PN	PG	T0	PE	PC	J0	I0
.280	.739	.923	35.379	34.876	.208	.028	8	8

ENSAIO REAL (———)
ENSAIO SIMULADO (_._._)

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA B112

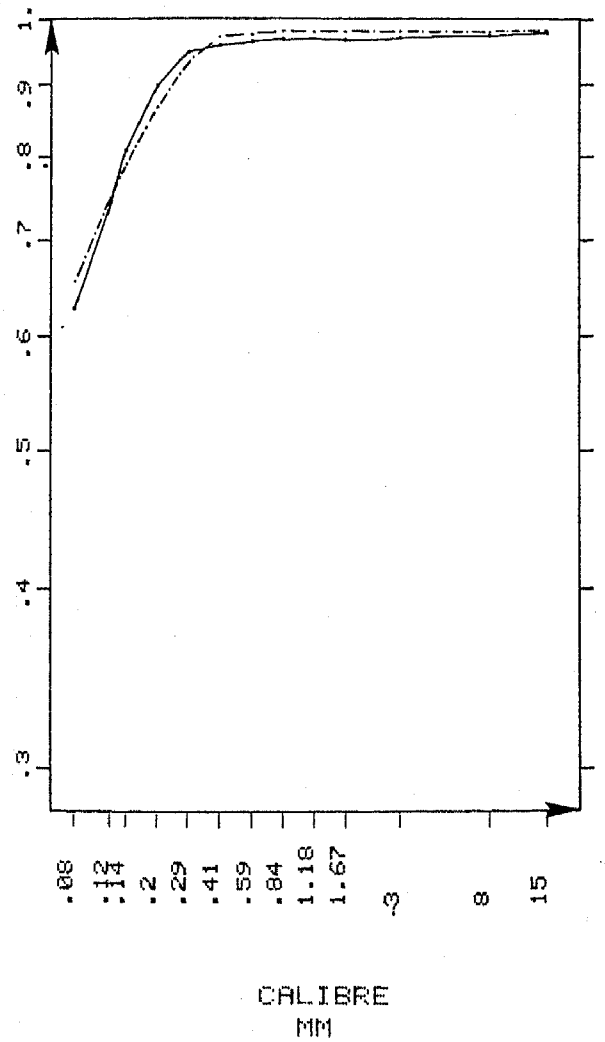
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

PA	PK	PW	PG	T0	PE	PC	J0	I0
.280	.739	.923	35.379	34.876	.208	.028	8	8

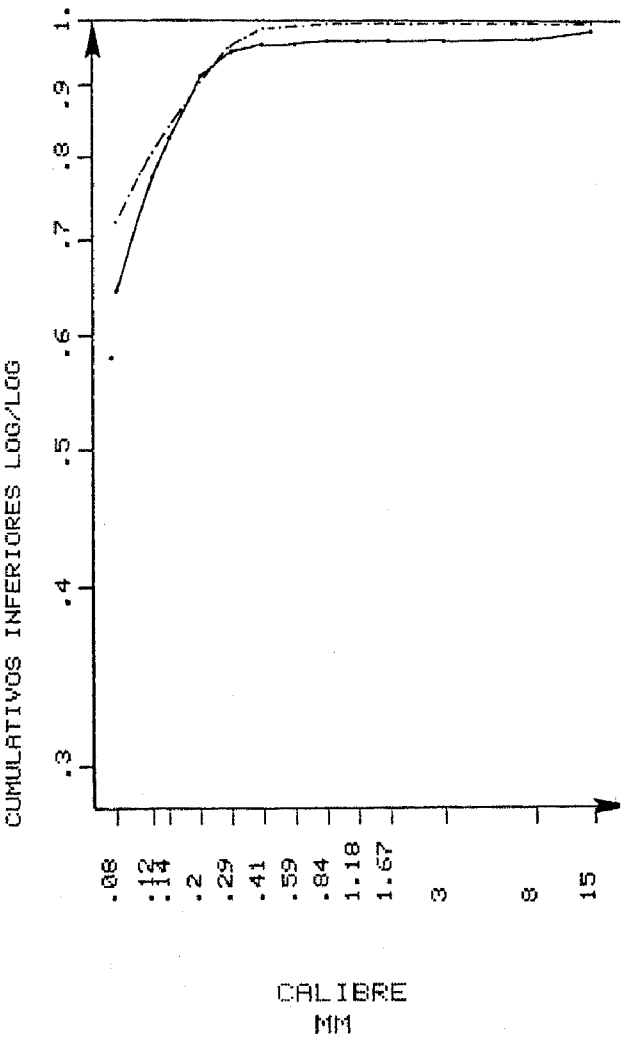
ENSAIO REAL (———)
ENSAIO SIMULADO (—.—.—)

TEMPO RESIDENCIA 180



CALIBRE
MM

TEMPO RESIDENCIA 210



CALIBRE
MM

ANEXO VII

AMOSTRA B 121

. XISTO BRECHÓIDE DE NISA

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS GROSSAS (35 MM)

. ENCHIMENTO ALTO (40 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO E COM ESCUDO+COLCHÃO
CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA B121-/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	1015	31.718	68.281	31.718
8	8.000	1037	32.406	35.875	64.125
3	3.000	791	24.718	11.156	88.843
12	1.697	172	5.375	5.781	94.218
16	1.200	97	3.031	2.750	97.250
20	.848	88	2.750	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA B121-/ 1 T= 60

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	116	3.625	96.375	3.625
8	8.000	109	3.406	92.968	7.031
3	3.000	223	6.968	86.000	14.000
12	1.697	110	3.437	82.562	17.437
16	1.200	141	4.406	78.156	21.843
20	.848	151	4.718	73.437	26.562
30	.600	144	4.500	68.937	31.062
40	.424	180	5.625	63.312	36.687
50	.300	124	3.875	59.437	40.562
70	.212	167	5.218	54.218	45.781
100	.150	152	4.750	49.468	50.531
140	.125	83	2.593	46.875	53.125
200	.084	182	5.687	41.187	58.812

ANALISE GRANULOMETRICA

AMOSTRA B121-/ 2 T= 90

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	66	2.062	97.937	2.062
8	8.000	50	1.562	96.375	3.625
3	3.000	26	.812	95.562	4.437
12	1.697	19	.593	94.968	5.031
16	1.200	39	1.218	93.750	6.250
20	.848	85	2.656	91.093	8.906
30	.600	132	4.125	86.968	13.031
40	.424	224	7.000	79.968	20.031
50	.300	180	5.625	74.343	25.656
70	.212	234	7.312	67.031	32.968
100	.150	214	6.687	60.343	39.656
140	.125	101	3.156	57.187	42.812
200	.084	247	7.718	49.468	50.531

ANALISE GRANULOMETRICA

AMOSTRA B121/ 3 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	22	.687	99.312	.687
8	8.000	61	1.906	97.406	2.593
3	3.000	29	.906	96.500	3.500
12	1.697	13	.406	96.093	3.906
16	1.200	24	.750	95.343	4.656
20	.848	62	1.937	93.406	6.593
30	.600	120	3.750	89.656	10.343
40	.424	237	7.406	82.250	17.750
50	.300	206	6.437	75.812	24.187
70	.212	270	8.437	67.375	32.625
100	.150	243	7.593	59.781	40.218
140	.125	138	4.312	55.468	44.531
200	.084	242	7.562	47.906	52.093

ANALISE GRANULOMETRICA

AMOSTRA B121/ 4 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	36	1.125	98.875	1.125
8	8.000	21	.656	98.218	1.781
3	3.000	11	.343	97.875	2.125
12	1.697	5	.156	97.718	2.281
16	1.200	7	.218	97.500	2.500
20	.848	22	.687	96.812	3.187
30	.600	61	1.906	94.906	5.093
40	.424	176	5.500	89.406	10.593
50	.300	188	5.875	83.531	16.468
70	.212	279	8.718	74.812	25.187
100	.150	256	8.000	66.812	33.187
140	.125	123	3.843	62.968	37.031
200	.084	285	8.906	54.062	45.937

ANALISE GRANULOMETRICA

AMOSTRA B121/ 5 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	45	1.406	98.593	1.406
8	8.000	23	.718	97.875	2.125
3	3.000	9	.281	97.593	2.406
12	1.697	3	.093	97.500	2.500
16	1.200	4	.125	97.375	2.625
20	.848	7	.218	97.156	2.843
30	.600	24	.750	96.406	3.593
40	.424	120	3.750	92.656	7.343
50	.300	173	5.406	87.250	12.750
70	.212	302	9.437	77.812	22.187
100	.150	296	9.250	68.562	31.437
140	.125	161	5.031	63.531	36.468
200	.084	313	9.781	53.750	46.250

ANALISE GRANULOMETRICA

AMOSTRA B121/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	50	1.562	98.437	1.562
8	8.000	33	1.031	97.406	2.593
3	3.000	6	.187	97.218	2.781
12	1.697	3	.093	97.125	2.875
16	1.200	3	.093	97.031	2.968
20	.848	7	.218	96.812	3.187
30	.600	28	.875	95.937	4.062
40	.424	122	3.812	92.125	7.875
50	.300	163	5.093	87.031	12.968
70	.212	283	8.843	78.187	21.812
100	.150	277	8.656	69.531	30.468
140	.125	164	5.125	64.406	35.593
200	.084	254	7.937	56.468	43.531

ANALISE GRANULOMETRICA

AMOSTRA B121/ 7 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	60	1.875	98.125	1.875
8	8.000	31	.968	97.156	2.843
3	3.000	15	.468	96.687	3.312
12	1.697	3	.093	96.593	3.406
16	1.200	3	.093	96.500	3.500
20	.848	6	.187	96.312	3.687
30	.600	23	.718	95.593	4.406
40	.424	122	3.812	91.781	8.218
50	.300	191	5.968	85.812	14.187
70	.212	297	9.281	76.531	23.468
100	.150	276	8.625	67.906	32.093
140	.125	118	3.687	64.218	35.781
200	.084	282	8.812	55.406	44.593

ANALISE GRANULOMETRICA

AMOSTRA B121/ 8 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	50	1.562	98.437	1.562
8	8.000	33	1.031	97.406	2.593
3	3.000	5	.156	97.250	2.750
12	1.697	3	.093	97.156	2.843
16	1.200	3	.093	97.062	2.937
20	.848	4	.125	96.937	3.062
30	.600	15	.468	96.468	3.531
40	.424	89	2.781	93.687	6.312
50	.300	144	4.500	89.187	10.812
70	.212	288	9.000	80.187	19.812
100	.150	290	9.062	71.125	28.875
140	.125	151	4.718	66.406	33.593
200	.084	287	8.968	57.437	42.562

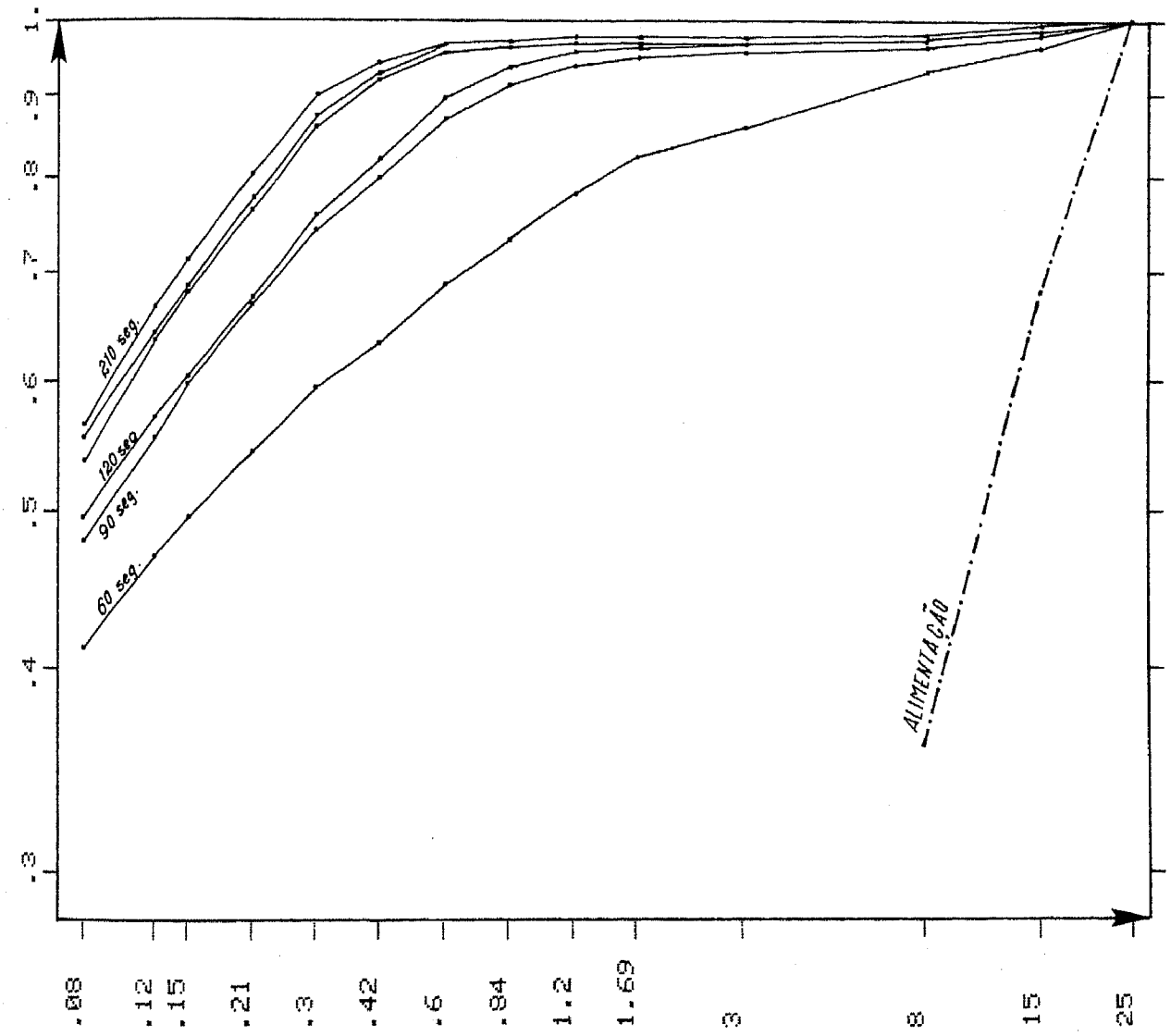
ANALISE GRANULOMETRICA

AMOSTRA B121/ 9 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	53	1.656	98.343	1.656
8	8.000	19	.593	97.750	2.250
3	3.000	10	.312	97.437	2.562
12	1.697	4	.125	97.312	2.687
16	1.200	3	.093	97.218	2.781
20	.848	4	.125	97.093	2.906
30	.600	12	.375	96.718	3.281
40	.424	76	2.375	94.343	5.656
50	.300	143	4.468	89.875	10.125
70	.212	300	9.375	80.500	19.500
100	.150	301	9.406	71.093	28.906
140	.125	145	4.531	66.562	33.437
200	.084	325	10.156	56.406	43.593

CUMULATIVOS INFERIORES

AMOSTRA B121/ N



ENSAIO B121/N

RESULTADOS DO MODELO

A	K	W	G	T0
.154	1.101	.901	32.320	34.043

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS →	60.000	90.000	120.000	150.000	180.000	210.000
15	99.417	99.994	99.999	99.999	100.000	100.000
8	95.743	99.697	99.975	99.998	99.999	99.999
3	86.395	96.660	98.989	99.677	99.895	99.966
1.68	82.524	94.152	97.366	98.627	99.216	99.526
1.19	79.444	91.746	95.499	97.178	98.091	98.653
.841	75.437	88.324	92.618	94.755	96.054	96.940
.595	72.358	85.459	90.065	92.486	94.038	95.148
.42	67.658	80.871	85.813	88.561	90.416	91.807
.297	61.610	74.733	79.958	83.010	85.159	86.831
.21	54.629	67.387	72.785	76.076	78.472	80.388
.149	47.282	59.381	64.810	68.250	70.824	72.924
.125	43.504	55.159	60.546	64.024	66.660	68.830
.084	35.259	45.705	50.866	54.341	57.047	59.314

MATRIZ [S]

.154 .083 .037 .014 .008 .005 .003 .002 .001 .001 .000 .000

MATRIZ [B]

.000
.007 .000
.023 .001 .000
.050 .008 .000 .000
.081 .027 .000 .000 .000
.105 .056 .002 .000 .000 .000
.115 .086 .011 .000 .000 .000 .000
.113 .107 .032 .004 .000 .000 .000 .000
.102 .114 .061 .016 .004 .000 .000 .000 .000
.046 .058 .042 .017 .006 .001 .000 .000 .000 .000
.091 .121 .118 .067 .033 .011 .002 .000 .000 .000 .000

ENSAIO B121/N
RESULTADOS DO MODELO

A	K	W	G	T0
.059	.544	.756	15.864	19.086

PE= 11.5901
J0= 7

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
15	97.264	99.546	99.924	99.987	99.997	99.999
8	91.938	98.129	99.547	99.887	99.971	99.992
3	84.360	94.955	98.219	99.331	99.738	99.895
1.68	81.253	93.117	97.156	98.720	99.388	99.694
1.19	78.470	91.194	95.882	97.887	98.845	99.340
.841	74.781	88.395	93.877	96.472	97.851	98.643
.595	71.761	85.804	91.870	94.959	96.719	97.799
.42	66.724	80.198	86.131	89.947	92.715	94.650
.297	60.871	73.623	79.363	83.120	86.279	89.181
.21	54.473	66.356	71.838	75.509	78.635	81.524
.149	47.914	58.813	63.976	67.527	70.602	73.467
.125	44.565	54.923	59.897	63.372	66.413	69.261
.084	37.218	46.293	50.782	54.044	56.978	59.768

MATRIZ [S]

.059 .044 .029 .018 .014 .011 .009 .008 .006 .005 .004 .003

MATRIZ [B]

.003
.030 .002
.045 .010 .000
.068 .027 .000 .000
.086 .049 .003 .000 .000
.097 .072 .013 .001 .000 .000
.099 .089 .031 .005 .001 .000 .000
.094 .098 .054 .018 .005 .001 .000 .000
.084 .097 .075 .037 .018 .005 .000 .000 .000
.039 .048 .044 .028 .016 .007 .001 .000 .000 .000
.077 .100 .110 .084 .059 .033 .013 .003 .000 .000 .000

ENSAIO B121/N

RESULTADOS DO MODELO

A	K	W	G	T0
.135	.641	.577	5.313	28.401

PE= .453 J0= 7
PC= .0781 I0= 11

AJUSTE NAO LINEAR - COM 'ESCUDO E COLCHAO ' CUMULOS INFERIORES

LUZ \TEMPOS -->	60.000	90.000	120.000	150.000	180.000	210.000
8	91.957	96.776	98.048	98.457	98.576	98.630
3	87.405	95.923	97.883	98.424	98.570	98.628
1.68	83.573	94.362	97.273	98.190	98.482	98.595
1.19	80.041	92.490	96.337	97.733	98.263	98.489
.841	75.597	89.752	94.762	96.847	97.772	98.218
.595	71.825	87.002	92.958	95.702	97.056	97.772
.42	65.863	80.392	86.792	90.297	92.391	93.756
.297	59.614	73.295	79.490	83.401	86.141	88.164
.21	53.262	65.961	71.848	75.985	79.251	81.848
.149	47.073	58.694	64.206	68.265	71.838	74.878
.125	44.000	55.041	60.338	64.296	67.888	71.071
.084	37.399	47.098	51.863	55.548	58.980	62.183

MATRIZ [S]

.135 .094 .058 .034 .025 .020 .016 .012 .010 .008 .006 .005

MATRIZ [B]

.067 .011
.102 .051
.075 .053 .007
.080 .068 .021 .002
.080 .077 .039 .011 .002
.078 .081 .057 .027 .011 .002
.072 .080 .070 .045 .027 .011 .002
.065 .076 .078 .061 .045 .027 .011 .002
.057 .070 .080 .072 .061 .045 .027 .011 .002
.026 .033 .040 .039 .036 .029 .020 .011 .004 .000
.053 .068 .089 .093 .089 .079 .063 .043 .023 .008 .001

AMOSTRA B121

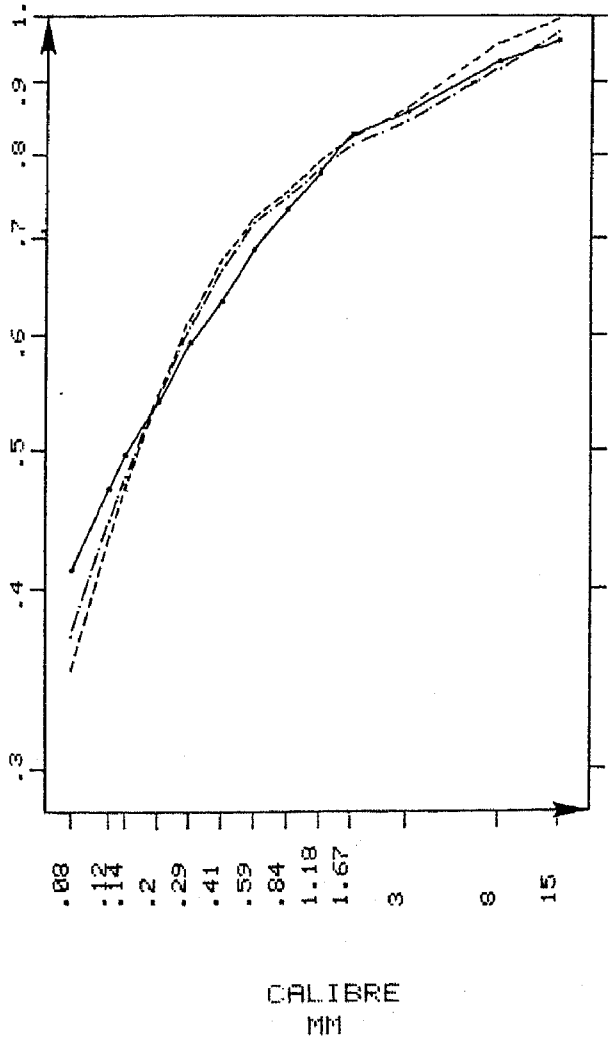
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

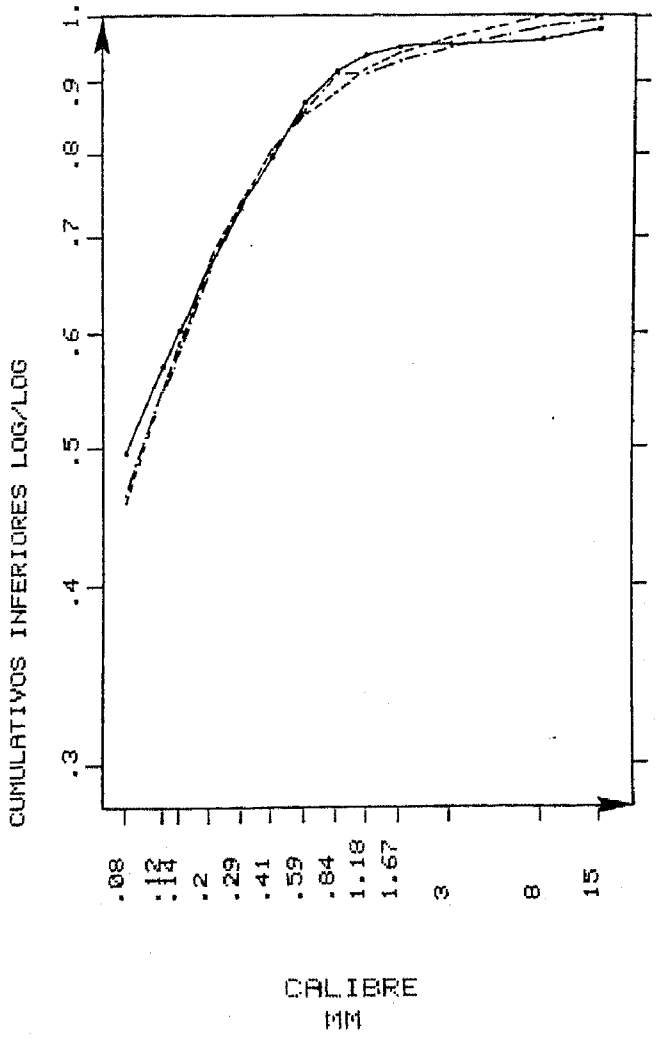
	PA	PK	PN	PG	T0	PE	J0
LINEAR	.154	1.101	.901	32.320	34.043	.000	0
N LINEAR	.059	.544	.756	15.864	19.086	11.590	7

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA B121

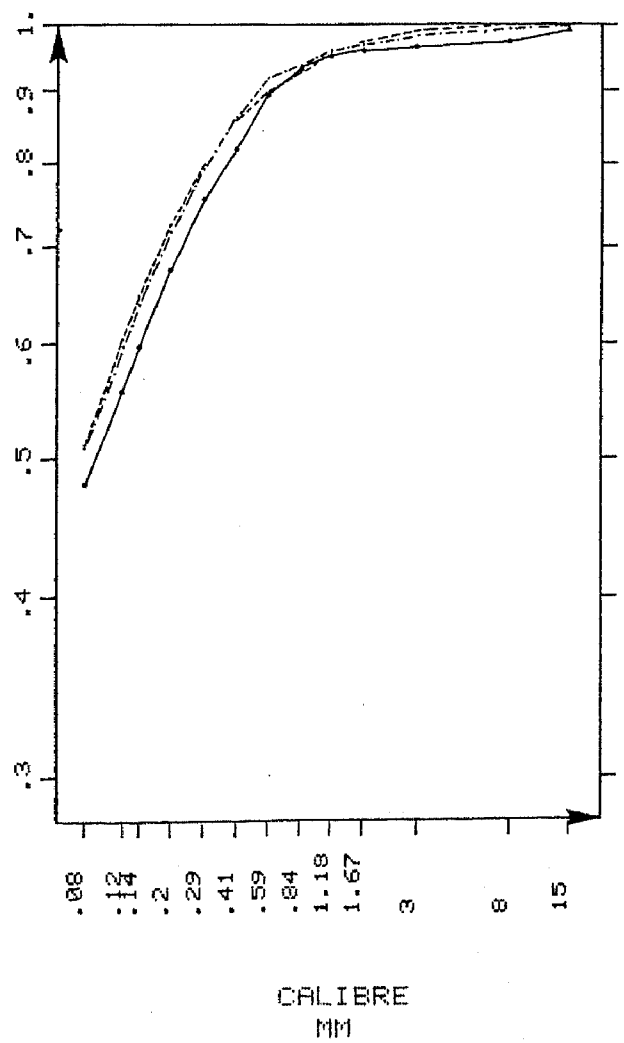
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

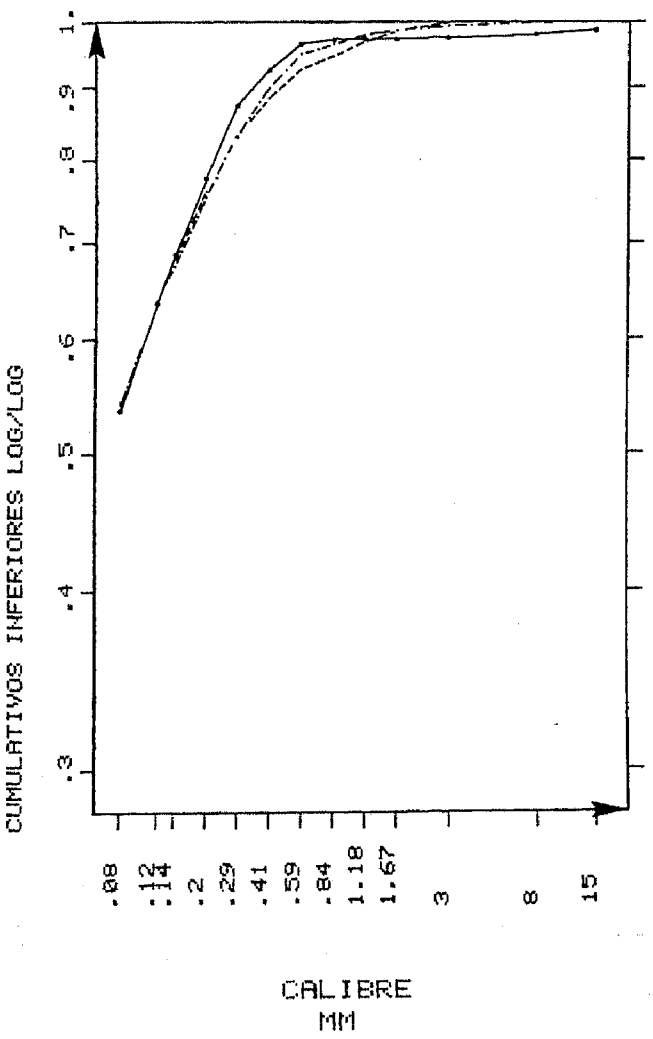
	PA	PK	PN	PG	T0	PE	J0
LINEAR	.154	1.101	.901	32.320	34.043	.000	0
N LINEAR	.059	.544	.756	15.864	19.086	11.590	7

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (–.–.–)

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA B121

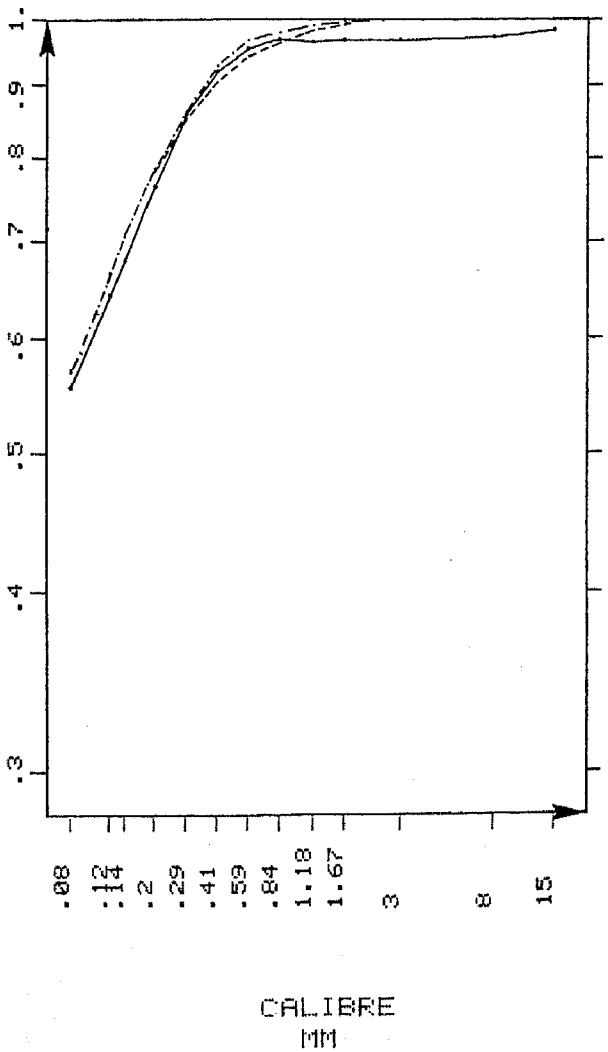
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

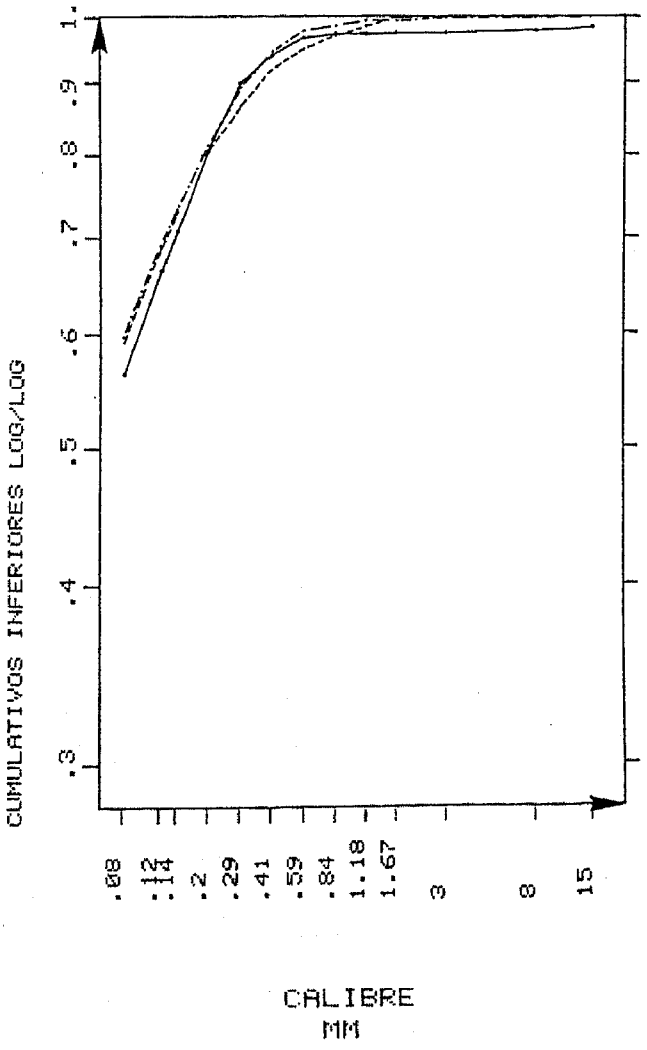
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.154	1.101	.901	32.320	34.043	.000	0
N LINEAR	.059	.544	.756	15.864	19.086	11.590	7

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



AMOSTRA B121

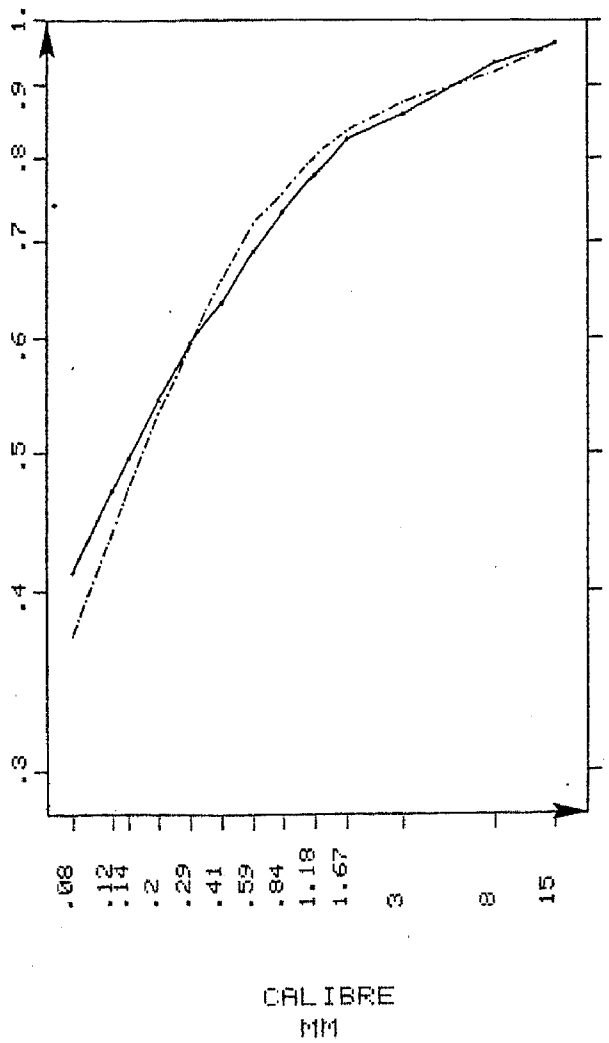
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

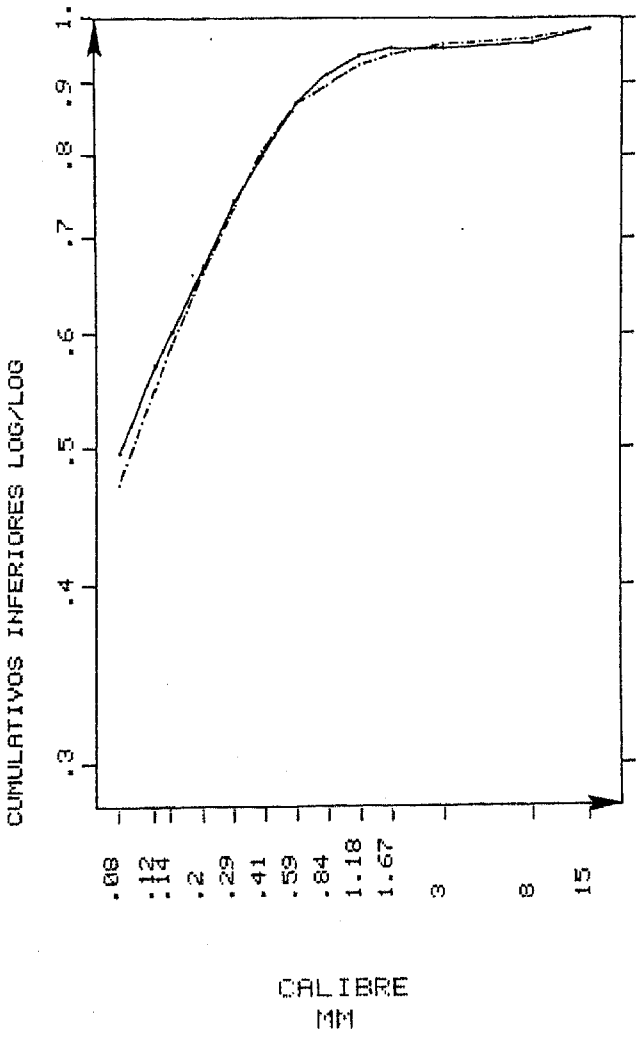
PA	PK	PW	PG	T0	PE	PC	J0	I0
.135	.641	.577	5.313	28.401	.453	.078	7	11

ENSAIO REAL <———>
ENSAIO SIMULADO <_._._>

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA B121

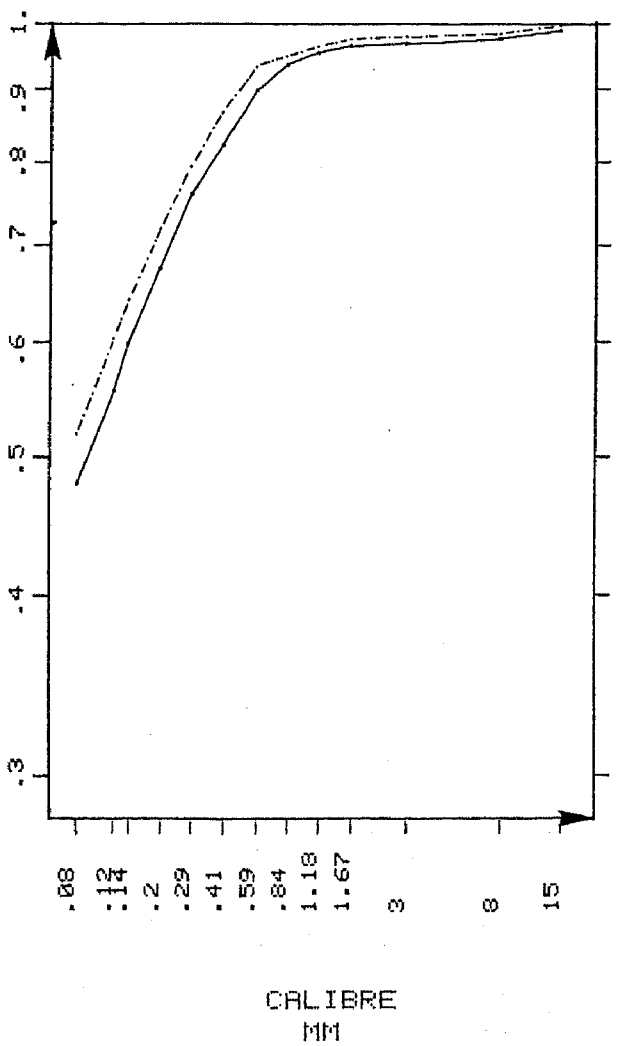
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [illegible]

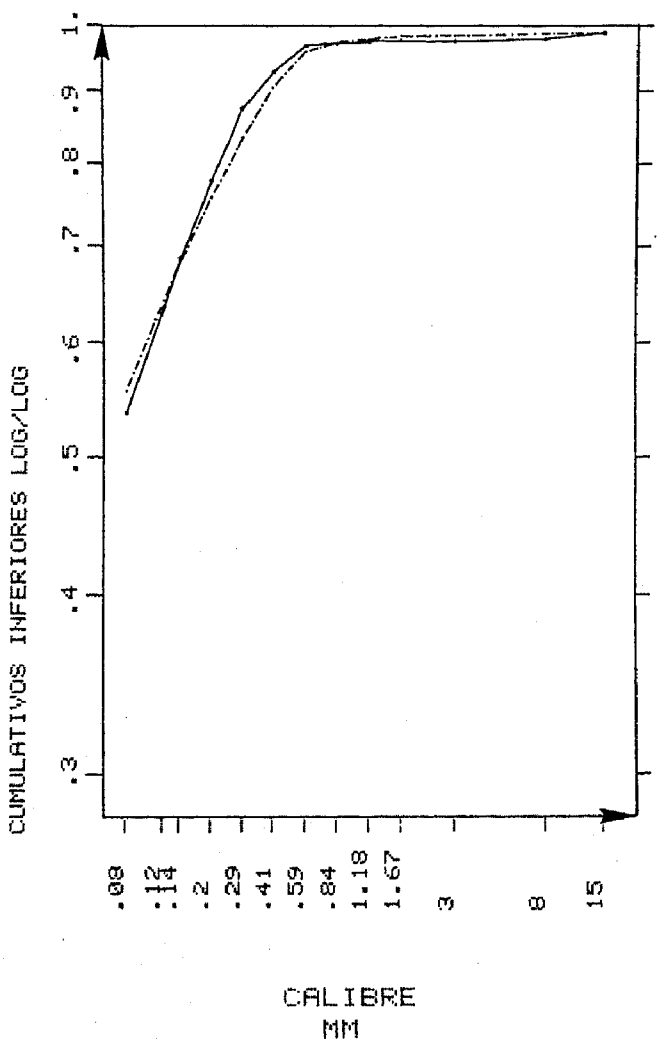
PR	PK	PW	PG	T0	PE	PC	J0	I0
.135	.641	.577	5.313	28.401	.453	.078	7	11

ENSAIO REAL (———)
ENSAIO SIMULADO (—.—.—)

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA B121

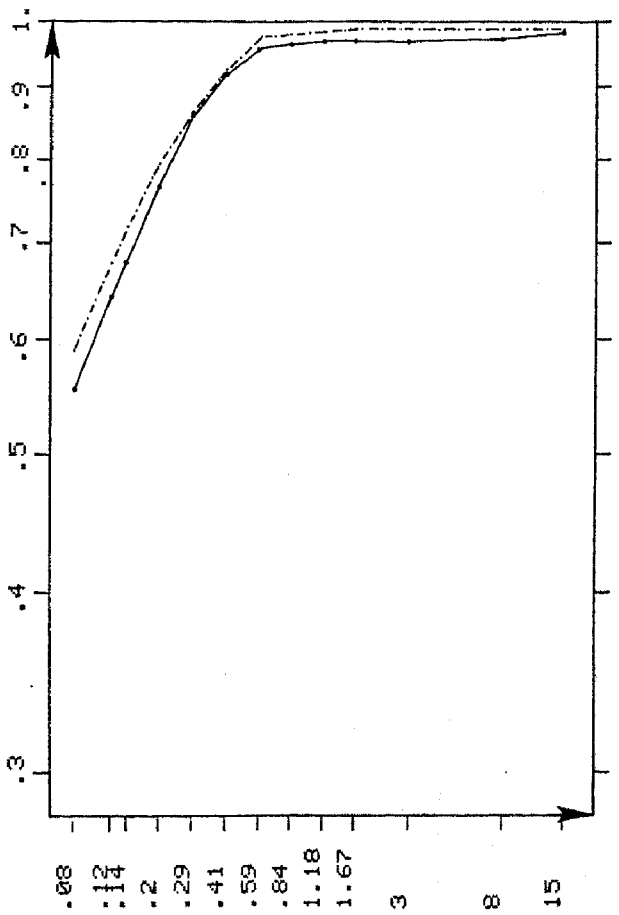
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

PA	PK	PW	PG	T0	PE	PC	J0	I0
.135	.641	.577	5.313	28.401	.453	.078	7	11

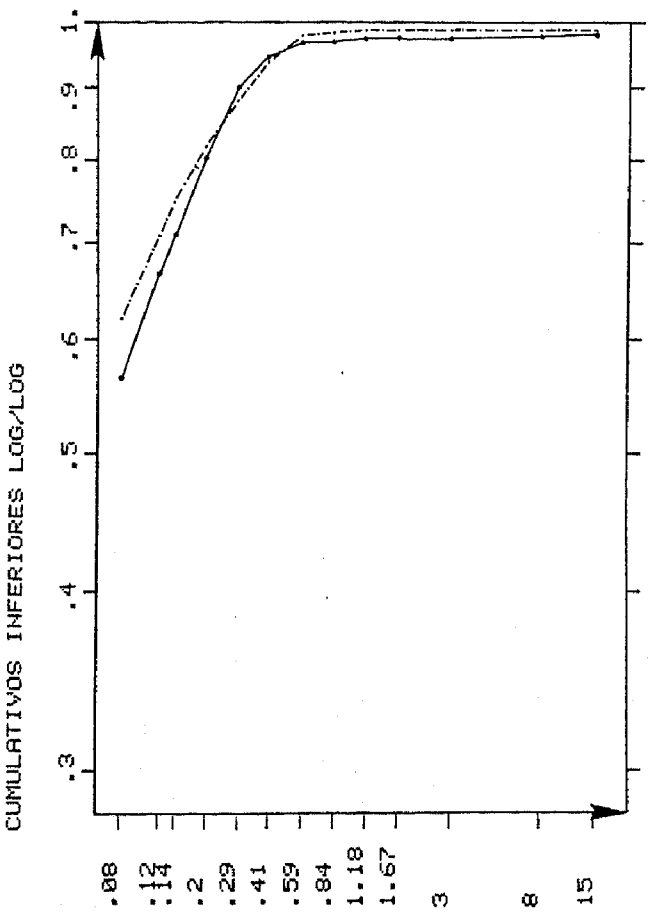
ENSAIO REAL (———)
ENSAIO SIMULADO (—.—.—)

TEMPO RESIDENCIA 180



CALIBRE
MM

TEMPO RESIDENCIA 210



CALIBRE
MM

ANEXO VIII

AMOSTRA B 122

. XISTO BRECHÓIDE DE NISA

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS GROSSAS (35 MM)

. ENCHIMENTO BAIXO (25 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO E COM ESCUDO+COLCHÃO
CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA B122/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	634	31.700	68.300	31.700
8	8.000	648	32.400	35.900	64.100
3	3.000	495	24.750	11.150	88.850
12	1.697	107	5.350	5.800	94.200
16	1.200	61	3.050	2.750	97.250
20	.848	55	2.750	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA B122/ 1 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	40	2.000	98.000	2.000
8	8.000	64	3.200	94.800	5.200
3	3.000	87	4.350	90.450	9.550
12	1.697	36	1.800	88.650	11.350
16	1.200	48	2.400	86.250	13.750
20	.848	69	3.450	82.800	17.200
30	.600	84	4.200	78.600	21.400
40	.424	125	6.250	72.350	27.650
50	.300	91	4.550	67.800	32.200
70	.212	129	6.450	61.350	38.650
100	.150	122	6.100	55.250	44.750
140	.125	69	3.450	51.800	48.200
200	.084	136	6.800	45.000	55.000

ANALISE GRANULOMETRICA

AMOSTRA B122/ 2 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	14	.700	99.300	.700
8	8.000	64	3.200	96.100	3.900
3	3.000	34	1.700	94.400	5.600
12	1.697	10	.500	93.900	6.100
16	1.200	14	.700	93.200	6.800
20	.848	27	1.350	91.850	8.150
30	.600	50	2.500	89.350	10.650
40	.424	108	5.400	83.950	16.050
50	.300	96	4.800	79.150	20.850
70	.212	153	7.650	71.500	28.500
100	.150	148	7.400	64.100	35.900
140	.125	85	4.250	59.850	40.150
200	.084	162	8.100	51.750	48.250

ANALISE GRANULOMETRICA

AMOSTRA B122/ 3 T= 90

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	27	1.350	98.650	1.350
8	8.000	20	1.000	97.650	2.350
3	3.000	11	.550	97.100	2.900
12	1.697	6	.300	96.800	3.200
16	1.200	11	.550	96.250	3.750
20	.848	24	1.200	95.050	4.950
30	.600	47	2.350	92.700	7.300
40	.424	112	5.600	87.100	12.900
50	.300	110	5.500	81.600	18.400
70	.212	168	8.400	73.200	26.800
100	.150	163	8.150	65.050	34.950
140	.125	91	4.550	60.500	39.500
200	.084	170	8.500	52.000	48.000

ANALISE GRANULOMETRICA

AMOSTRA B122/ 4 T= 120

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	70	3.500	96.500	3.500
8	8.000	30	1.500	95.000	5.000
3	3.000	16	.800	94.200	5.800
12	1.697	5	.250	93.950	6.050
16	1.200	4	.200	93.750	6.250
20	.848	8	.400	93.350	6.650
30	.600	22	1.100	92.250	7.750
40	.424	76	3.800	88.450	11.550
50	.300	100	5.000	83.450	16.550
70	.212	170	8.500	74.950	25.050
100	.150	170	8.500	66.450	33.550
140	.125	93	4.650	61.800	38.200
200	.084	172	8.600	53.200	46.800

ANALISE GRANULOMETRICA

AMOSTRA B122/ 5 T= 120

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
15	15.000	36	1.800	98.200	1.800
8	8.000	56	2.800	95.400	4.600
3	3.000	13	.650	94.750	5.250
12	1.697	3	.150	94.600	5.400
16	1.200	4	.200	94.400	5.600
20	.848	6	.300	94.100	5.900
30	.600	17	.850	93.250	6.750
40	.424	67	3.350	89.900	10.100
50	.300	94	4.700	85.200	14.800
70	.212	175	8.750	76.450	23.550
100	.150	177	8.850	67.600	32.400
140	.125	98	4.900	62.700	37.300
200	.084	195	9.750	52.950	47.050

ANALISE GRANULOMETRICA

AMOSTRA B122/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	17	.850	99.150	.850
8	8.000	18	.900	98.250	1.750
3	3.000	8	.400	97.850	2.150
12	1.697	3	.150	97.700	2.300
16	1.200	3	.150	97.550	2.450
20	.848	3	.150	97.400	2.600
30	.600	7	.350	97.050	2.950
40	.424	39	1.950	95.100	4.900
50	.300	76	3.800	91.300	8.700
70	.212	170	8.500	82.800	17.200
100	.150	194	9.700	73.100	26.900
140	.125	109	5.450	67.650	32.350
200	.084	210	10.500	57.150	42.850

ANALISE GRANULOMETRICA

AMOSTRA B122/ 7 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	17	.850	99.150	.850
8	8.000	17	.850	98.300	1.700
3	3.000	7	.350	97.950	2.050
12	1.697	3	.150	97.800	2.200
16	1.200	3	.150	97.650	2.350
20	.848	4	.200	97.450	2.550
30	.600	11	.550	96.900	3.100
40	.424	50	2.500	94.400	5.600
50	.300	84	4.200	90.200	9.800
70	.212	176	8.800	81.400	18.600
100	.150	191	9.550	71.850	28.150
140	.125	110	5.500	66.350	33.650
200	.084	191	9.550	56.800	43.200

ANALISE GRANULOMETRICA

AMOSTRA B122/ 8 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	34	1.700	98.300	1.700
8	8.000	23	1.150	97.150	2.850
3	3.000	3	.150	97.000	3.000
12	1.697	2	.100	96.900	3.100
16	1.200	2	.100	96.800	3.200
20	.848	3	.150	96.650	3.350
30	.600	4	.200	96.450	3.550
40	.424	21	1.050	95.400	4.600
50	.300	46	2.300	93.100	6.900
70	.212	135	6.750	86.350	13.650
100	.150	182	9.100	77.250	22.750
140	.125	112	5.600	71.650	28.350
200	.084	221	11.050	60.600	39.400

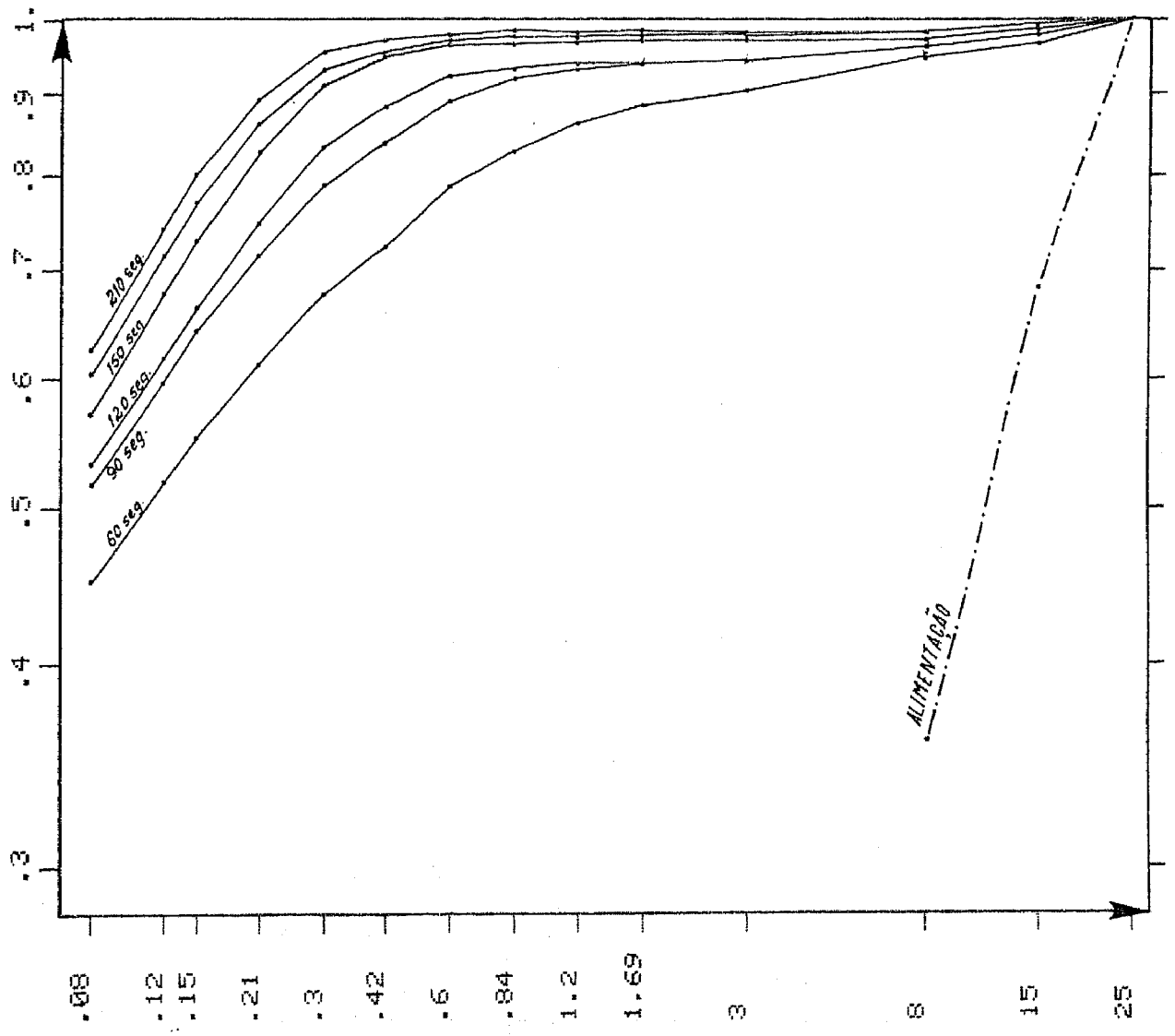
ANALISE GRANULOMETRICA

AMOSTRA B122/ 9 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	26	1.300	98.700	1.300
8	8.000	8	.400	98.300	1.700
3	3.000	0	.000	98.300	1.700
12	1.697	1	.050	98.250	1.750
16	1.200	2	.100	98.150	1.850
20	.848	2	.100	98.050	1.950
30	.600	3	.150	97.900	2.100
40	.424	14	.700	97.200	2.800
50	.300	36	1.800	95.400	4.600
70	.212	124	6.200	89.200	10.800
100	.150	183	9.150	80.050	19.950
140	.125	114	5.700	74.350	25.650
200	.084	234	11.700	62.650	37.350

CUMULATIVOS INFERIORES

AMOSTRA B122/ N



ENSAIO B122/N

RESULTADOS DO MODELO

A	K	N	G	T0
.062	.730	1.217	121.119	5.274

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
15	98.980	99.845	99.976	99.996	99.999	99.999
8	95.689	98.905	99.708	99.919	99.977	99.993
3	89.064	95.689	98.146	99.161	99.609	99.814
1.68	86.446	93.920	96.952	98.354	99.064	99.446
1.19	84.532	92.466	95.847	97.516	98.428	98.964
.841	82.165	90.538	94.289	96.258	97.412	98.144
.595	80.442	89.017	92.991	95.157	96.480	97.354
.42	76.689	85.564	89.924	92.455	94.103	95.265
.297	70.710	79.864	84.700	87.712	89.808	91.378
.21	63.046	72.341	77.629	81.139	83.717	85.740
.149	54.645	63.868	69.483	73.412	76.422	78.864
.125	50.247	59.334	65.051	69.151	72.349	74.980
.084	40.482	49.038	54.814	59.172	62.698	65.680

MATRIZ [S]

.062 .041 .024 .013 .009 .007 .005 .004 .003 .002 .002 .001

MATRIZ [B]

.000
.000 .000
.003 .000 .000 .000
.021 .000 .000 .000 .000
.065 .005 .000 .000 .000 .000
.118 .028 .000 .000 .000 .000 .000
.150 .075 .000 .000 .000 .000 .000 .000
.152 .125 .007 .000 .000 .000 .000 .000 .000
.131 .151 .034 .001 .000 .000 .000 .000 .000 .000
.057 .077 .035 .003 .000 .000 .000 .000 .000 .000 .000
.102 .159 .130 .035 .007 .000 .000 .000 .000 .000 .000 .000

ENSAIO B122/N

RESULTADOS DO MODELO

A	K	W	G	T0
.036	.337	.844	21.835	-7.967

PE= 2.6098
J0= 6

AJUSTE NAO LINEAR - COM 'ESCUDO'

CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
15	97.418	99.146	99.717	99.906	99.969	99.989
8	93.343	97.514	99.064	99.645	99.864	99.947
3	88.294	95.013	97.825	99.031	99.560	99.797
1.68	86.394	93.870	97.146	98.630	99.324	99.659
1.19	84.603	92.669	96.362	98.125	99.002	99.453
.841	82.057	90.836	95.092	97.263	98.421	99.064
.595	79.678	88.951	93.698	96.261	97.712	98.567
.42	76.307	86.182	91.569	94.672	96.543	97.712
.297	69.866	79.248	84.513	88.568	91.730	94.033
.21	62.719	71.514	76.542	80.500	84.395	87.985
.149	55.311	63.450	68.198	72.034	75.874	79.829
.125	51.503	59.284	63.873	67.637	71.442	75.388
.084	43.105	50.032	54.227	57.799	61.508	65.404

MATRIZ [S]

.036 .030 .023 .017 .015 .013 .012 .010 .009 .008 .007 .006

MATRIZ [B]

.001
.022 .001
.041 .006 .000
.069 .021 .000 .000
.093 .046 .001 .000 .000
.107 .074 .008 .000 .000 .000
.109 .096 .025 .002 .000 .000 .000
.103 .108 .051 .012 .002 .000 .000 .000
.090 .107 .078 .032 .012 .002 .000 .000 .000
.041 .052 .048 .027 .013 .004 .000 .000 .000 .000
.079 .108 .121 .087 .055 .026 .008 .001 .000 .000 .000

ENSAIO B122/N

RESULTADOS DO MODELO

A	K	W	G	T0
.148	.728	.880	25.640	23.704

PE= .2743 J0= 8
PC= .0677 I0= 11

AJUSTE NAO LINEAR - COM 'ESCUDO E COLCHAO ' CUMULOS INFERIORES

LUZ \TEMPOS -->	60.000	90.000	120.000	150.000	180.000	210.000
8	92.306	96.228	97.485	98.098	98.651	99.206
3	89.204	95.671	97.385	98.080	98.648	99.205
1.68	87.272	94.899	97.077	97.955	98.594	99.178
1.19	85.274	93.824	96.506	97.650	98.423	99.076
.841	82.325	91.959	95.356	96.940	97.973	98.779
.595	79.680	89.998	93.977	95.979	97.289	98.278
.42	75.703	86.788	91.527	94.131	95.883	97.194
.297	69.286	80.196	85.385	88.593	91.009	93.031
.21	62.042	72.386	77.643	81.333	84.397	87.176
.149	54.431	64.120	69.325	73.387	77.002	80.445
.125	50.494	59.814	64.937	69.124	72.968	76.706
.084	41.786	50.201	55.051	59.327	63.531	67.797

MATRIZ [S]

.148 .099 .057 .031 .021 .017 .013 .010 .007 .006 .004 .003

MATRIZ [B]

.000
.016 .000
.036 .004 .000
.066 .017 .000 .000
.093 .041 .000 .000 .000
.110 .072 .005 .000 .000 .000
.113 .097 .020 .001 .000 .000 .000
.107 .111 .047 .009 .001 .000 .000 .000
.094 .112 .076 .028 .009 .001 .000 .000 .000
.042 .054 .048 .024 .011 .003 .000 .000 .000 .000
.081 .112 .125 .084 .050 .021 .005 .000 .000 .000 .000

AMOSTRA B122

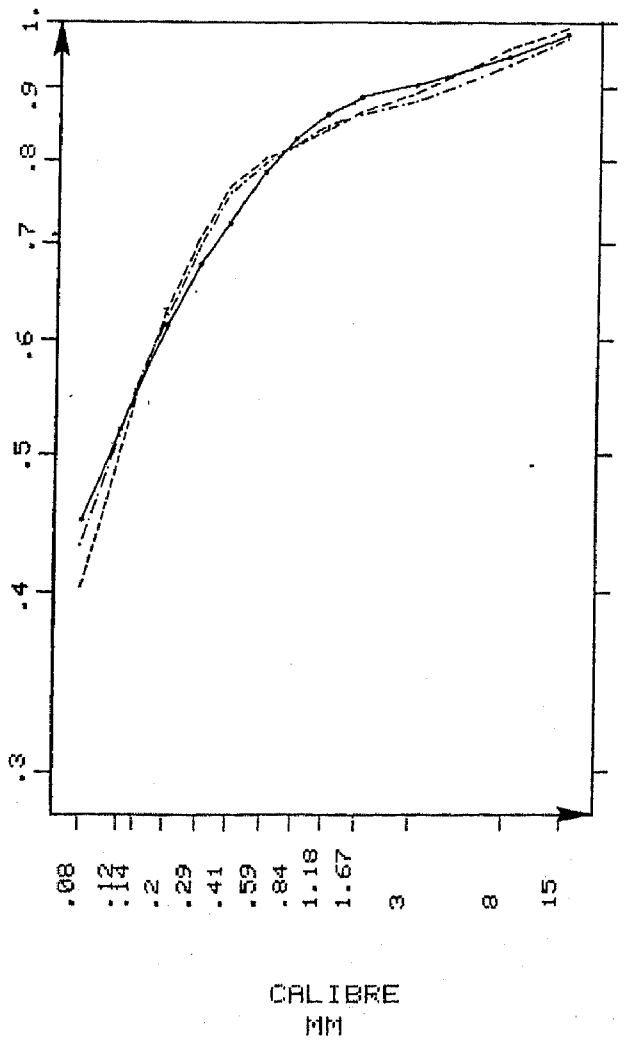
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

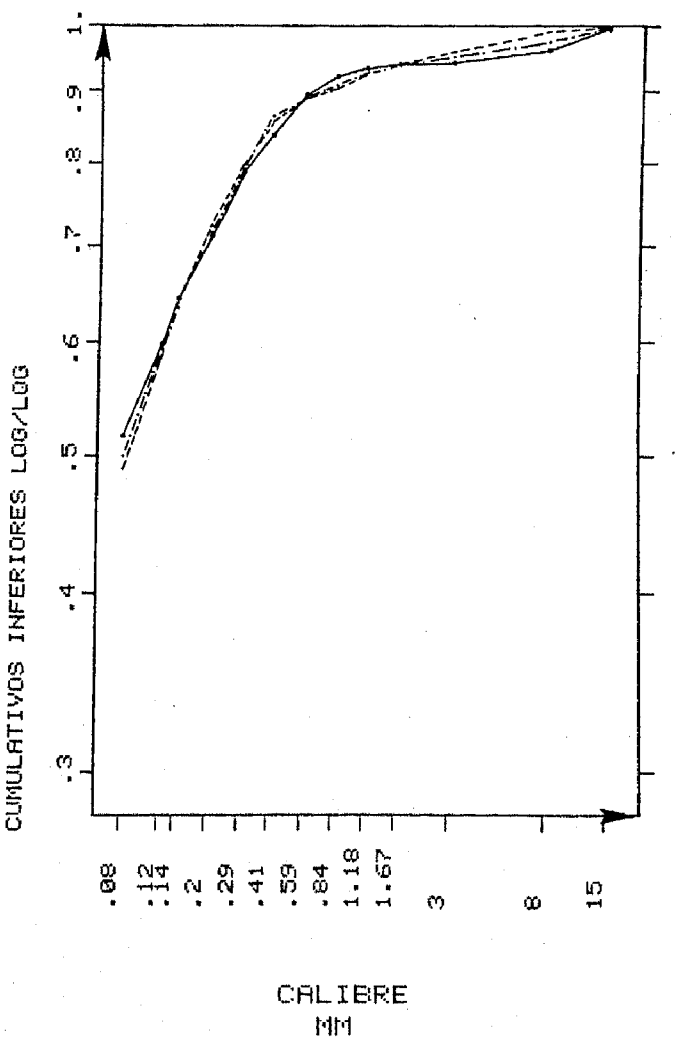
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.062	.730	1.217	121.119	5.274	.000	0
N LINEAR	.036	.337	.844	21.835	-7.967	2.609	8

ENSAIO REAL (———)
ENSAIO SIMULADO LINEAR (– – – –)
ENSAIO SIMULADO N LINEAR C/ ESCUDO (–.–.–)

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA B122

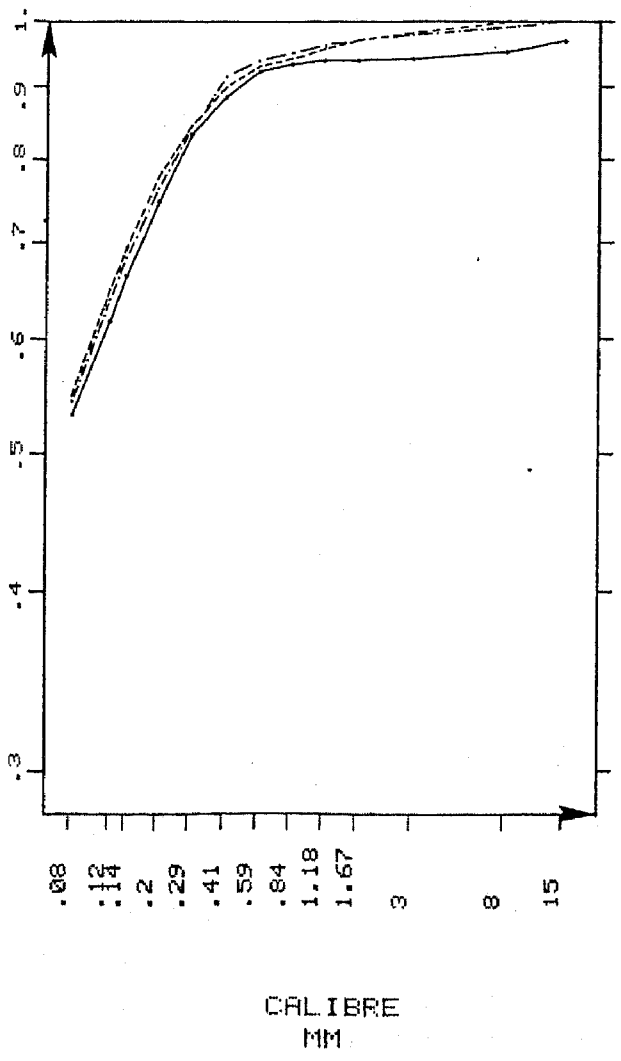
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

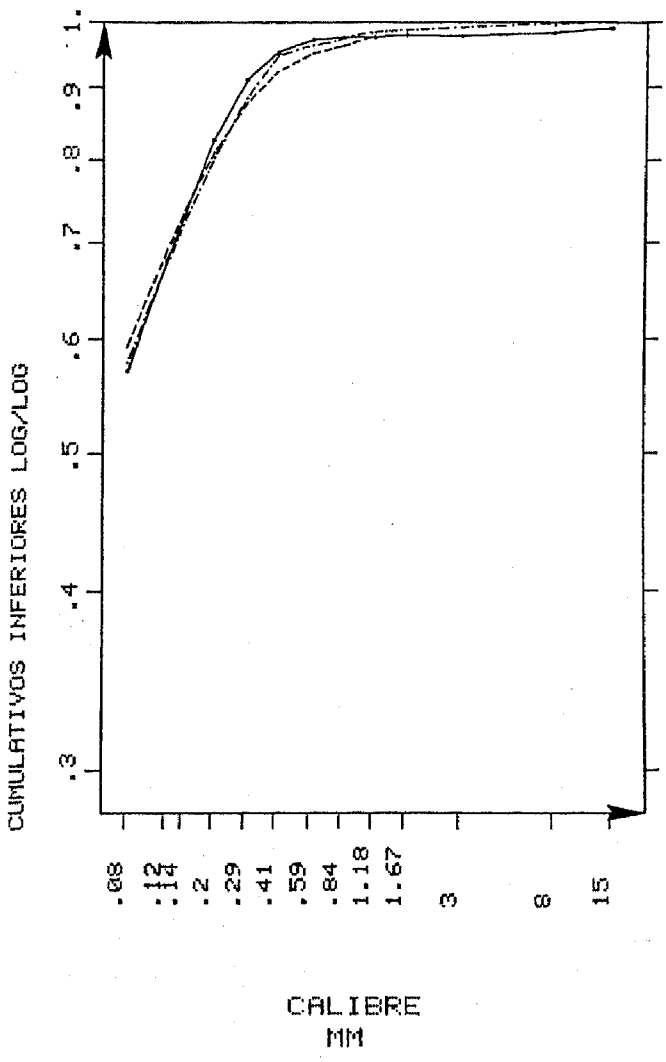
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.062	.730	1.217	121.119	5.274	.000	0
N LINEAR	.036	.337	.844	21.835	-7.967	2.609	8

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA B122

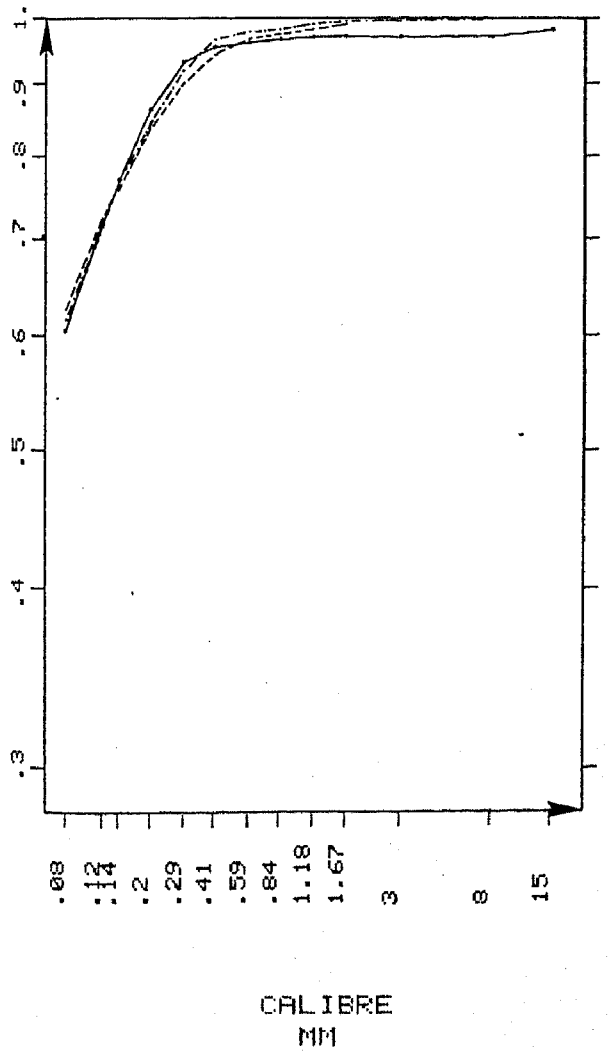
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

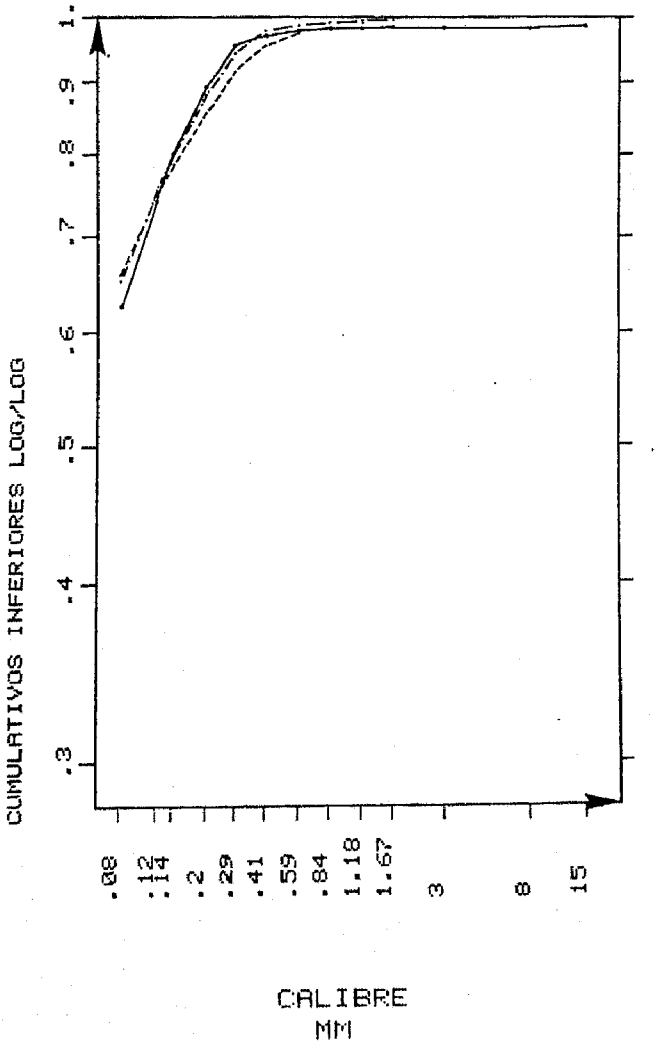
	PR	PK	PW	PG	T0	PE	J0
LINEAR	.062	.730	1.217	121.119	5.274	.000	0
N LINEAR	.036	.337	.844	21.835	-7.967	2.609	8

ENSAIO REAL <————>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



AMOSTRA B122

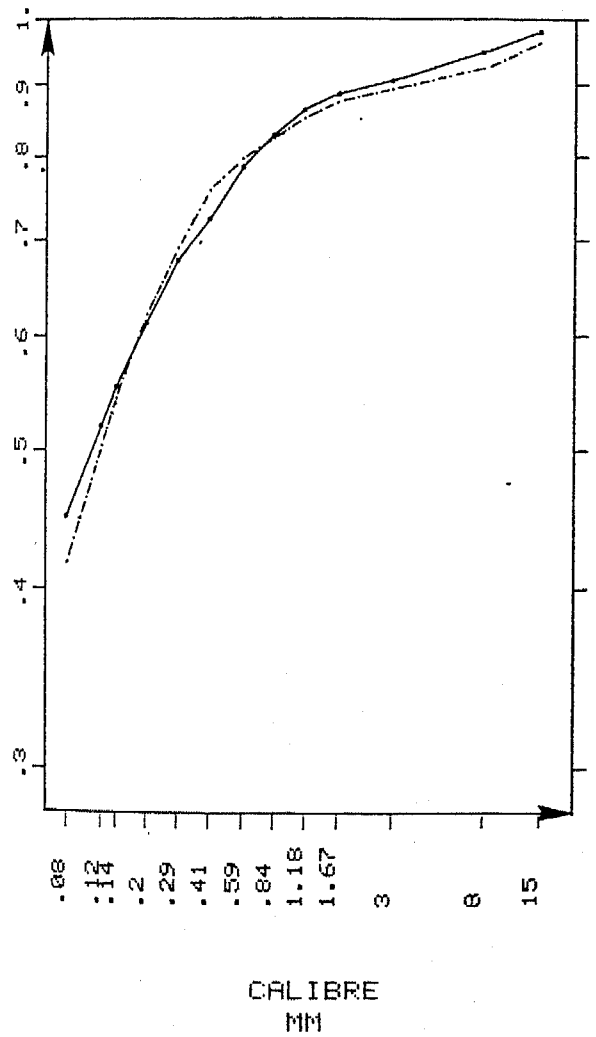
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

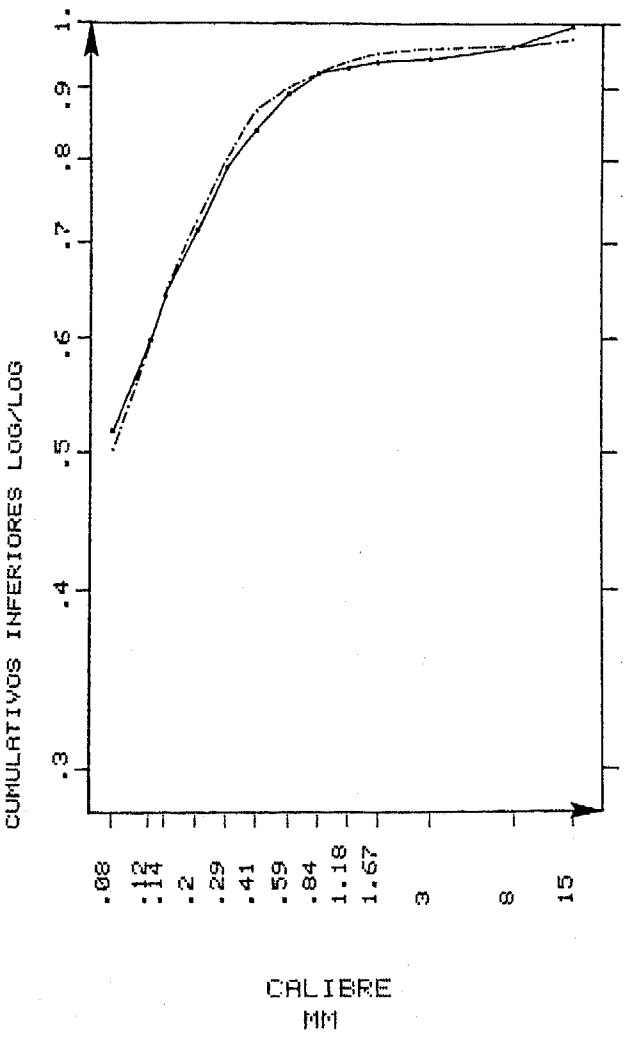
PA	PK	PW	PG	T0	PE	PC	J0	I0
,148	.728	.880	25.640	23.704	.274	.067	8	11

ENSAIO REAL (———)
ENSAIO SIMULADO (—.—.—)

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA B122

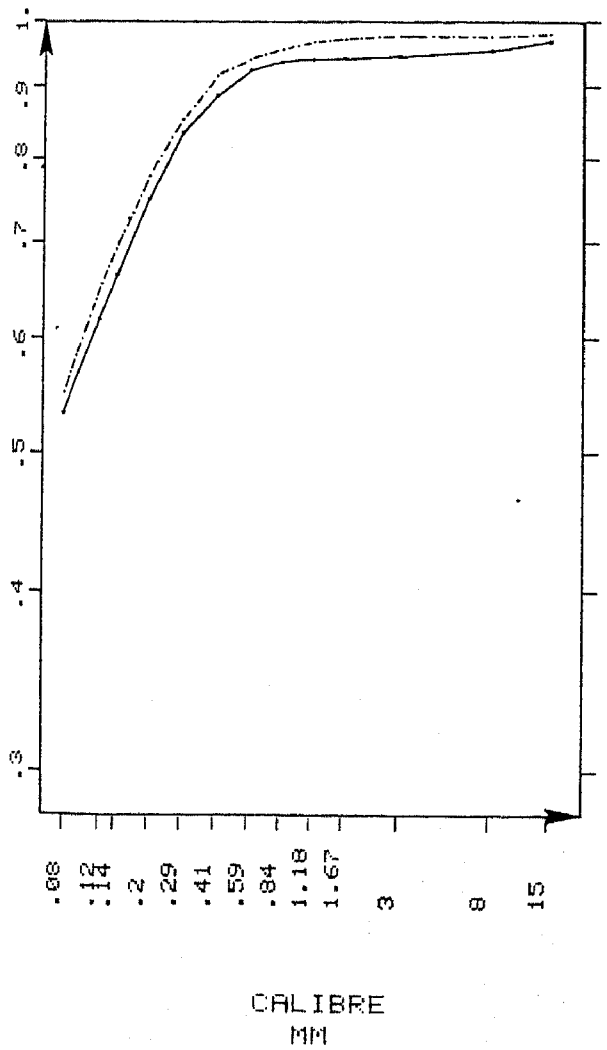
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

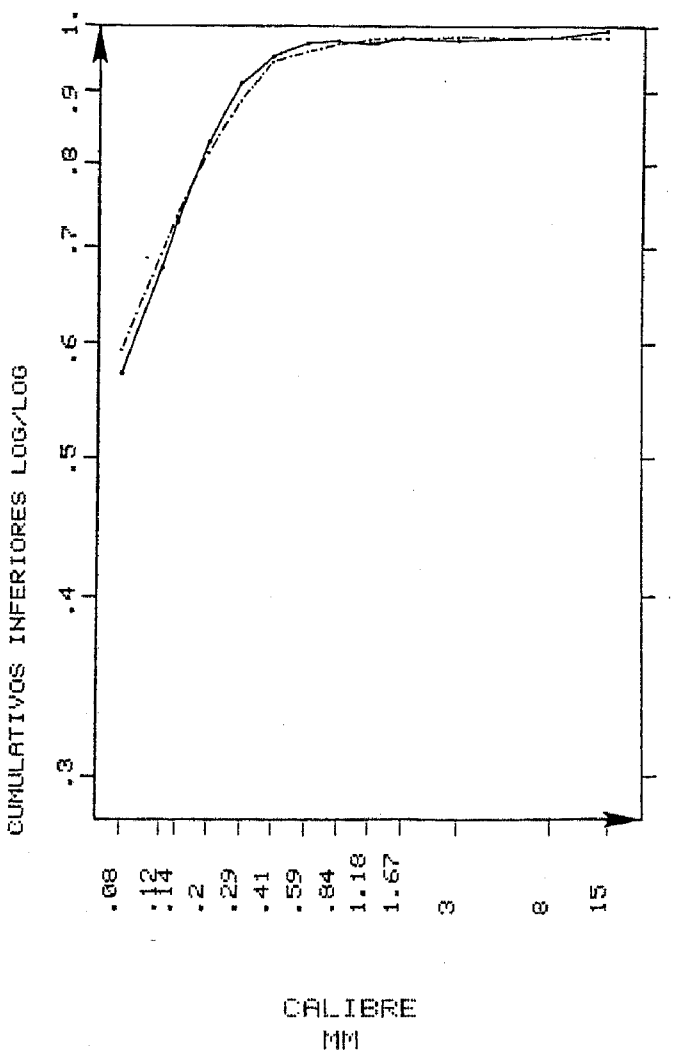
PA	PK	PW	PG	T0	PE	PC	J0	I0
.148	.728	.880	25.640	23.704	.274	.067	8	11

ENSAIO REAL (———)
ENSAIO SIMULADO (—.—.—)

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA B122

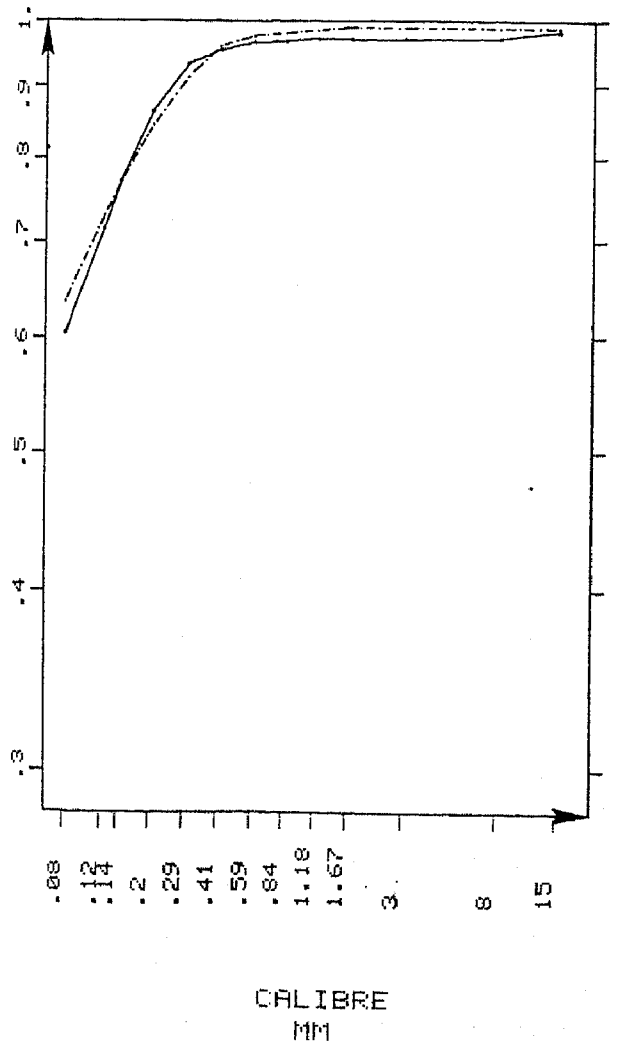
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS MODELO COM [redacted]

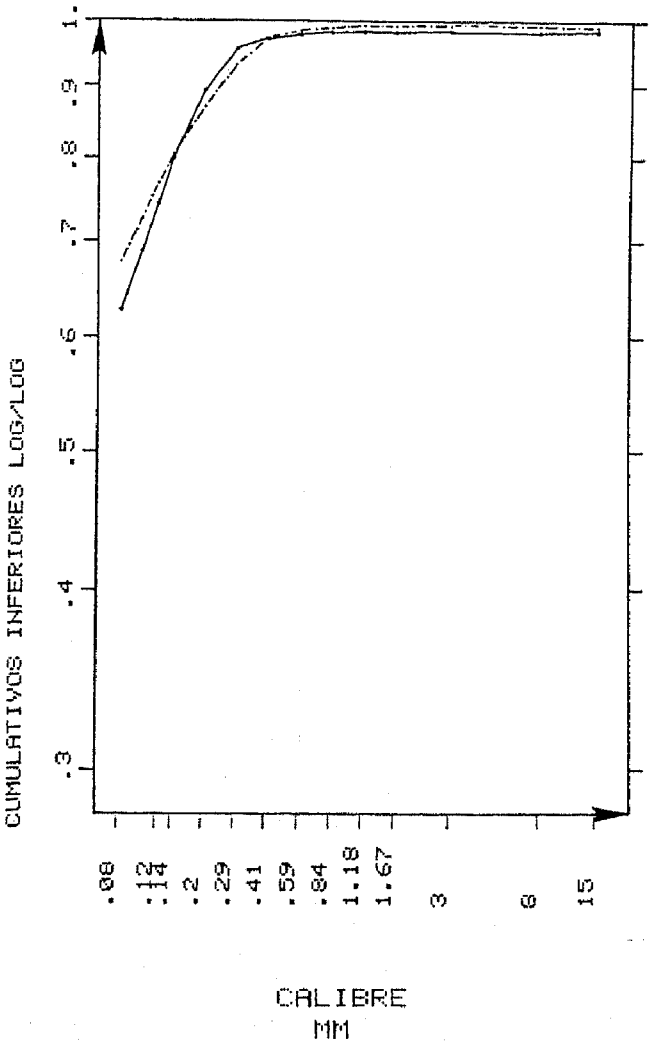
PA	PK	PW	PG	T0	PE	PC	J0	I0
.148	.728	.880	25.640	23.704	.274	.067	8	11

ENSAIO REAL (———)
ENSAIO SIMULADO (—.—.—)

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



ANEXO IX

AMOSTRA CA 121

. CALCÁRIO

. ALIMENTAÇÃO COM O LOTE 25/15 MM

. BARRAS GROSSAS (35 MM)

. ENCHIMENTO ALTO (40 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA CA121/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	698	21.812	78.187	21.812
8	8.000	1416	44.250	33.937	66.062
3	3.000	776	24.250	9.687	90.312
12	1.680	152	4.750	4.937	95.062
16	1.190	86	2.687	2.250	97.750
20	.841	72	2.250	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA CA121/ 1 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	332	10.375	89.625	10.375
8	8.000	535	16.718	72.906	27.093
3	3.000	823	25.718	47.187	52.812
12	1.680	171	5.343	41.843	58.156
16	1.190	133	4.156	37.687	62.312
20	.841	121	3.781	33.906	66.093
30	.595	108	3.375	30.531	69.468
40	.420	148	4.625	25.906	74.093
50	.297	144	4.500	21.406	78.593
70	.210	158	4.937	16.468	83.531
100	.149	94	2.937	13.531	86.468
140	.125	38	1.187	12.343	87.656
200	.084	58	1.812	10.531	89.468

ANALISE GRANULOMETRICA

AMOSTRA CA121/ 2 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	247	7.718	92.281	7.718
8	8.000	535	16.718	75.562	24.437
3	3.000	872	27.250	48.312	51.687
12	1.680	178	5.562	42.750	57.250
16	1.190	143	4.468	38.281	61.718
20	.841	129	4.031	34.250	65.750
30	.595	112	3.500	30.750	69.250
40	.420	153	4.781	25.968	74.031
50	.297	145	4.531	21.437	78.562
70	.210	157	4.906	16.531	83.468
100	.149	95	2.968	13.562	86.437
140	.125	37	1.156	12.406	87.593
200	.084	60	1.875	10.531	89.468

ANALISE GRANULOMETRICA

AMOSTRA CA121/ 3 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	86	2.687	97.312	2.687
8	8.000	200	6.250	91.062	8.937
3	3.000	444	13.875	77.187	22.812
12	1.680	208	6.500	70.687	29.312
16	1.190	188	5.875	64.812	35.187
20	.841	185	5.781	59.031	40.968
30	.595	181	5.656	53.375	46.625
40	.420	264	8.250	45.125	54.875
50	.297	263	8.218	36.906	63.093
70	.210	288	9.000	27.906	72.093
100	.149	163	5.093	22.812	77.187
140	.125	63	1.968	20.843	79.156
200	.084	104	3.250	17.593	82.406

ANALISE GRANULOMETRICA

AMOSTRA CA121/ 4 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	77	2.406	97.593	2.406
8	8.000	68	2.125	95.468	4.531
3	3.000	113	3.531	91.937	8.062
12	1.680	96	3.000	88.937	11.062
16	1.190	131	4.093	84.843	15.156
20	.841	171	5.343	79.500	20.500
30	.595	216	6.750	72.750	27.250
40	.420	344	10.750	62.000	38.000
50	.297	503	15.718	46.281	53.718
70	.210	295	9.218	37.062	62.937
100	.149	221	6.906	30.156	69.843
140	.125	91	2.843	27.312	72.687
200	.084	130	4.062	23.250	76.750

ANALISE GRANULOMETRICA

AMOSTRA CA121/ 5 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	93	2.906	97.093	2.906
8	8.000	52	1.625	95.468	4.531
3	3.000	106	3.312	92.156	7.843
12	1.680	94	2.937	89.218	10.781
16	1.190	137	4.281	84.937	15.062
20	.841	190	5.937	79.000	21.000
30	.595	226	7.062	71.937	28.062
40	.420	355	11.093	60.843	39.156
50	.297	357	11.156	49.687	50.312
70	.210	385	12.031	37.656	62.343
100	.149	227	7.093	30.562	69.437
140	.125	92	2.875	27.687	72.312
200	.084	135	4.218	23.468	76.531

ANALISE GRANULOMETRICA

AMOSTRA CA121/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	37	1.156	98.843	1.156
8	8.000	25	.781	98.062	1.937
3	3.000	18	.562	97.500	2.500
12	1.680	8	.250	97.250	2.750
16	1.190	21	.656	96.593	3.406
20	.841	59	1.843	94.750	5.250
30	.595	145	4.531	90.218	9.781
40	.420	376	11.750	78.468	21.531
50	.297	462	14.437	64.031	35.968
70	.210	514	16.062	47.968	52.031
100	.149	313	9.781	38.187	61.812
140	.125	131	4.093	34.093	65.906
200	.084	176	5.500	28.593	71.406

ANALISE GRANULOMETRICA

AMOSTRA CA121/ 7 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	0	.000	100.000	.000
8	8.000	0	.000	100.000	.000
3	3.000	2	.062	99.937	.062
12	1.680	3	.093	99.843	.156
16	1.190	3	.093	99.750	.250
20	.841	6	.187	99.562	.437
30	.595	29	.906	98.656	1.343
40	.420	181	5.656	93.000	7.000
50	.297	453	14.156	78.843	21.156
70	.210	633	19.781	59.062	40.937
100	.149	400	12.500	46.562	53.437
140	.125	169	5.281	41.281	58.718
200	.084	233	7.281	34.000	66.000

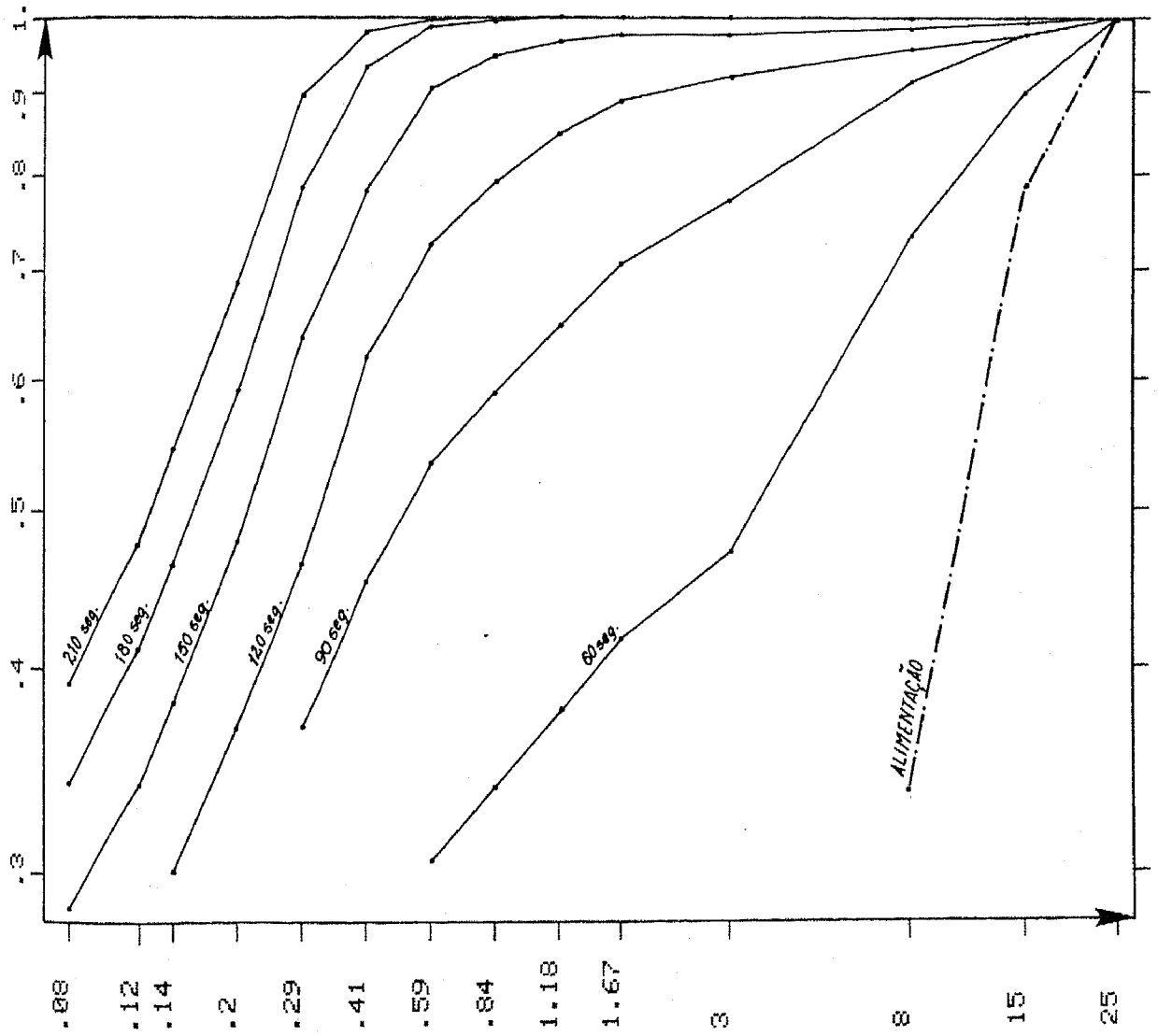
ANALISE GRANULOMETRICA

AMOSTRA CA121/ 8 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
15	15.000	0	.000	100.000	.000
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.680	1	.031	99.968	.031
16	1.190	2	.062	99.906	.093
20	.841	3	.093	99.812	.187
30	.595	5	.156	99.656	.343
40	.420	64	2.000	97.656	2.343
50	.297	259	8.093	89.562	10.437
70	.210	658	20.562	69.000	31.000
100	.149	460	14.375	54.625	45.375
140	.125	214	6.687	47.937	52.062
200	.084	280	8.750	39.187	60.812

CUMULATIVOS INFERIORES

AMOSTRA CA121/ N



ENSAIO CA121/N

RESULTADOS DO MODELO

A	K	W	G	T0
.093	.641	1.034	3.436	43.938

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS -->	60.000	90.000	120.000	150.000	180.000	210.000
15	95.149	99.707	99.982	99.998	99.999	99.999
8	78.938	97.325	99.641	99.950	99.993	99.999
3	57.142	88.505	96.735	99.046	99.717	99.915
1.68	44.346	78.538	91.170	96.163	98.261	99.188
1.19	36.071	70.245	85.368	92.459	95.979	97.804
.841	28.119	60.824	77.786	86.961	92.155	95.197
.595	22.491	52.128	69.690	80.346	87.031	91.333
.42	17.561	43.499	60.787	72.370	80.299	85.826
.297	13.474	35.522	51.793	63.650	72.386	78.894
.21	10.182	28.443	43.166	54.696	63.738	70.865
.149	7.622	22.441	35.335	46.071	54.947	62.287
.125	6.545	19.761	31.669	41.867	50.504	57.803
.084	4.598	14.619	24.308	33.086	40.893	47.785

MATRIZ [S]

.093 .065 .040 .023 .017 .013 .011 .008 .007 .005 .004 .003

MATRIZ [B]

.079
.407 .212
.199 .253 .064
.085 .130 .124 .015
.064 .106 .152 .083 .016
.047 .081 .147 .137 .083 .016
.034 .061 .127 .154 .139 .084 .016
.024 .044 .101 .142 .153 .138 .084 .016
.017 .032 .077 .118 .142 .153 .138 .083 .016
.012 .022 .057 .092 .117 .141 .152 .136 .082 .015
.004 .008 .023 .038 .050 .063 .074 .078 .065 .033
.008 .015 .040 .068 .091 .119 .148 .171 .173 .136 .060 .023

ENSAIO CA121/N

RESULTADOS DO MODELO

A	K	W	G	T0
.037	.000	.645	1.041	34.715

PE= 1.2094
J0= 7

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
15	91.634	97.316	99.139	99.723	99.911	99.971
8	72.107	90.080	96.506	98.779	99.576	99.853
3	52.327	79.283	91.453	96.596	98.679	99.497
1.68	42.535	71.620	86.974	94.311	97.604	99.018
1.19	36.910	66.642	83.730	92.491	96.673	98.571
.841	31.726	61.667	80.264	90.431	95.563	98.012
.595	27.740	57.027	76.728	88.191	94.291	97.342
.42	22.246	45.775	61.621	76.568	88.864	95.126
.297	17.835	36.712	49.432	61.489	74.309	87.629
.21	14.288	29.417	39.615	49.299	59.631	72.264
.149	11.467	23.612	31.800	39.584	47.900	58.098
.125	10.245	21.096	28.413	35.371	42.809	51.937
.084	7.937	16.344	22.014	27.410	33.182	40.273

MATRIZ [S]

.037 .037 .037 .037 .037 .037 .037 .037 .037 .037 .037 .037 .037

MATRIZ [B]

.318
.315 .454
.113 .168 .297
.050 .074 .137 .186
.040 .060 .111 .158 .187
.032 .048 .089 .128 .157 .187
.026 .038 .072 .104 .129 .158 .188
.020 .030 .057 .083 .103 .128 .158 .187
.016 .024 .046 .067 .083 .103 .128 .158 .187
.013 .019 .036 .053 .066 .082 .102 .127 .156 .185
.005 .008 .015 .023 .028 .035 .044 .055 .068 .084 .097
.010 .016 .030 .043 .054 .068 .084 .105 .130 .161 .196 .212

AMOSTRA CA121

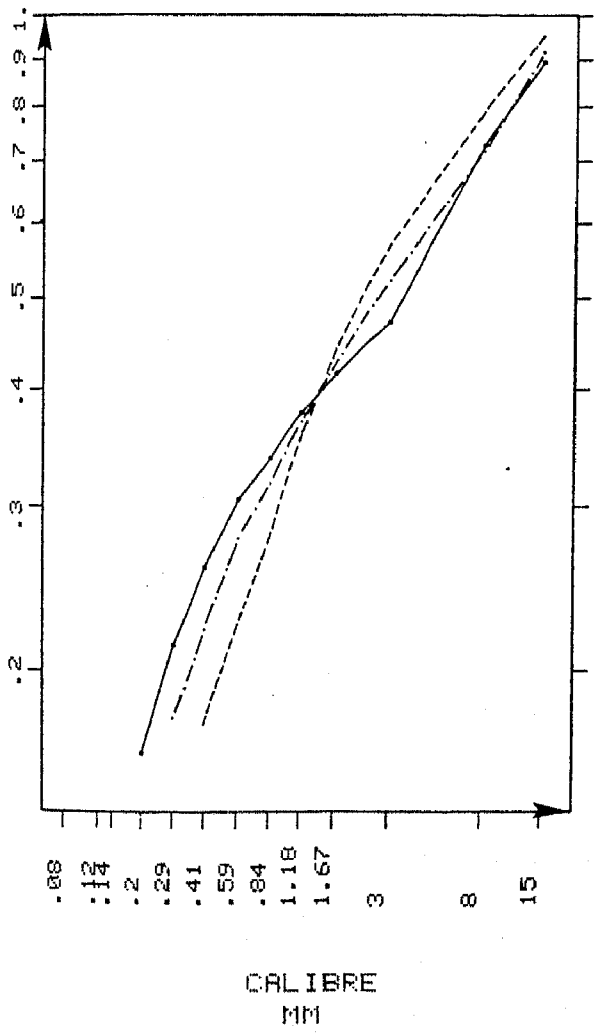
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

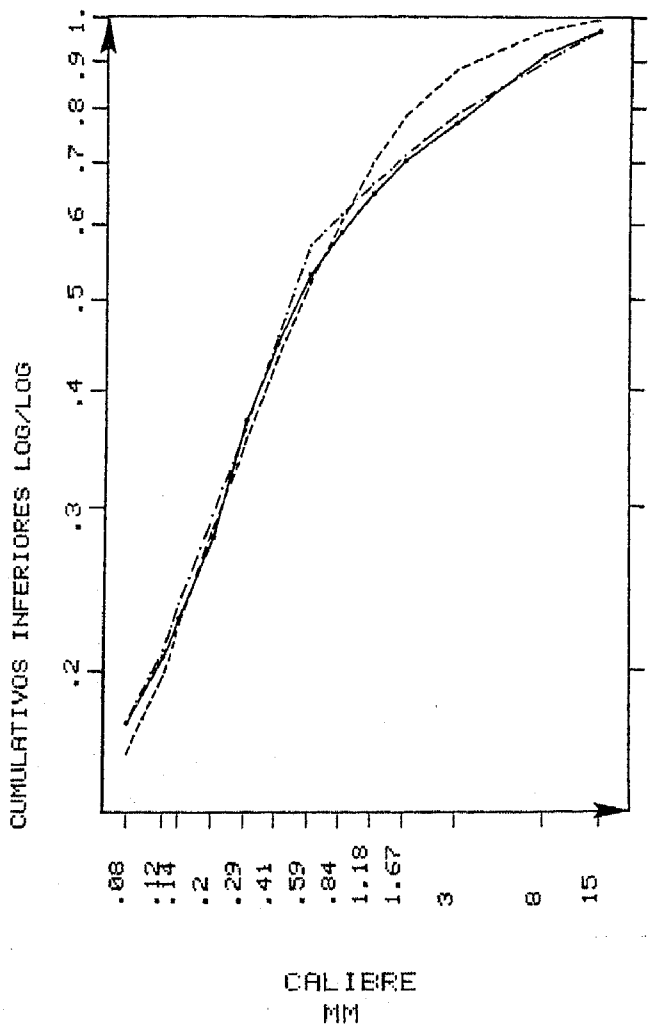
	PA	PK	PN	PG	T0	PE	J0
LINEAR	.093	.641	1.034	3.436	43.938	.000	0
N LINEAR	.037	.000	.645	1.041	34.715	1.209	7

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <—.—.—>

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA CA121

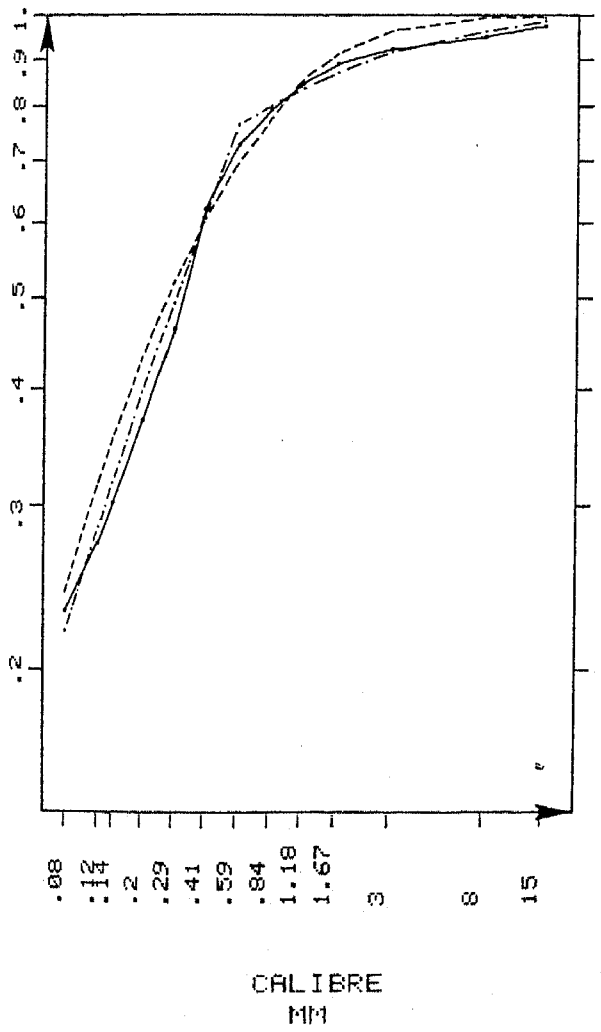
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

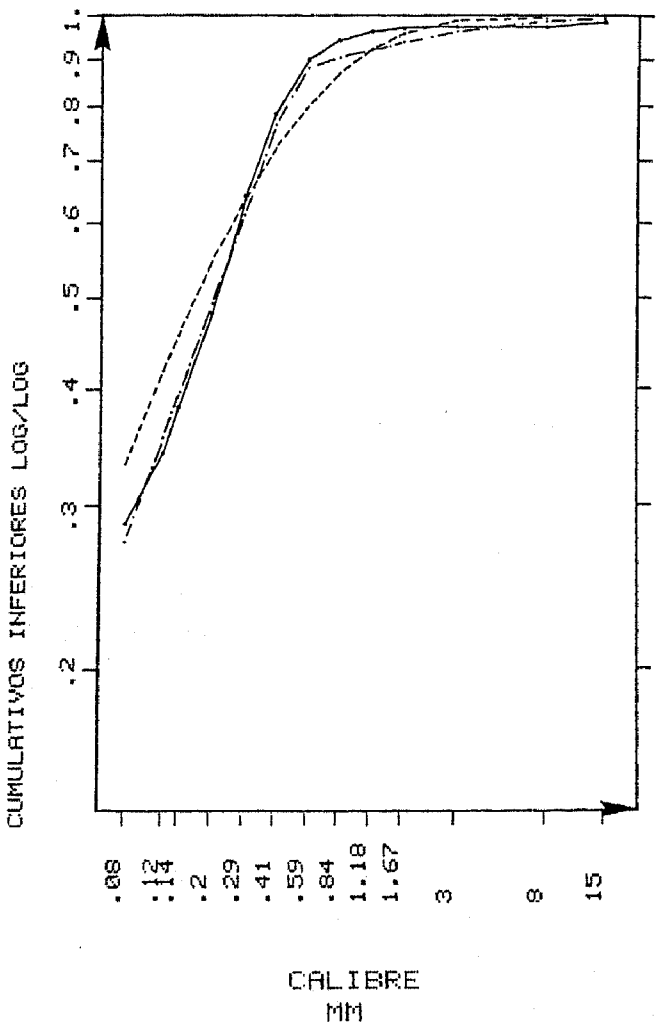
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.093	.641	1.034	3.436	43.938	.000	0
N LINEAR	.037	.000	.645	1.041	34.715	1.209	7

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA CA121

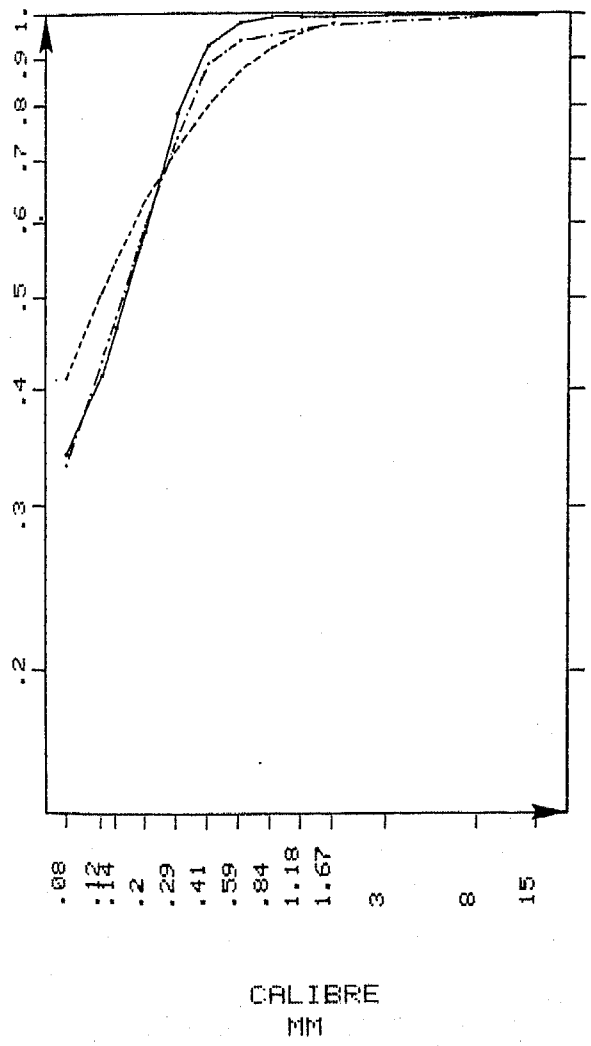
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

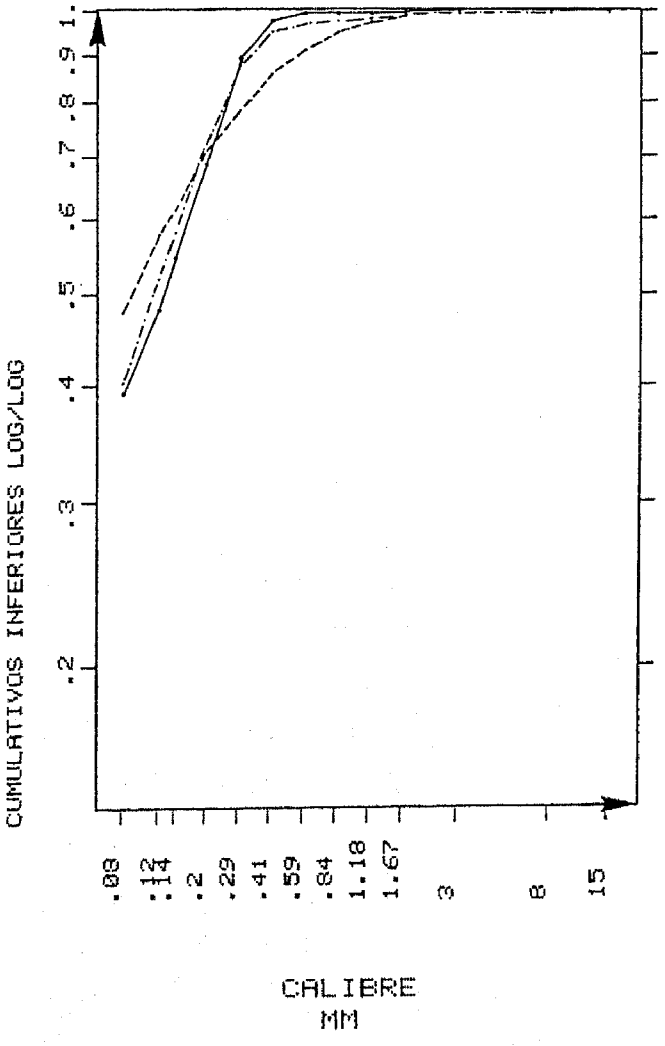
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.093	.641	1.034	3.436	43.938	.000	0
N LINEAR	.037	.000	.645	1.041	34.715	1.209	7

ENSAIO REAL ⟨———⟩
ENSAIO SIMULADO LINEAR ⟨– – – –⟩
ENSAIO SIMULADO N LINEAR C/ ESCUDO ⟨—.—.—⟩

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



ANEXO X

AMOSTRA CA 221

. CALCÁRIO

. ALIMENTAÇÃO SEM O LOTE 25/15 MM

. BARRAS GROSSAS (35 MM)

. ENCHIMENTO ALTO (40 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA CA221/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	1811	56.593	43.406	56.593
3	3.000	992	31.000	12.406	87.593
12	1.680	195	6.093	6.312	93.687
16	1.190	110	3.437	2.875	97.125
20	.841	92	2.875	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA CA221/ 1 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	616	19.250	80.750	19.250
3	3.000	1011	31.593	49.156	50.843
12	1.680	159	4.968	44.187	55.812
16	1.190	154	4.812	39.375	60.625
20	.841	142	4.437	34.937	65.062
30	.595	117	3.656	31.281	68.718
40	.420	152	4.750	26.531	73.468
50	.297	147	4.593	21.937	78.062
70	.210	156	4.875	17.062	82.937
100	.149	91	2.843	14.218	85.781
140	.125	37	1.156	13.062	86.937
200	.084	38	1.187	11.875	88.125

ANALISE GRANULOMETRICA

AMOSTRA CA221/ 2 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	330	10.312	89.687	10.312
3	3.000	949	29.656	60.031	39.968
12	1.680	243	7.593	52.437	47.562
16	1.190	200	6.250	46.187	53.812
20	.841	173	5.406	40.781	59.218
30	.595	141	4.406	36.375	63.625
40	.420	187	5.843	30.531	69.468
50	.297	166	5.187	25.343	74.656
70	.210	178	5.562	19.781	80.218
100	.149	110	3.437	16.343	83.656
140	.125	37	1.156	15.187	84.812
200	.084	69	2.156	13.031	86.968

ANALISE GRANULOMETRICA

AMOSTRA CA221/ 3 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	52	1.625	98.375	1.625
3	3.000	353	11.031	87.343	12.656
12	1.680	239	7.468	79.875	20.125
16	1.190	248	7.750	72.125	27.875
20	.841	246	7.687	64.437	35.562
30	.595	255	7.968	56.468	43.531
40	.420	306	9.562	46.906	53.093
50	.297	339	10.593	36.312	63.687
70	.210	245	7.656	28.656	71.343
100	.149	169	5.281	23.375	76.625
140	.125	70	2.187	21.187	78.812
200	.084	103	3.218	17.968	82.031

ANALISE GRANULOMETRICA

AMOSTRA CA221/ 4 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	63	1.968	98.031	1.968
3	3.000	282	8.812	89.218	10.781
12	1.680	204	6.375	82.843	17.156
16	1.190	226	7.062	75.781	24.218
20	.841	239	7.468	68.312	31.687
30	.595	232	7.250	61.062	38.937
40	.420	323	10.093	50.968	49.031
50	.297	347	10.843	40.125	59.875
70	.210	277	8.656	31.468	68.531
100	.149	185	5.781	25.687	74.312
140	.125	78	2.437	23.250	76.750
200	.084	114	3.562	19.687	80.312

ANALISE GRANULOMETRICA

AMOSTRA CA221/ 5 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	7	.218	99.781	.218
3	3.000	8	.250	99.531	.468
12	1.680	17	.531	99.000	1.000
16	1.190	63	1.968	97.031	2.968
20	.841	161	5.031	92.000	8.000
30	.595	250	7.812	84.187	15.812
40	.420	461	14.406	69.781	30.218
50	.297	465	14.531	55.250	44.750
70	.210	430	13.437	41.812	58.187
100	.149	266	8.312	33.500	66.500
140	.125	117	3.656	29.843	70.156
200	.084	148	4.625	25.218	74.781

ANALISE GRANULOMETRICA

AMOSTRA CA221/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	2	.062	99.937	.062
12	1.680	1	.031	99.906	.093
16	1.190	2	.062	99.843	.156
20	.841	22	.687	99.156	.843
30	.595	91	2.843	96.312	3.687
40	.420	367	11.468	84.843	15.156
50	.297	509	15.906	68.937	31.062
70	.210	556	17.375	51.562	48.437
100	.149	341	10.656	40.906	59.093
140	.125	150	4.687	36.218	63.781
200	.084	169	5.281	30.937	69.062

ANALISE GRANULOMETRICA

AMOSTRA CA221/ 7 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.680	0	.000	100.000	.000
16	1.190	0	.000	100.000	.000
20	.841	1	.031	99.968	.031
30	.595	13	.406	99.562	.437
40	.420	157	4.906	94.656	5.343
50	.297	419	13.093	81.562	18.437
70	.210	629	19.656	61.906	38.093
100	.149	431	13.468	48.437	51.562
140	.125	191	5.968	42.468	57.531
200	.084	218	6.812	35.656	64.343

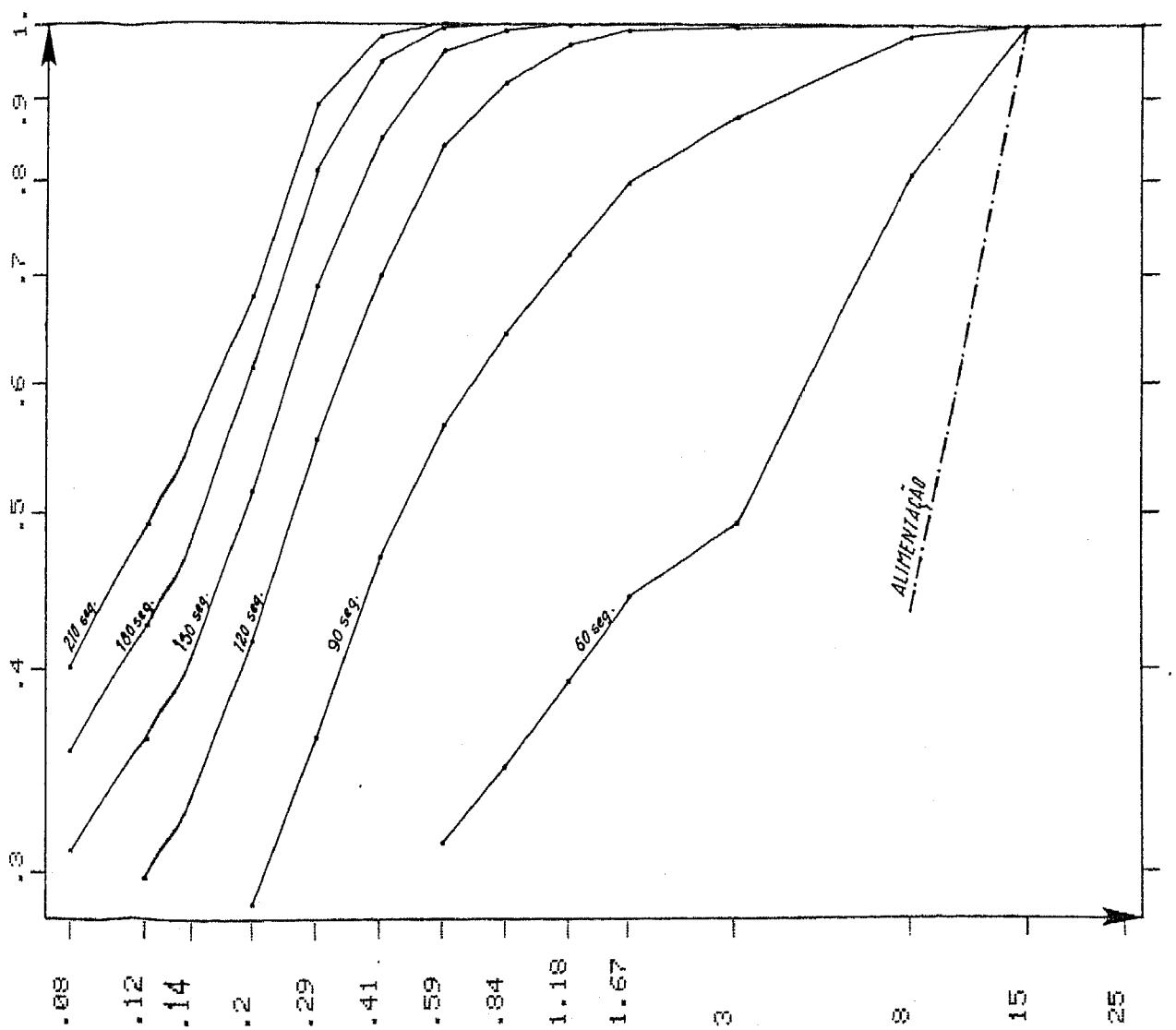
ANALISE GRANULOMETRICA

AMOSTRA CA221/ 8 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.680	0	.000	100.000	.000
16	1.190	0	.000	100.000	.000
20	.841	0	.000	100.000	.000
30	.595	2	.062	99.937	.062
40	.420	57	1.781	98.156	1.843
50	.297	281	8.781	89.375	10.625
70	.210	681	21.281	68.093	31.906
100	.149	384	12.000	56.093	43.906
140	.125	227	7.093	49.000	51.000
200	.084	282	8.812	40.187	59.812

CUMULATIVOS INFERIORES

AMOSTRA CA221 / N



ENSAIO CA221/N

RESULTADOS DO MODELO

A	K	W	G	T0
.187	.894	.970	4.286	49.618

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
8	82.691	99.435	99.981	99.999	99.999	99.999
3	62.398	95.328	99.254	99.873	99.978	99.996
1.68	50.093	87.582	95.734	98.318	99.294	99.696
1.19	41.344	79.840	90.933	95.459	97.609	98.705
.841	32.581	70.323	83.955	90.608	94.285	96.441
.595	26.557	61.428	76.339	84.577	89.627	92.883
.42	21.080	52.110	67.407	76.767	83.015	87.372
.297	16.409	43.139	57.967	67.827	74.880	80.117
.21	12.560	34.937	48.642	58.404	65.793	71.566
.149	9.512	27.832	40.018	49.205	56.490	62.421
.125	8.216	24.619	35.942	44.699	51.788	57.667
.084	5.847	18.393	27.712	35.292	41.684	47.179

MATRIZ [S]

.187 .114 .058 .027 .017 .013 .009 .007 .005 .003 .002 .002

MATRIZ [B]

.034
.330 .123
.215 .221 .026
.102 .135 .079
.081 .119 .123 .042
.062 .098 .139 .096 .042
.047 .078 .134 .131 .097 .042
.034 .059 .116 .139 .131 .096 .042
.025 .044 .094 .128 .139 .131 .096 .042
.018 .032 .073 .108 .127 .138 .130 .095 .041
.007 .013 .030 .047 .058 .067 .071 .063 .042 .014
.012 .023 .055 .087 .111 .135 .154 .158 .136 .084 .025

ENSAIO CA221/N

RESULTADOS DO MODELO

A	K	W	G	T0
.062	.203	.622	1.069	40.076

PE= 2.0147
J0= 6

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS -->	60.000	90.000	120.000	150.000	180.000	210.000
8	81.443	96.538	99.354	99.879	99.977	99.995
3	59.708	88.478	96.891	99.190	99.794	99.948
1.68	48.104	80.840	93.418	97.833	99.306	99.782
1.19	41.131	75.218	90.314	96.375	98.681	99.529
.841	34.579	69.189	86.564	94.404	97.740	99.106
.595	29.831	63.447	82.440	91.969	96.446	98.464
.42	24.155	51.467	66.939	79.571	90.270	95.659
.297	19.541	41.671	54.222	64.551	75.942	87.456
.21	15.792	33.693	43.854	52.242	61.543	73.485
.149	12.781	27.278	35.511	42.320	49.888	59.664
.125	11.467	24.477	31.868	37.983	44.787	53.587
.084	8.968	19.147	24.931	29.723	35.061	41.980

MATRIZ [S]

.062 .055 .047 .040 .036 .034 .032 .029 .027 .025 .024 .022 .021

MATRIZ [B]

.299
.313 .432
.115 .168 .278
.051 .075 .134 .172
.042 .062 .111 .153 .173
.034 .050 .090 .126 .152 .172
.027 .040 .074 .104 .127 .153 .173
.022 .032 .059 .084 .103 .126 .152 .173
.017 .026 .048 .068 .084 .103 .126 .152 .173
.014 .021 .038 .055 .068 .083 .102 .125 .151 .171
.006 .009 .016 .024 .029 .036 .045 .055 .067 .080 .088
.011 .017 .032 .045 .056 .070 .086 .106 .129 .157 .187 .197

AMOSTRA CA221

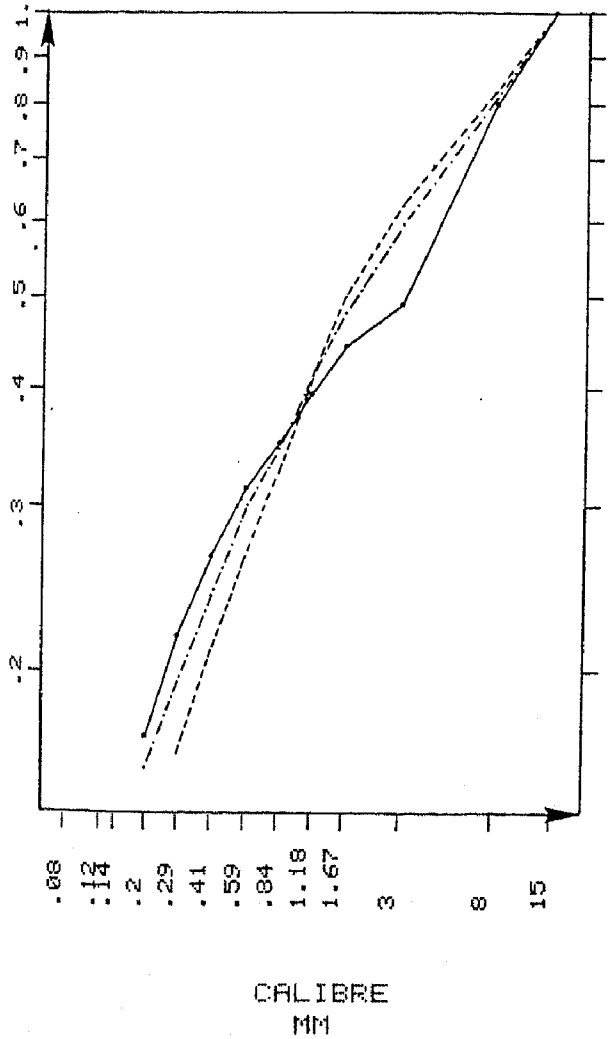
@UALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

	PA	PK	PW	PG	T0	PE	J0
LINEAR	.187	.894	.970	4.286	49.618	.000	0
N LINEAR	.062	.203	.622	1.069	40.076	2.014	6

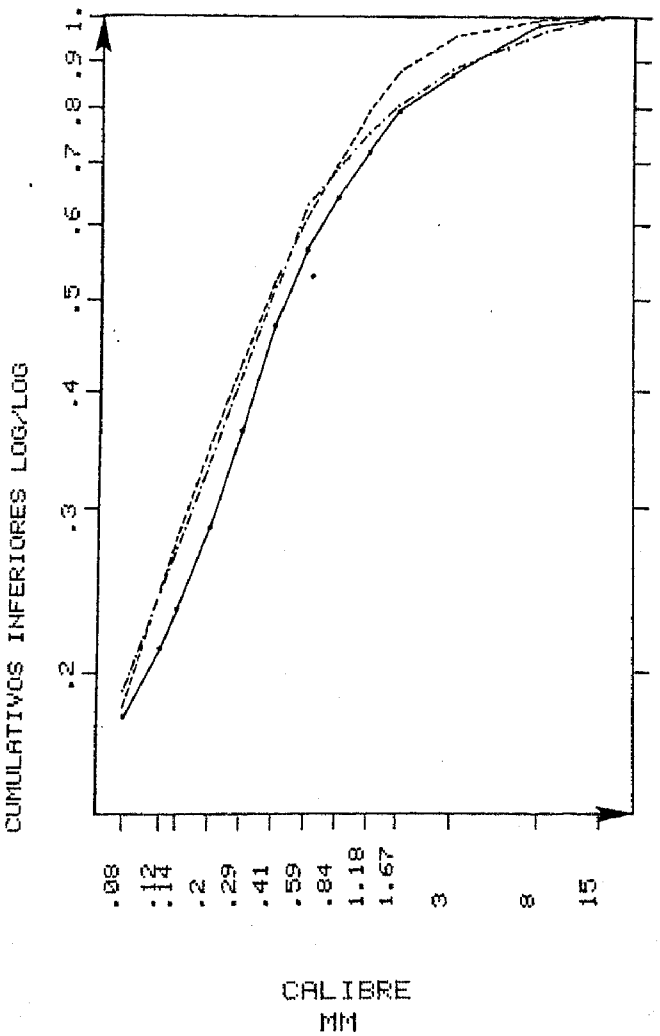
ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 60



CALIBRE
MM

TEMPO RESIDENCIA 90



CALIBRE
MM

AMOSTRA CA221

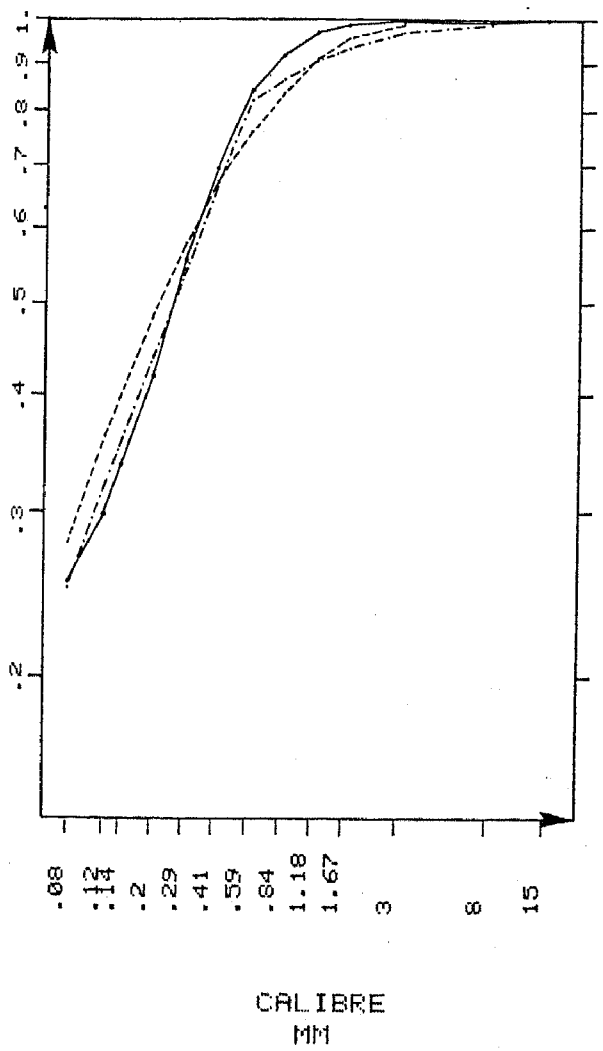
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

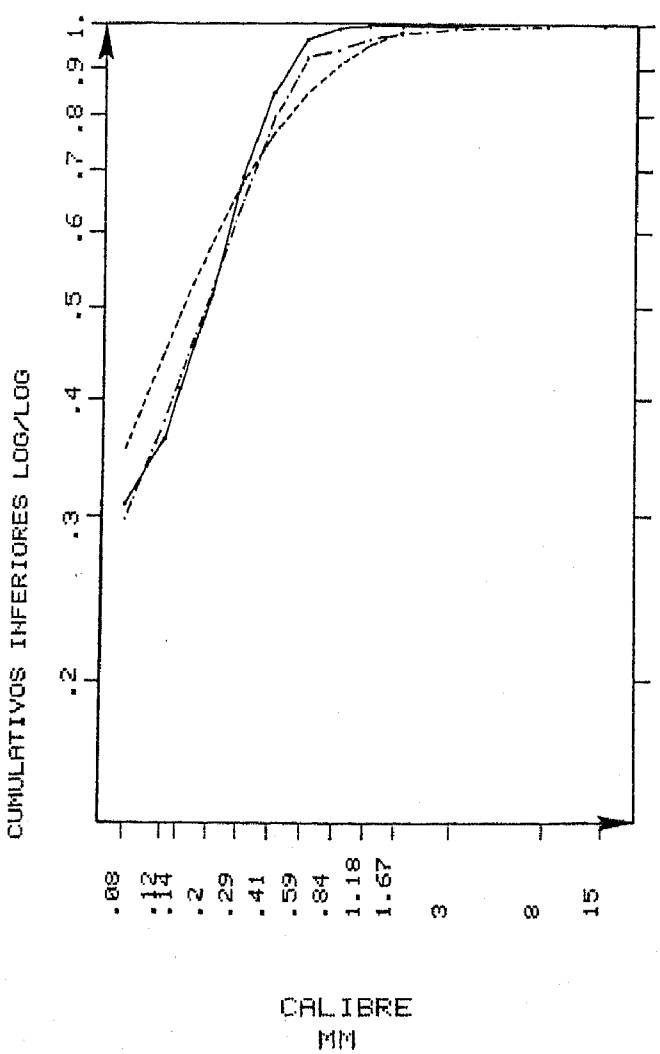
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.187	.894	.970	4.286	49.618	.000	0
N LINEAR	.062	.203	.622	1.069	40.076	2.014	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA CA221

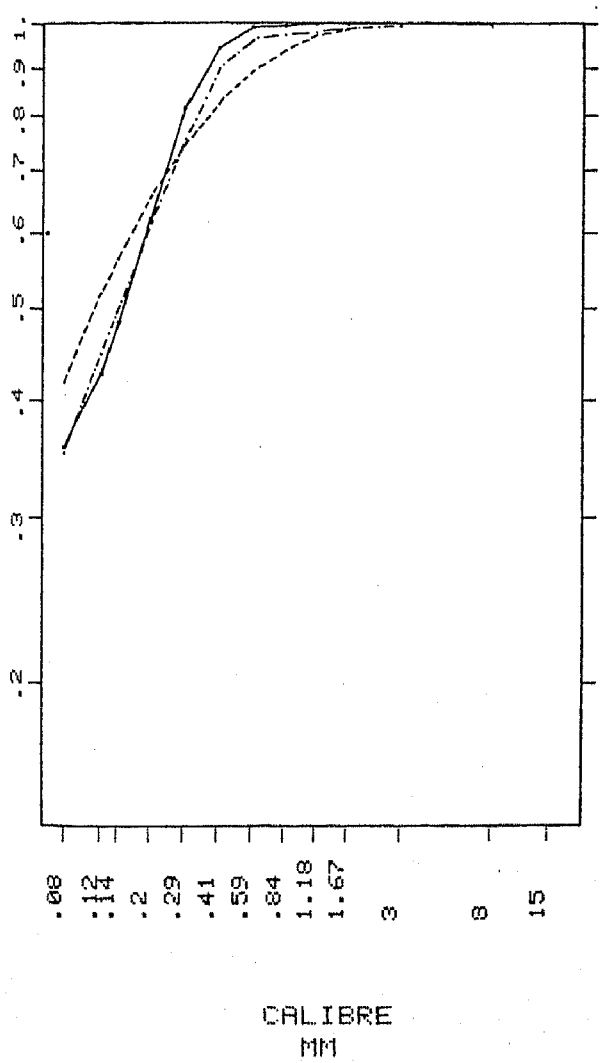
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

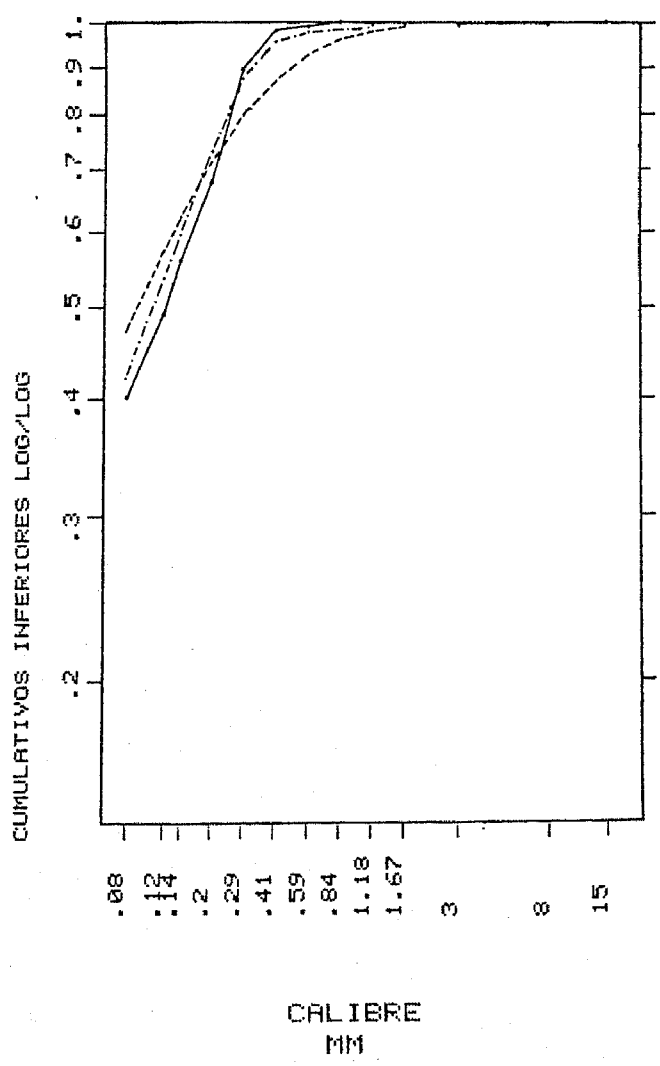
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.187	.894	.970	4.286	49.618	.000	0
N LINEAR	.062	.203	.622	1.069	40.076	2.014	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <- - - - ->
ENSAIO SIMULADO N LINEAR C/ ESCUDO <-.-.->

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



ANEXO XI

AMOSTRA CAN 221

. CALCÁRIO NOVO

. ALIMENTAÇÃO SEM O LOTE 25/15 MM

. BARRAS GROSSAS (35 MM)

. ENCHIMENTO ALTO (40 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	1811	56.593	43.406	56.593
3	3.000	992	31.000	12.406	87.593
12	1.680	195	6.093	6.312	93.687
16	1.190	110	3.437	2.875	97.125
20	.841	92	2.875	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 1 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	361	11.287	88.712	11.287
3	3.000	717	22.415	66.296	33.703
12	1.680	333	10.428	55.868	44.131
16	1.190	227	7.106	48.762	51.237
20	.841	188	5.878	42.884	57.115
30	.595	157	4.925	37.959	62.040
40	.420	189	5.912	32.046	67.953
50	.297	188	5.884	26.162	73.837
70	.210	190	5.965	20.196	79.803
100	.149	120	3.765	16.431	83.568
140	.125	20	.640	15.790	84.209
200	.084	62	1.937	13.853	86.146

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 2 T= 60

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	277	8.656	91.343	8.656
3	3.000	713	22.300	69.043	30.956
12	1.680	329	10.290	58.753	41.246
16	1.190	239	7.484	51.268	48.731
20	.841	200	6.253	45.015	54.984
30	.595	164	5.150	39.865	60.134
40	.420	198	6.200	33.665	66.334
50	.297	197	6.156	27.509	72.490
70	.210	204	6.381	21.128	78.871
100	.149	127	3.968	17.159	82.840
140	.125	6	.206	16.953	83.046
200	.084	86	2.690	14.262	85.737

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 3 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	73	2.293	97.706	2.293
3	3.000	263	8.228	89.478	10.521
12	1.680	245	7.684	81.793	18.206
16	1.190	245	7.665	74.128	25.871
20	.841	247	7.731	66.396	33.603
30	.595	234	7.328	59.068	40.931
40	.420	322	10.071	48.996	51.003
50	.297	274	8.578	40.418	59.581
70	.210	304	9.506	30.912	69.087
100	.149	191	5.975	24.937	75.062
140	.125	32	1.018	23.918	76.081
200	.084	112	3.525	20.393	79.606

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 4 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	109	3.431	96.568	3.431
3	3.000	277	8.684	87.884	12.115
12	1.680	248	7.771	80.112	19.887
16	1.190	240	7.525	72.587	27.412
20	.841	241	7.546	65.040	34.959
30	.595	229	7.162	57.878	42.121
40	.420	296	9.262	48.615	51.384
50	.297	301	9.415	39.200	60.800
70	.210	301	9.425	29.775	70.225
100	.149	189	5.925	23.850	76.150
140	.125	26	.834	23.015	76.984
200	.084	125	3.915	19.100	80.900

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 5 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	10	.318	99.681	.318
3	3.000	20	.643	99.037	.962
12	1.680	42	1.337	97.700	2.300
16	1.190	111	3.478	94.221	5.778
20	.841	215	6.731	87.490	12.509
30	.595	273	8.537	78.953	21.046
40	.420	417	13.046	65.906	34.093
50	.297	419	13.103	52.803	47.196
70	.210	402	12.571	40.231	59.768
100	.149	261	8.184	32.046	67.953
140	.125	68	2.125	29.921	70.078
200	.084	137	4.300	25.621	74.378

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.015	99.984	.015
12	1.680	0	.009	99.975	.025
16	1.190	1	.053	99.921	.078
20	.841	17	.540	99.381	.618
30	.595	88	2.771	96.609	3.390
40	.420	347	10.850	85.759	14.240
50	.297	524	16.381	69.378	30.621
70	.210	543	16.990	52.387	47.612
100	.149	359	11.231	41.156	58.843
140	.125	75	2.359	38.796	61.203
200	.084	212	6.628	32.168	67.831

ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 7 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	2	.062	99.937	.062
3	3.000	0	.012	99.925	.075
12	1.680	0	.009	99.915	.084
16	1.190	0	.006	99.909	.090
20	.841	1	.053	99.856	.143
30	.595	18	.584	99.271	.728
40	.420	165	5.184	94.087	5.912
50	.297	410	12.834	81.253	18.746
70	.210	637	19.931	61.321	38.678
100	.149	446	13.965	47.356	52.643
140	.125	94	2.950	44.406	55.593
200	.084	238	7.440	36.965	63.034

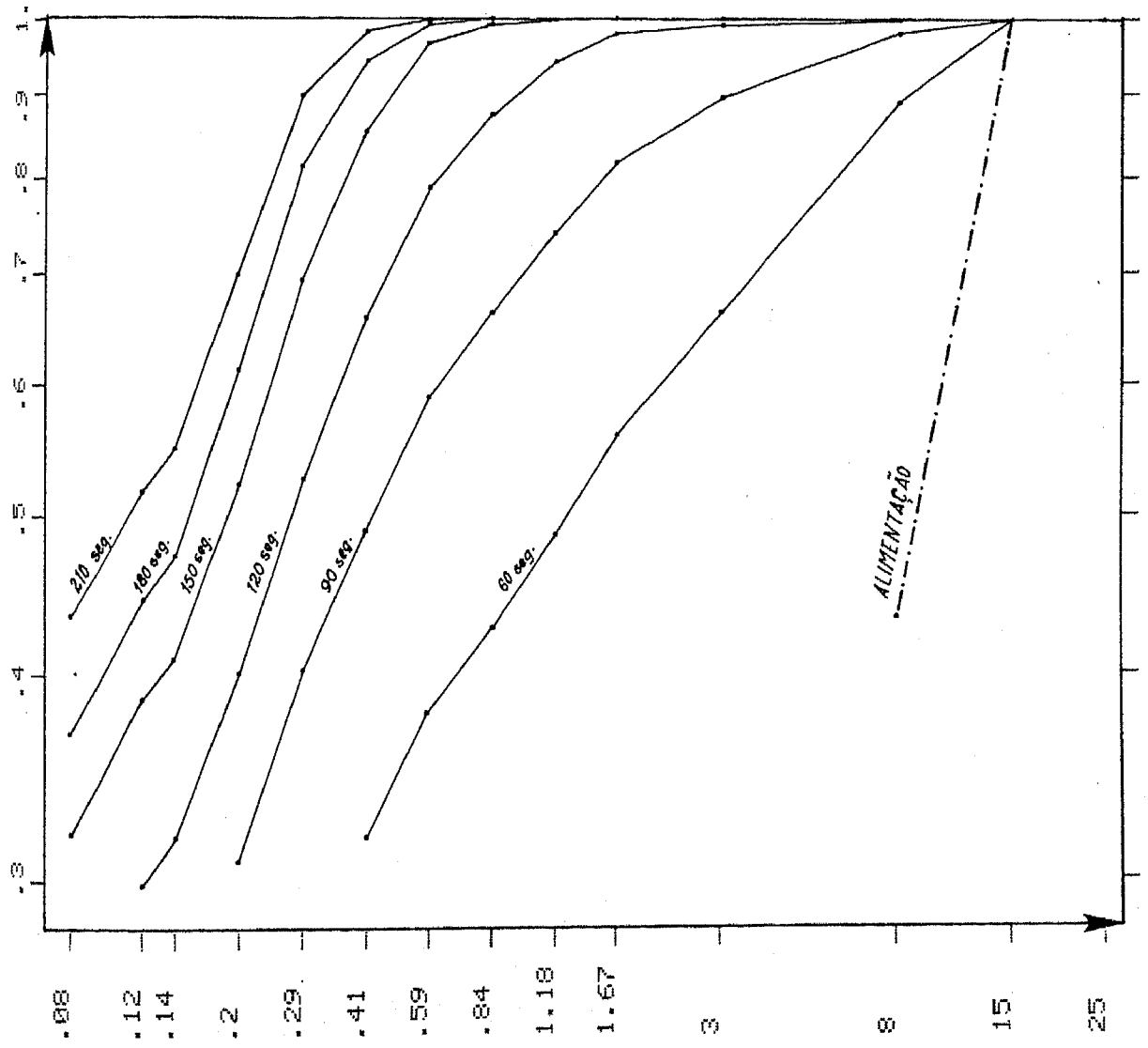
ANALISE GRANULOMETRICA

AMOSTRA CAN221/ 8 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.680	0	.000	100.000	.000
16	1.190	0	.003	99.996	.003
20	.841	0	.006	99.990	.009
30	.595	2	.090	99.900	.100
40	.420	59	1.862	98.037	1.962
50	.297	251	7.865	90.171	9.828
70	.210	641	20.043	70.128	29.871
100	.149	481	15.056	55.071	44.928
140	.125	98	3.090	51.981	48.018
200	.084	268	8.387	43.593	56.406

CUMULATIVOS INFERIORES

AMOSTRA CAN221/ N



ENSAIO CAN221/N

RESULTADOS DO MODELO

A	K	W	G	T0
.151	.744	.968	2.237	39.043

PE= 0
J0= 0

AJUSTE LINEAR

CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
8	93.058	99.655	99.982	99.999	99.999	99.999
3	75.777	95.836	99.259	99.867	99.976	99.995
1.68	61.468	87.915	95.780	98.425	99.391	99.760
1.19	51.077	79.862	90.965	95.737	97.928	98.974
.841	40.658	69.932	83.808	90.972	94.861	97.034
.595	32.825	60.335	75.594	84.622	90.165	93.645
.42	25.869	50.557	66.144	76.449	83.448	88.278
.297	20.048	41.384	56.354	67.177	75.147	81.081
.21	15.312	33.171	46.835	57.463	65.821	72.440
.149	11.589	26.175	38.153	48.040	56.242	63.070
.125	10.011	23.047	34.093	43.453	51.403	58.168
.084	7.128	17.041	25.963	33.917	40.990	47.270

MATRIZ [S]

.151 .100 .057 .030 .021 .016 .012 .009 .007 .005 .004 .003

MATRIZ [B]

.172
.417 .335
.161 .237 .151
.066 .108 .158 .059
.049 .084 .153 .141 .060
.036 .063 .130 .159 .141 .060
.026 .047 .104 .147 .160 .142 .061
.019 .034 .080 .121 .146 .159 .141 .060
.013 .025 .060 .095 .121 .146 .159 .141 .060
.009 .018 .044 .072 .095 .120 .145 .158 .139 .059
.003 .007 .017 .029 .039 .051 .065 .077 .081 .065 .015
.006 .012 .031 .052 .071 .094 .122 .152 .176 .180 .132 .077

ENSAIO CAN221/N

RESULTADOS DO MODELO

A	K	W	G	T0
.055	.202	.542	.664	30.331

PE= 1.3826
J0= 6

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
8	89.223	97.985	99.623	99.929	99.986	99.997
3	70.423	91.352	97.636	99.379	99.841	99.960
1.68	56.856	83.037	93.871	97.901	99.306	99.776
1.19	48.861	76.582	90.091	96.022	98.462	99.422
.841	41.720	70.119	85.787	93.580	97.208	98.821
.595	36.128	63.945	81.097	90.587	95.491	97.904
.42	28.801	50.395	64.886	80.630	90.447	95.432
.297	23.375	40.731	52.154	63.855	77.556	88.328
.21	19.081	33.162	42.366	51.624	61.786	74.499
.149	15.664	27.172	34.664	42.127	50.192	59.956
.125	14.173	24.568	31.325	38.030	45.242	53.883
.084	11.323	19.603	24.969	30.264	35.915	42.605

MATRIZ [S]

.055 .047 .040 .036 .034 .032 .029 .027 .025 .024 .022 .021

MATRIZ [B]

.555
.133 .419
.057 .120 .309
.046 .090 .153 .310
.037 .070 .109 .152 .309
.030 .055 .083 .109 .153 .311
.024 .044 .064 .082 .109 .152 .310
.020 .035 .051 .064 .082 .108 .152 .310
.016 .028 .041 .051 .064 .082 .108 .151 .308
.007 .012 .017 .022 .027 .034 .044 .059 .085 .203
.013 .024 .034 .042 .052 .065 .082 .106 .143 .212 .336

AMOSTRA CAN221

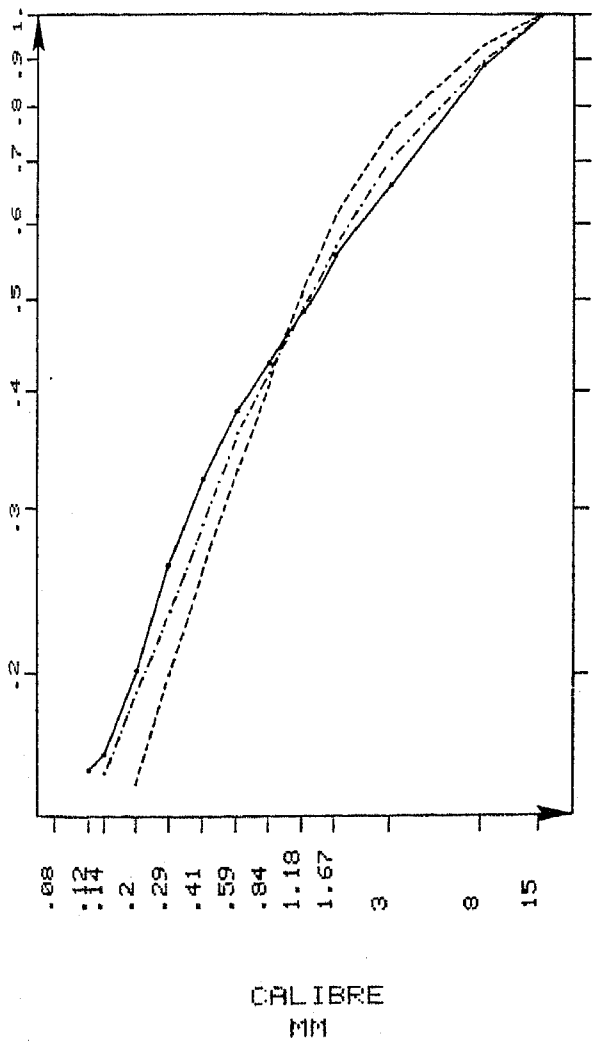
@UALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

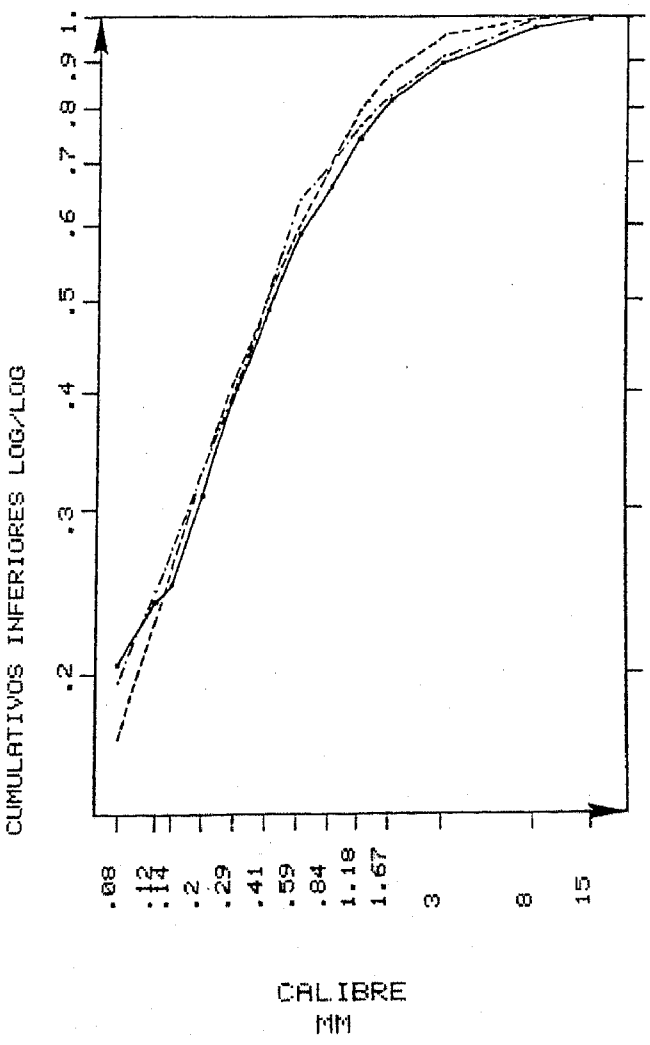
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.151	.744	.968	2.237	39.043	.000	0
N LINEAR	.055	.202	.542	.664	30.331	1.382	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA CAN221

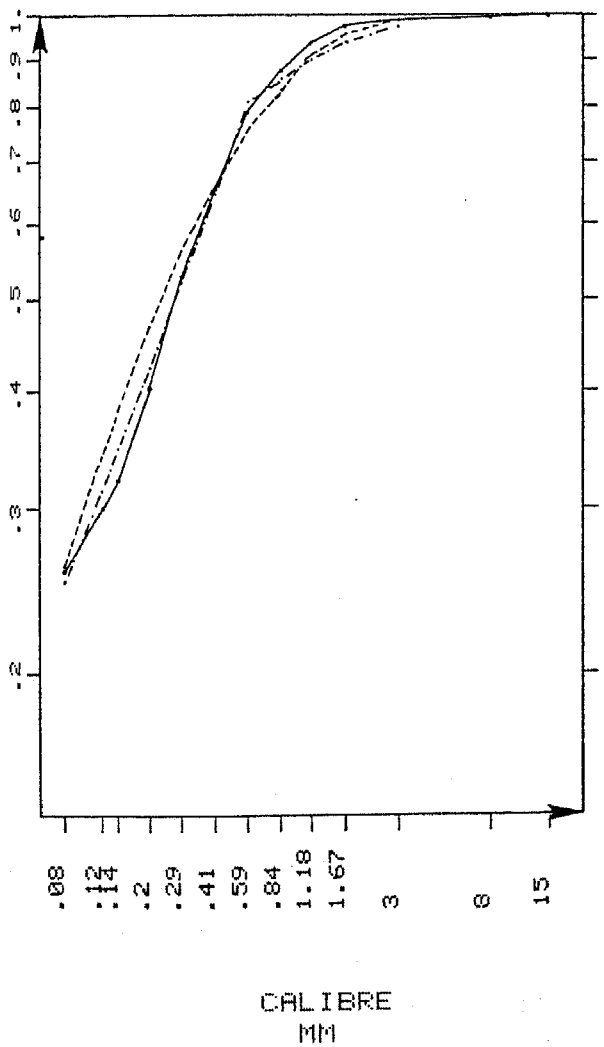
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

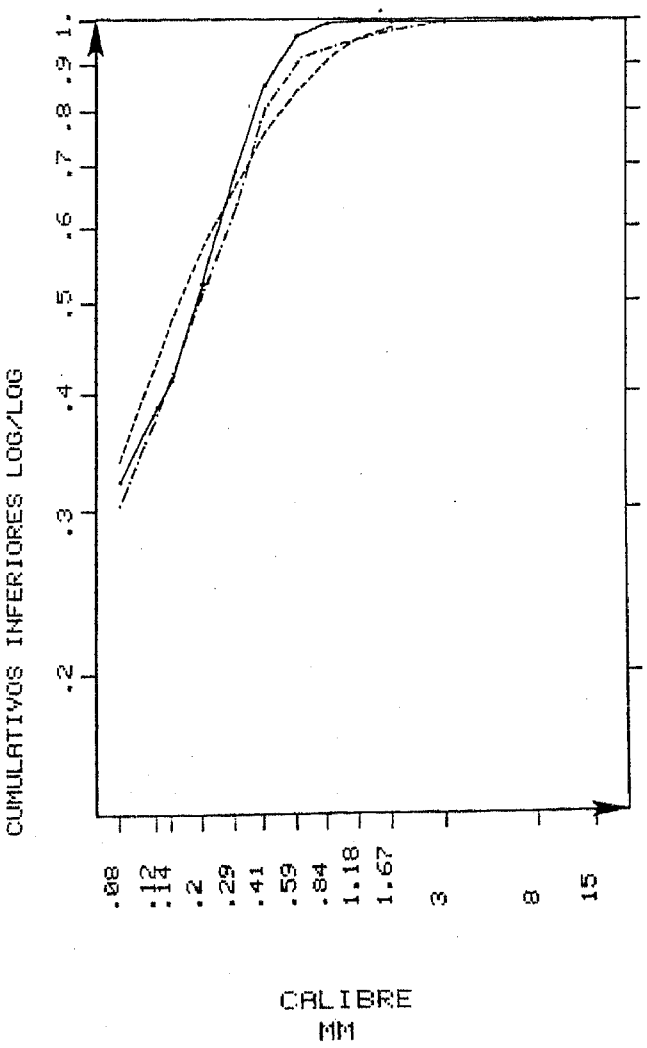
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.151	.744	.968	2.237	39.043	.000	0
N LINEAR	.055	.202	.542	.664	30.331	1.382	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA CAN221

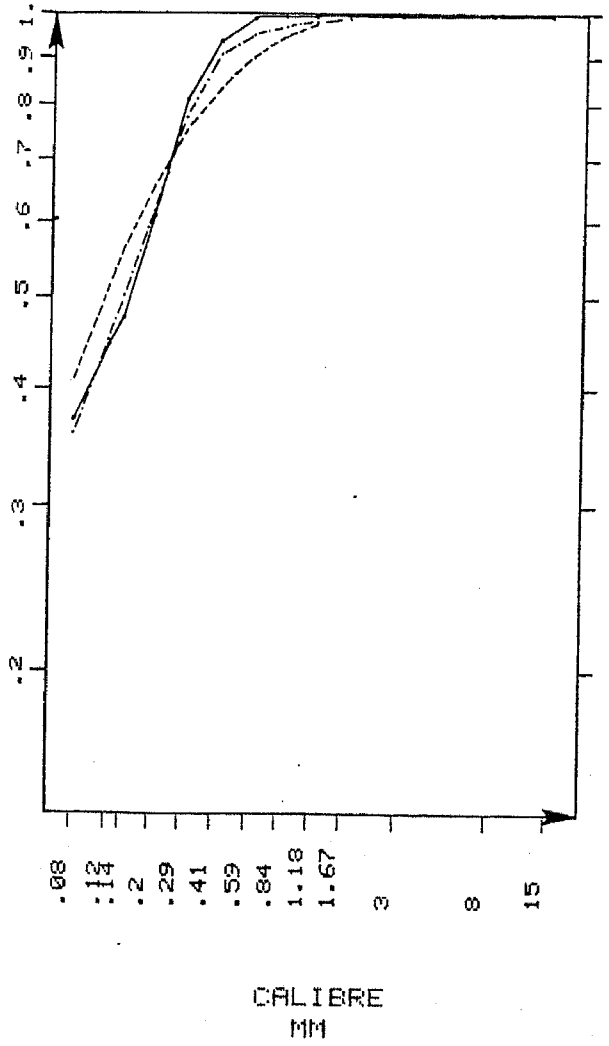
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

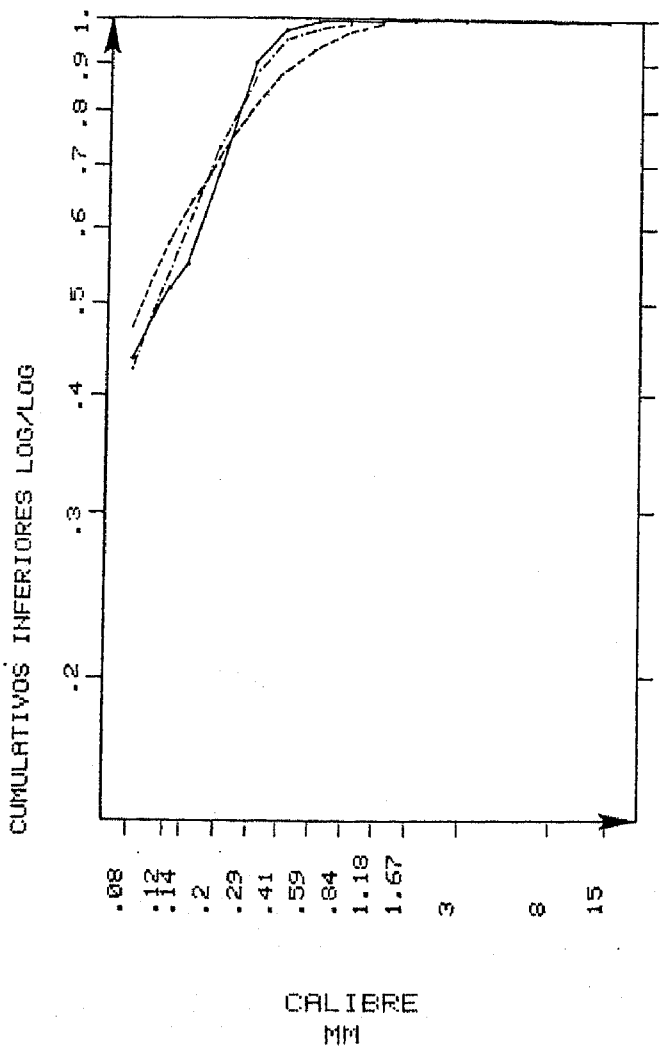
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.151	.744	.968	2.237	39.043	.000	0
N LINEAR	.055	.202	.542	.664	30.331	1.382	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



ANEXO XII

AMOSTRA CAN 222

. CALCÁRIO NOVO

. ALIMENTAÇÃO SEM O LOTE 25/15 MM

. BARRAS GROSSAS (35 MM)

. ENCHIMENTO BAIXO (25 %)

. ENSAIOS REAIS - ANÁLISES GRANULOMÉTRICAS

. SIMULAÇÕES MODELO LINEAR - CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. SIMULAÇÕES MODELO NÃO LINEAR COM ESCUDO
CÚMULOS INFERIORES
MATRIZES DESTRUIÇÃO E FORMAÇÃO

. QUALIDADE DOS AJUSTAMENTOS - REPRESENTAÇÕES GRÁFICAS

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ N ALIMENTACAO

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	1132	56.600	43.400	56.600
3	3.000	620	31.000	12.400	87.600
12	1.680	122	6.100	6.300	93.700
16	1.190	69	3.450	2.850	97.150
20	.841	57	2.850	.000	100.000

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 1 T= 60

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	162	8.120	91.880	8.120
3	3.000	306	15.340	76.540	23.460
12	1.680	165	8.285	68.255	31.745
16	1.190	130	6.515	61.740	38.260
20	.841	126	6.330	55.410	44.590
30	.595	117	5.890	49.520	50.480
40	.420	163	8.190	41.330	58.670
50	.300	152	7.635	33.695	66.305
70	.212	159	7.975	25.720	74.280
100	.150	102	5.110	20.610	79.390
140	.125	34	1.700	18.910	81.090
200	.084	68	3.420	15.490	84.510

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 2 T= 60

MALHA	LUZ	PESOS GR	%	CUM INF	CUM SUP
8	8.000	155	7.790	92.210	7.790
3	3.000	316	15.810	76.400	23.600
12	1.680	161	8.060	68.340	31.660
16	1.190	130	6.515	61.825	38.175
20	.841	127	6.350	55.475	44.525
30	.595	120	6.045	49.430	50.570
40	.420	169	8.465	40.965	59.035
50	.300	149	7.460	33.505	66.495
70	.212	163	8.170	25.335	74.665
100	.150	107	5.360	19.975	80.025
140	.125	36	1.805	18.170	81.830
200	.084	58	2.945	15.225	84.775

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 3 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	28	1.425	98.575	1.425
3	3.000	79	3.950	94.625	5.375
12	1.680	69	3.480	91.145	8.855
16	1.190	84	4.225	86.920	13.080
20	.841	113	5.660	81.260	18.740
30	.595	138	6.935	74.325	25.675
40	.420	231	11.575	62.750	37.250
50	.300	222	11.100	51.650	48.350
70	.212	246	12.300	39.350	60.650
100	.150	162	8.140	31.210	68.790
140	.125	59	2.950	28.260	71.740
200	.084	84	4.240	24.020	75.980

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 4 T= 90

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	52	2.635	97.365	2.635
3	3.000	75	3.795	93.570	6.430
12	1.680	63	3.165	90.405	9.595
16	1.190	79	3.980	86.425	13.575
20	.841	112	5.615	80.810	19.190
30	.595	142	7.135	73.675	26.325
40	.420	237	11.890	61.785	38.215
50	.300	223	11.195	50.590	49.410
70	.212	245	12.275	38.315	61.685
100	.150	164	8.245	30.070	69.930
140	.125	51	2.595	27.475	72.525
200	.084	86	4.320	23.155	76.845

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 5 T= 120

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	3	.150	99.850	.150
3	3.000	4	.230	99.620	.380
12	1.680	4	.235	99.385	.615
16	1.190	7	.380	99.005	.995
20	.841	24	1.200	97.805	2.195
30	.595	69	3.460	94.345	5.655
40	.420	217	10.870	83.475	16.525
50	.300	272	13.625	69.850	30.150
70	.212	334	16.740	53.110	46.890
100	.150	240	12.010	41.100	58.900
140	.125	108	5.430	35.670	64.330
200	.084	107	5.355	30.315	69.685

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 6 T= 150

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.680	0	.015	99.985	.015
16	1.190	0	.030	99.955	.045
20	.841	2	.130	99.825	.175
30	.595	15	.765	99.060	.940
40	.420	117	5.850	93.210	6.790
50	.300	225	11.260	81.950	18.050
70	.212	359	17.970	63.980	36.020
100	.150	282	14.125	49.855	50.145
140	.125	94	4.740	45.115	54.885
200	.084	142	7.110	38.005	61.995

ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 7 T= 180

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.680	0	.000	100.000	.000
16	1.190	0	.000	100.000	.000
20	.841	0	.010	99.990	.010
30	.595	2	.125	99.865	.135
40	.420	39	1.995	97.870	2.130
50	.300	154	7.745	90.125	9.875
70	.212	335	16.795	73.330	26.670
100	.150	309	15.475	57.855	42.145
140	.125	121	6.085	51.770	48.230
200	.084	178	8.920	42.850	57.150

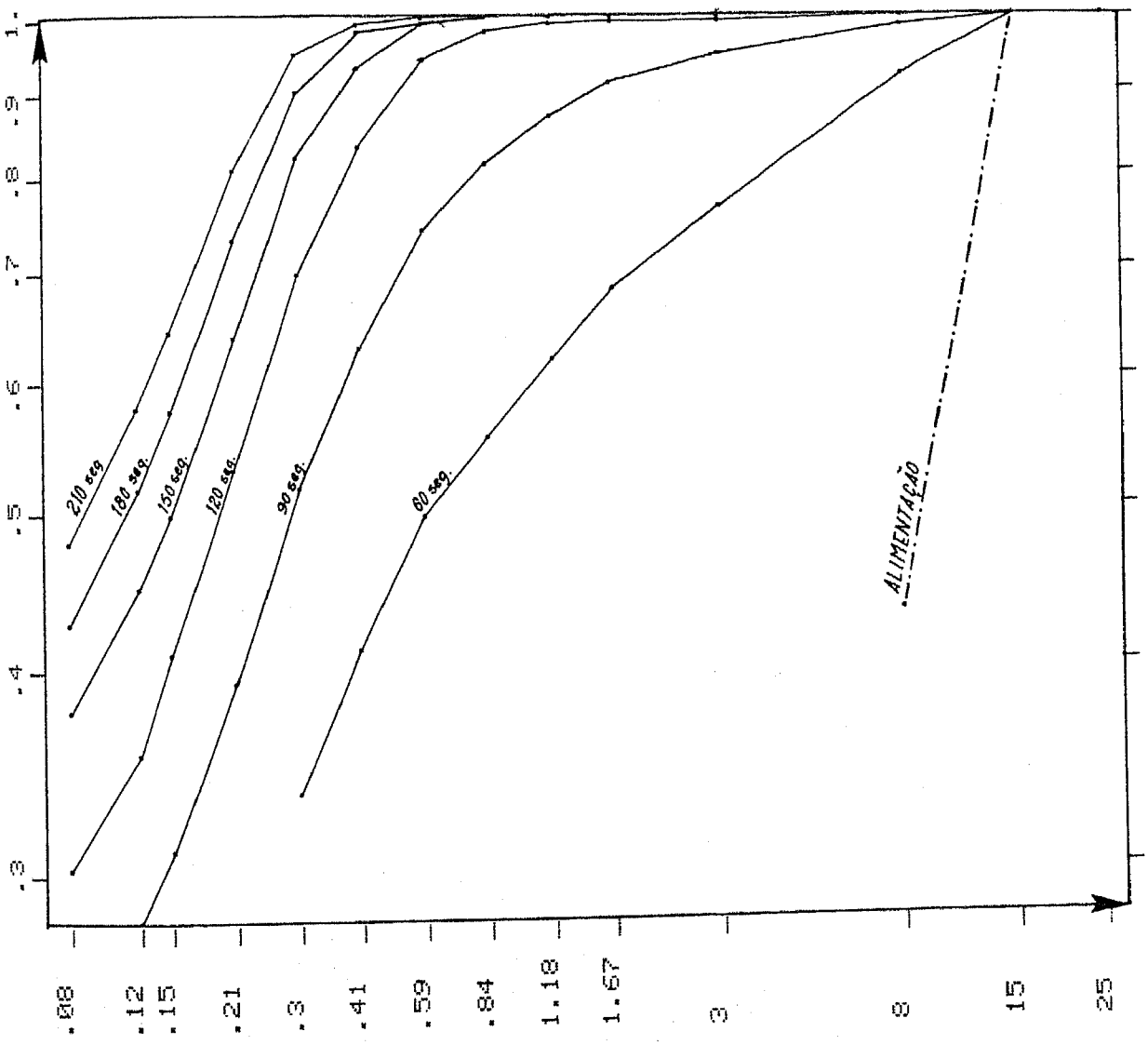
ANALISE GRANULOMETRICA

AMOSTRA CAN222/ 8 T= 210

MALHA	LUZ	PESOS GR	%%	CUM INF	CUM SUP
8	8.000	0	.000	100.000	.000
3	3.000	0	.000	100.000	.000
12	1.680	0	.000	100.000	.000
16	1.190	0	.000	100.000	.000
20	.841	0	.005	99.995	.005
30	.595	0	.025	99.970	.030
40	.420	14	.720	99.250	.750
50	.300	85	4.260	94.990	5.010
70	.212	284	14.205	80.785	19.215
100	.150	327	16.370	64.415	35.585
140	.125	128	6.410	58.005	41.995
200	.084	201	10.055	47.950	52.050

CUMULATIVOS INFERIORES

AMOSTRA CAN222/ N



ENSAIO CAN222/N

RESULTADOS DO MODELO

A	K	W	G	T0
.397	1.041	.996	4.570	47.670

PE= 0
J0= 0

AJUSTE LINEAR — CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
8	96.396	99.995	99.999	100.000	100.000	100.000
3	85.162	99.463	99.976	99.998	99.999	99.999
1.68	72.879	95.649	98.905	99.699	99.916	99.976
1.19	62.830	90.202	96.343	98.504	99.360	99.717
.841	51.941	82.322	91.595	95.694	97.704	98.744
.595	43.159	73.885	85.417	91.327	94.654	96.626
.42	34.807	64.185	77.203	84.714	89.432	92.539
.297	27.432	54.181	67.713	76.285	82.138	86.311
.21	21.192	44.555	57.719	66.706	73.258	78.219
.149	16.152	35.893	48.039	56.848	63.610	68.975
.125	13.983	31.886	43.339	51.870	58.568	63.990
.084	9.978	23.979	33.645	41.231	47.452	52.685

MATRIZ [S]

.397 .223 .103 .042 .025 .017 .012 .008 .006 .004 .002 .002

MATRIZ [B]

.030
.327 .115
.220 .222 .023
.104 .138 .075
.083 .122 .122 .037
.063 .100 .141 .092 .038
.047 .079 .137 .132 .093 .038
.034 .059 .119 .142 .131 .093 .038
.025 .044 .096 .132 .142 .131 .093 .038
.018 .032 .074 .111 .130 .140 .130 .092 .037
.007 .013 .031 .048 .059 .069 .072 .063 .040 .012
.012 .022 .055 .089 .113 .138 .158 .160 .135 .080 .022

ENSAIO CAN222/N

RESULTADOS DO MODELO

A	K	W	G	T0
.097	.473	.710	1.655	37.789

PE= 4.4786
J0= 6

AJUSTE NAO LINEAR - COM 'ESCUDO' CUMULOS INFERIORES

LUZ \TEMPOS ->	60.000	90.000	120.000	150.000	180.000	210.000
8	93.479	99.647	99.980	99.998	99.999	99.999
3	80.184	97.364	99.651	99.953	99.993	99.999
1.68	69.570	93.243	98.434	99.624	99.907	99.977
1.19	61.738	89.027	96.731	98.995	99.684	99.899
.841	53.518	83.510	93.998	97.769	99.159	99.680
.595	46.704	77.550	90.413	95.855	98.192	99.206
.42	38.120	64.080	79.489	89.677	94.837	97.412
.297	30.748	52.083	65.284	77.175	86.955	92.719
.21	24.597	41.882	52.836	63.079	73.134	82.693
.149	19.609	33.513	42.463	51.009	59.619	69.234
.125	17.433	29.838	37.871	45.601	53.457	62.366
.084	13.315	22.851	29.091	35.172	41.436	48.696

MATRIZ [S]

.097 .067 .045 .036 .031 .026 .022 .018 .016 .013 .012 .010

MATRIZ [B]

.319
.195 .165
.094 .132 .079
.078 .124 .128 .080
.063 .108 .131 .128 .080
.051 .092 .120 .132 .129 .080
.041 .075 .103 .119 .131 .128 .080
.032 .061 .086 .103 .119 .131 .128 .080
.025 .049 .070 .085 .102 .118 .130 .127 .079
.011 .021 .030 .037 .045 .054 .062 .067 .063 .028
.020 .040 .058 .072 .088 .107 .127 .144 .152 .134 .098

AMOSTRA CAN222

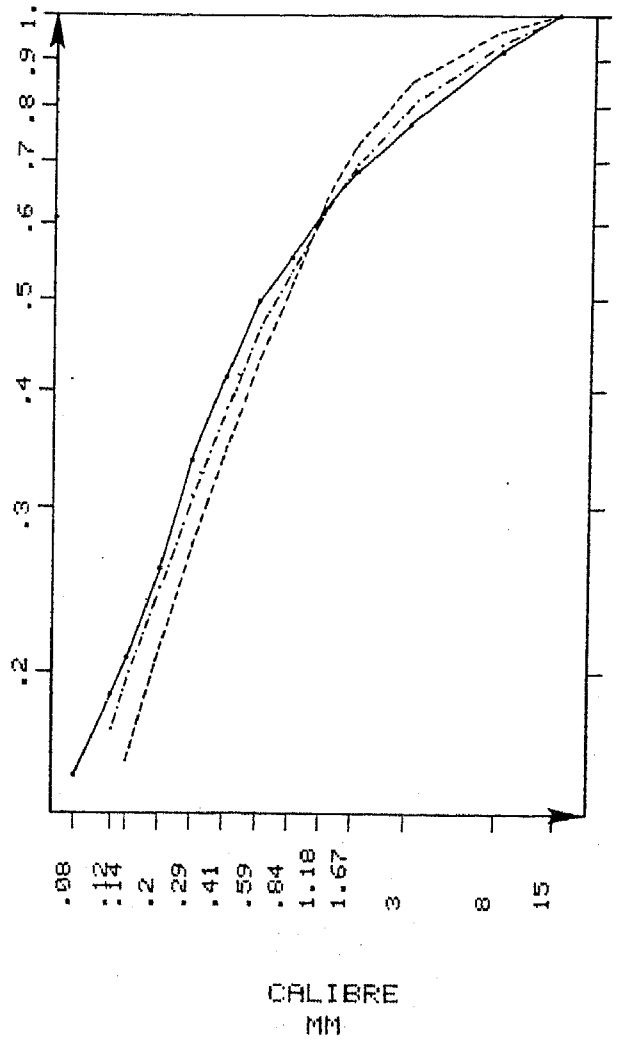
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

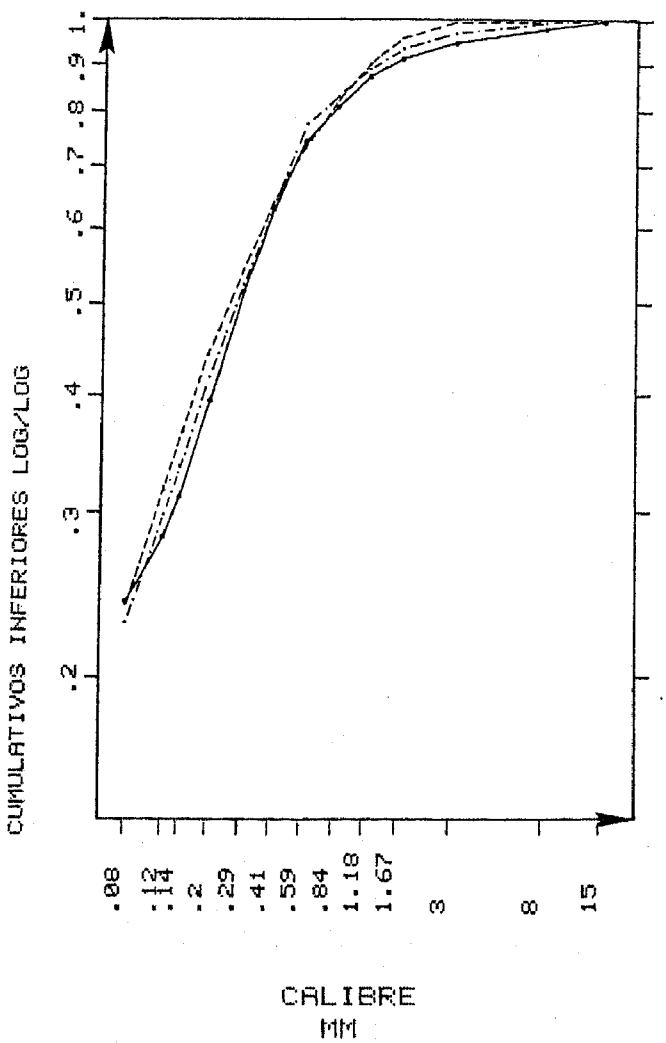
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.397	1.042	.996	4.570	47.670	.000	0
N LINEAR	.097	.473	.710	1.655	37.789	4.478	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <- - - - ->
ENSAIO SIMULADO N LINEAR C/ ESCUDO <-.-.->

TEMPO RESIDENCIA 60



TEMPO RESIDENCIA 90



AMOSTRA CAN222

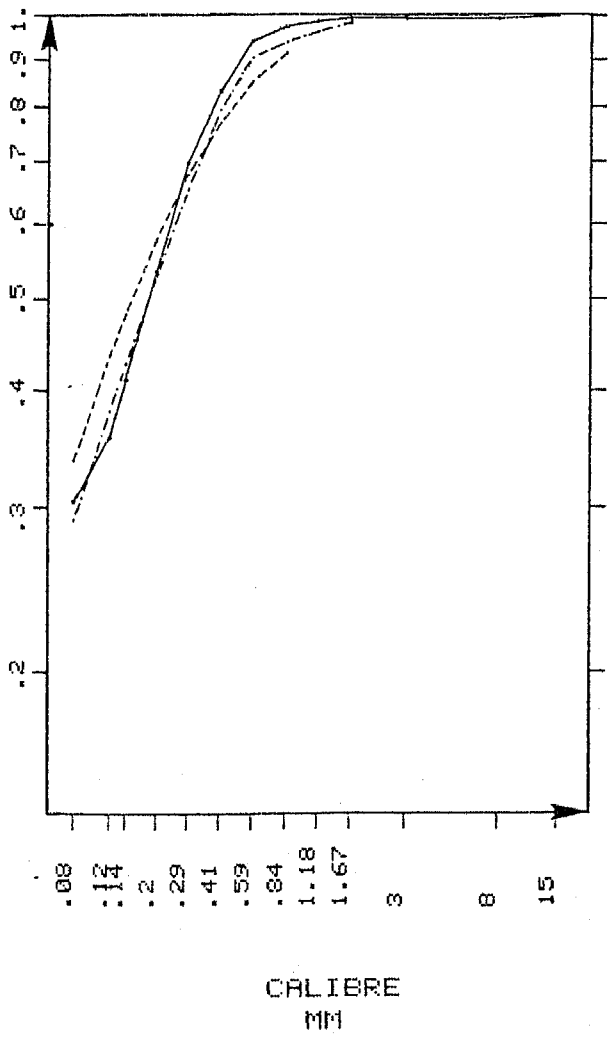
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

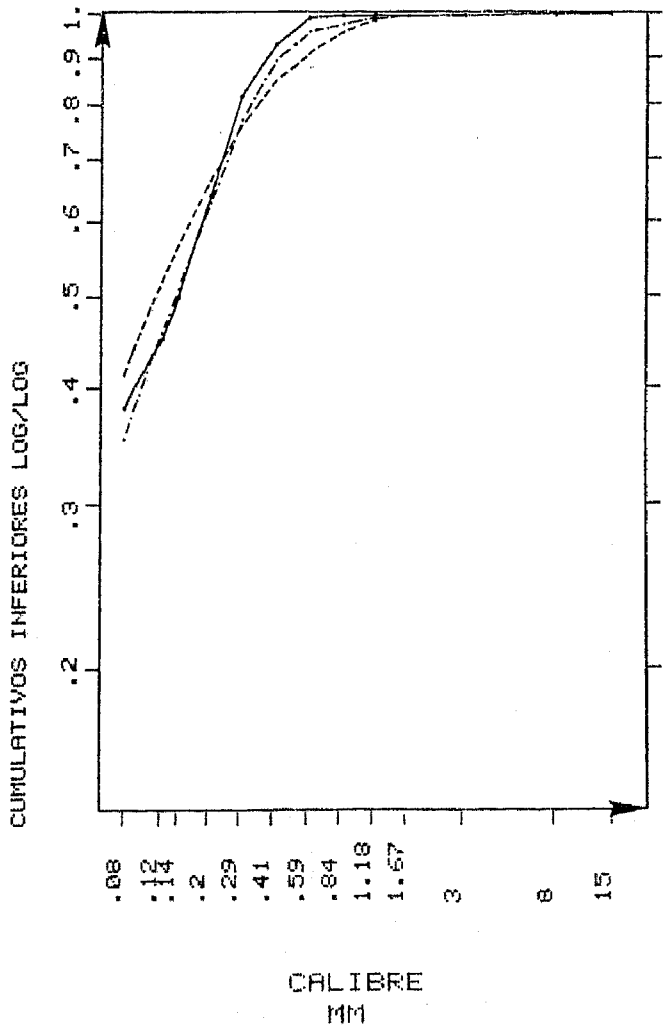
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.397	1.042	.996	4.570	47.670	.000	0
N LINEAR	.097	.473	.710	1.655	37.789	4.478	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <- - - - ->
ENSAIO SIMULADO N LINEAR C/ ESCUDO <-.-.->

TEMPO RESIDENCIA 120



TEMPO RESIDENCIA 150



AMOSTRA CAN222

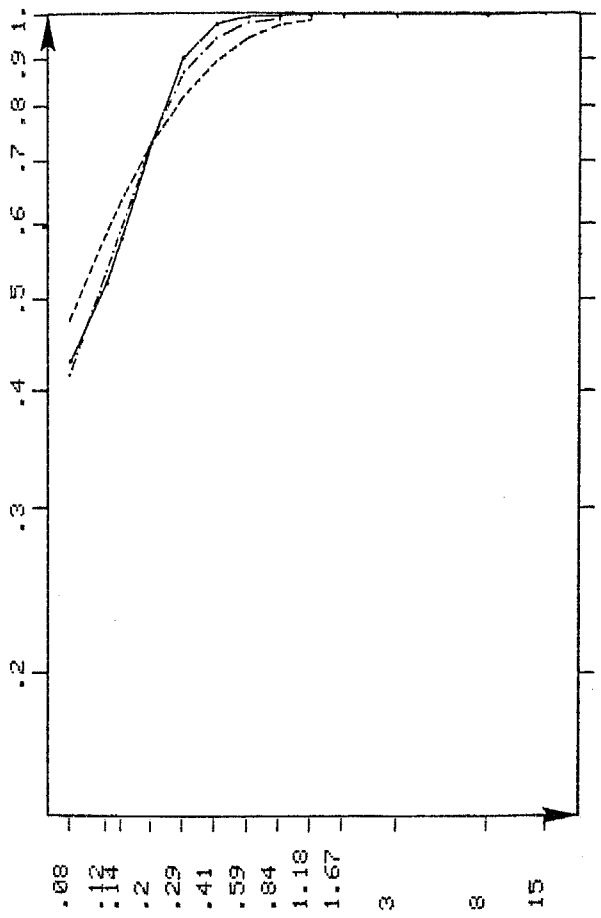
QUALIDADE DOS AJUSTAMENTOS

PARAMETROS AJUSTADOS

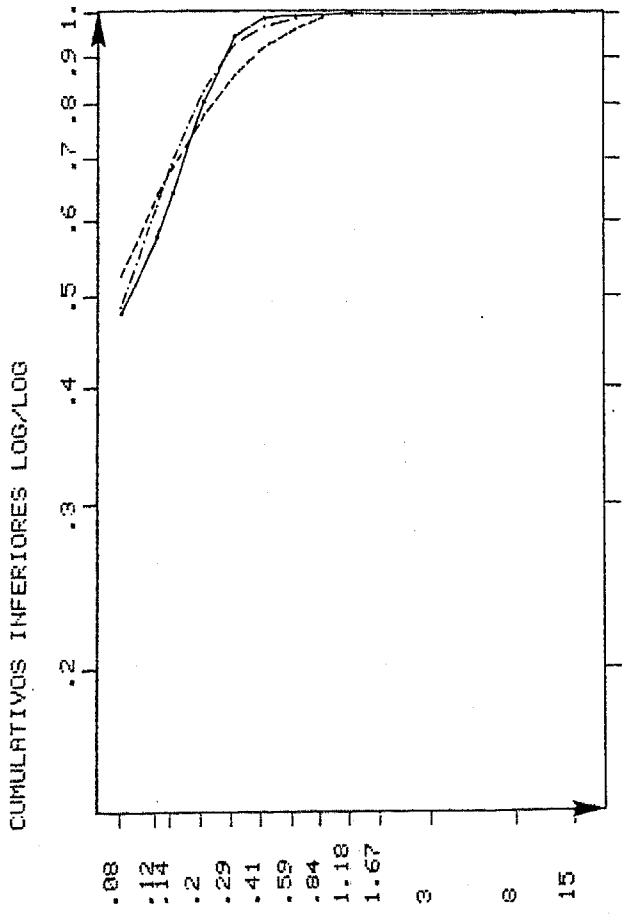
	PA	PK	PW	PG	T0	PE	J0
LINEAR	.397	1.042	.996	4.570	47.670	.000	0
N LINEAR	.097	.473	.710	1.655	37.789	4.478	6

ENSAIO REAL <———>
ENSAIO SIMULADO LINEAR <– – – –>
ENSAIO SIMULADO N LINEAR C/ ESCUDO <–.–.–>

TEMPO RESIDENCIA 180



TEMPO RESIDENCIA 210



ANEXO XIII

PRIMEIRO MODELO DE MOAGEM EM CONTÍNUO SOBRE UMA ALIMENTAÇÃO GRAÚDA E OUTRA FINA

. RESULTADOS DO MODELO - CÚMULOS INFERIORES

. PARAMETROS AJUSTADOS NO MODELO LINEAR BATCH

. MATRIZES DESTRUIÇÃO E FORMAÇÃO

ALIMENTACAO GRAUDA/BRUTA

ENSAIO A121/N
RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS			CUMULOS INFERIORES		
	.000	10.000	20.000	40.000	60.000	80.000
40	72.000	99.953	99.999	100.000	100.000	100.000
10	27.000	96.873	99.840	99.999	99.999	100.000
2.362	9.000	72.540	85.823	95.720	98.699	99.604
1.651	5.800	64.530	78.064	89.470	93.964	96.098
1.168	3.799	57.602	70.751	82.724	88.185	91.273
.589	2.099	46.606	58.233	69.785	75.911	79.958
.295	.999	37.344	47.166	57.352	63.137	67.223
.149	.399	29.975	38.107	46.716	51.764	55.439
.074	.100	23.959	30.584	37.672	41.896	45.015

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15108	.318209	1.18254

MATRIZ [S]

.640307	.296804100	.0595379139
.015795826	.0105176634	6.14619073E-03
2.78800799E-03	1.26166986E-03	5.7131426E-04

MATRIZ [B]

.295							
.244	.306						
.047	.068	.071					
.041	.060	.078	.069				
.070	.104	.146	.152	.145			
.058	.087	.128	.138	.148	.146		
.046	.070	.106	.116	.127	.146	.144	
.038	.058	.089	.099	.109	.129	.149	.148

ALIMENTACAO GRAUDA/BRUTA (CONT.)

ENSAIO A121/N

RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS					CUMULOS INFERIORES
	100.000	110.000	120.000	130.000	140.000	150.000
40	100.000	100.000	100.000	100.000	100.000	100.000
10	100.000	100.000	100.000	100.000	100.000	100.000
2.362	99.879	99.933	99.963	99.979	99.988	99.993
1.651	97.307	97.733	98.082	98.372	98.616	98.821
1.168	93.319	94.115	94.802	95.400	95.924	96.385
.589	83.012	84.303	85.472	86.538	87.512	88.405
.295	70.483	71.912	73.236	74.469	75.621	76.702
.149	58.445	59.785	61.040	62.221	63.336	64.392
.074	47.600	48.761	49.855	50.889	51.870	52.804

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15108	.318209	1.18254

MATRIZ [S]

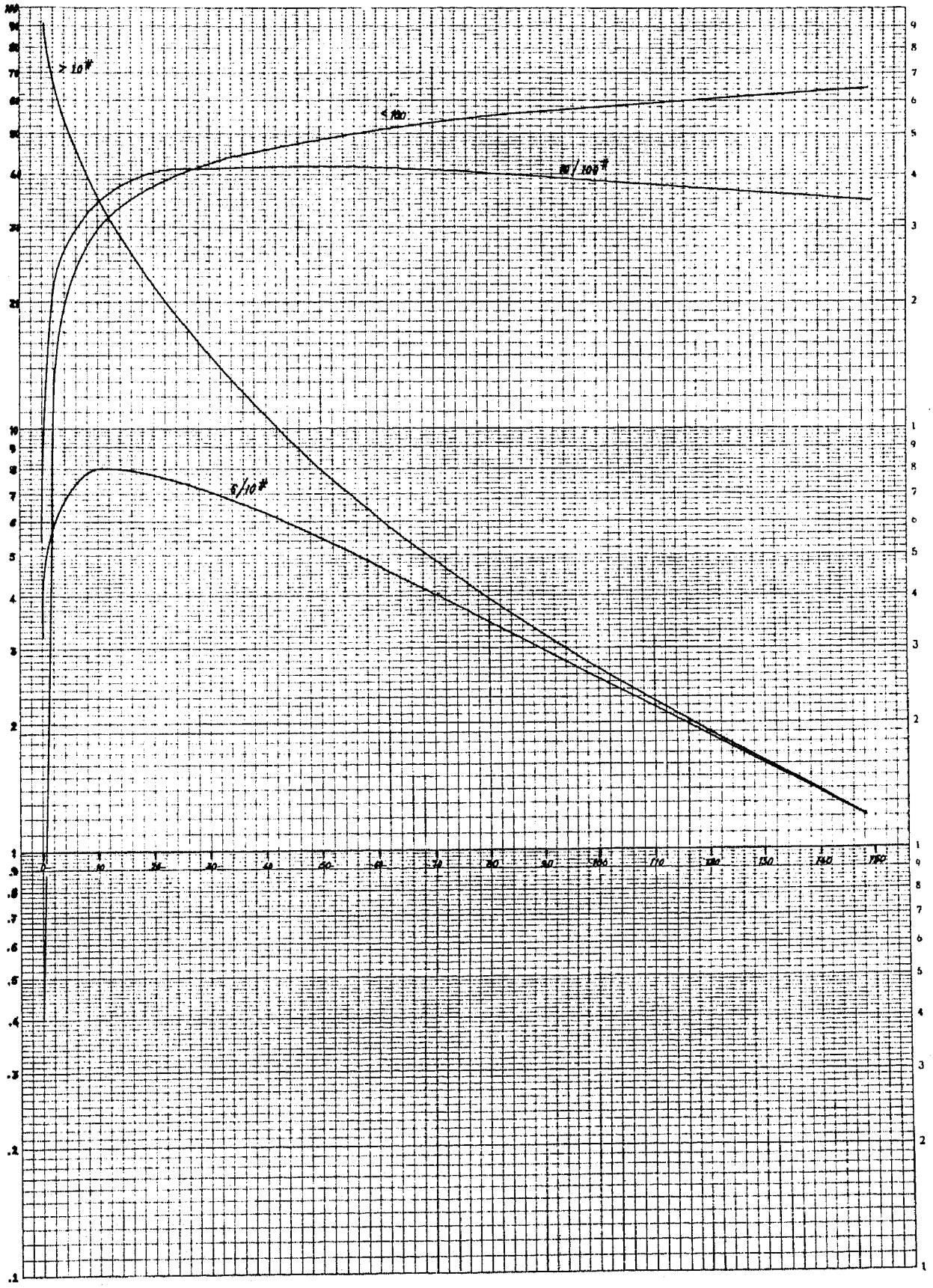
.640307	.296804108	.0595379139
.015795826	.0105176634	6.14619073E-03
2.78800799E-03	1.26166986E-03	5.7131426E-04

MATRIZ [B]

.295						
.244	.306					
.047	.068	.071				
.041	.060	.078	.069			
.070	.104	.146	.152	.145		
.058	.087	.128	.138	.148	.146	
.046	.070	.106	.116	.127	.146	.144
.038	.058	.089	.099	.109	.129	.149	.148

PRIMEIRO MODELO DE MOAGEM EM CONTÍNUO

ALIMENTAÇÃO GRAÚDA/BRUTA



ALIMENTACAO GRAUDA/DESENLAMEADA

ENSAIO A121/N

RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS			CUMULOS INFERIORES		
	.000	10.000	20.000	40.000	60.000	80.000
40	70.300	99.950	99.999	100.000	100.000	100.000
10	22.500	96.679	99.830	99.999	99.999	100.000
2.362	3.399	70.852	84.952	95.457	98.619	99.580
1.651	.000	62.346	76.713	88.821	93.592	95.857
1.168	.000	56.903	70.670	83.054	88.587	91.650
.589	.000	46.957	59.032	70.823	76.923	80.876
.295	.000	38.307	48.477	58.826	64.564	68.546
.149	.000	31.160	39.572	48.308	53.312	56.897
.074	.000	25.134	31.984	39.175	43.362	46.410

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15108	.318209	1.10254

MATRIZ [S]

.640307	.296804108	.0595379139
.0157958260	.0105176634	6.14619073E-03
2.78800799E-03	1.26166986E-03	5.7131426E-04

MATRIZ [B]

.295							
.244	.306						
.047	.068	.071					
.041	.060	.078	.069				
.070	.104	.146	.152	.145			
.058	.087	.128	.138	.148	.146		
.046	.070	.106	.116	.127	.146	.144	
.038	.058	.089	.099	.109	.129	.149	.148

ALIMENTACAO GRAUDA/DESENLAMEADA (CONT.)

ENSAIO A121/H
RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS			CUMULOS INFERIORES		
	100.000	110.000	120.000	130.000	140.000	150.000
40	100.000	100.000	100.000	100.000	100.000	100.000
10	100.000	100.000	100.000	100.000	100.000	100.000
2.362	99.872	99.929	99.961	99.978	99.988	99.993
1.651	97.140	97.593	97.964	98.272	98.530	98.748
1.168	93.649	94.420	95.083	95.658	96.160	96.600
.589	83.826	85.066	86.187	87.206	88.137	88.990
.295	71.695	73.070	74.342	75.526	76.631	77.666
.149	59.807	61.101	62.311	63.448	64.521	65.537
.074	48.916	50.039	51.096	52.095	53.042	53.944

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15108	.318209	1.18254

MATRIZ [S]

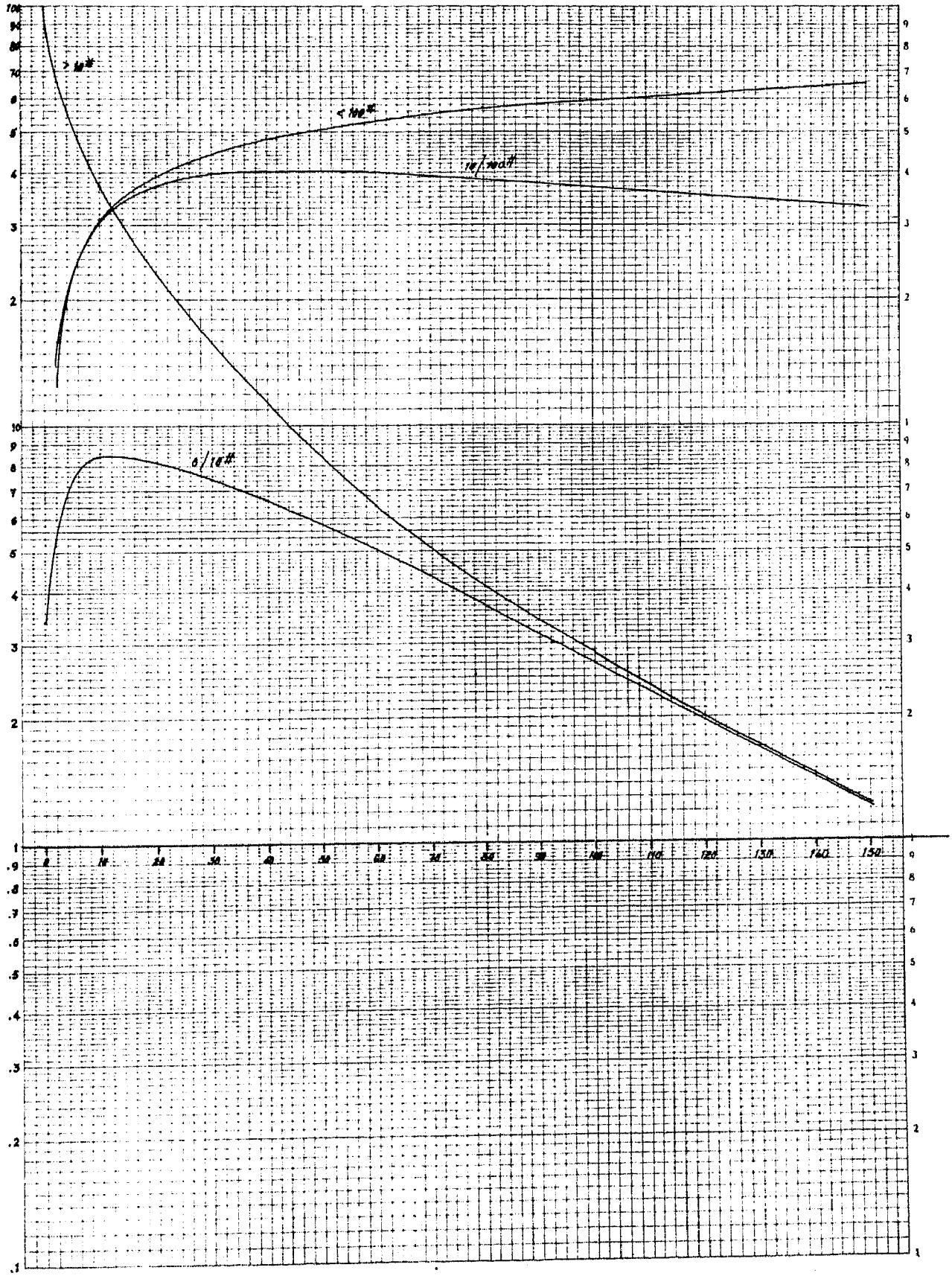
.640307	.296804108	.0595379139
.015795826	.0105176634	6.14619073E-03
2.78800799E-03	1.26166986E-03	5.7131426E-04

MATRIZ [B]

.295							
.244	.306						
.047	.068	.071					
.041	.060	.078	.069				
.070	.104	.146	.152	.145			
.058	.087	.128	.138	.148	.146		
.046	.070	.106	.116	.127	.146	.144	
.038	.058	.089	.099	.109	.129	.149	.148

PRIMEIRO MODELO DE MOAGEM EM CONTÍNUO

ALIMENTAÇÃO GRAÚDA/DESENLAMEADA



ALIMENTACAO FINA/BRUTA

ENSAIO A121/N

RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS			CUMULOS INFERIORES		
	.000	10.000	20.000	40.000	60.000	80.000
10	40.000	99.900	99.999	100.000	100.000	100.000
2.362	14.000	86.367	96.243	99.712	99.977	99.998
1.651	9.000	77.916	89.652	96.221	98.200	99.098
1.168	5.500	69.839	82.383	91.223	94.916	96.963
.589	2.500	56.790	69.015	79.752	85.622	89.562
.295	1.000	45.769	56.566	67.026	73.444	78.175
.149	.400	37.013	46.140	55.388	61.367	65.973
.074	.150	29.775	37.289	45.077	50.244	54.311

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15108	.318209	1.18254

MATRIZ [S]

.640307	.128443448	.0340769473
.0226901626	.0132594154	6.01467765E-03
2.72184926E-03	1.23251839E-03	

MATRIZ [B]

.306						
.068	.071					
.060	.078	.069				
.104	.146	.152	.145			
.087	.128	.138	.148	.146		
.070	.106	.116	.127	.146	.144	
.058	.089	.099	.109	.129	.149	.148

ALIMENTACAO FINA/BRUTA (CONT.)

ENSAIO A121/N
RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS					CUMULOS INFERIORES
	100.000	110.000	120.000	130.000	140.000	150.000
10	100.000	100.000	100.000	100.000	100.000	100.000
2.362	99.999	99.999	99.999	99.999	99.999	99.999
1.651	99.544	99.676	99.769	99.836	99.883	99.917
1.168	98.164	98.568	98.880	99.123	99.312	99.460
.589	92.329	93.400	94.310	95.087	95.751	96.320
.295	81.824	83.347	84.707	85.928	87.027	88.021
.149	69.686	71.291	72.759	74.107	75.351	76.503
.074	57.664	59.137	60.500	61.767	62.950	64.057

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15100	.318209	1.18254

MATRIZ [S]

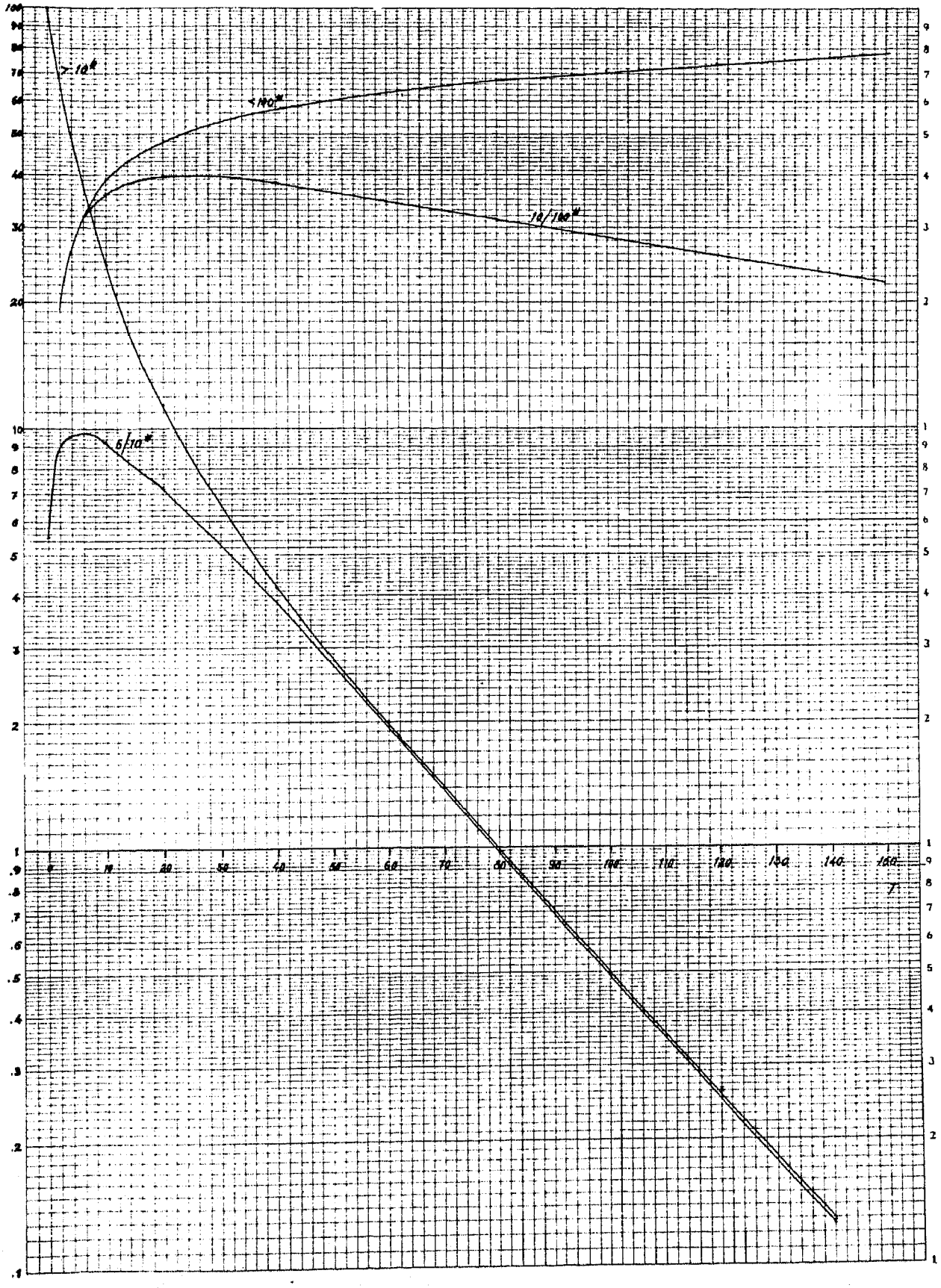
.640307	.128443448	.0340769473
.0226901626	.0132594154	6.01467765E-03
2.72184926E-03	1.23251839E-03	

MATRIZ [B]

.306						
.068	.071					
.060	.078	.069				
.104	.146	.152	.145			
.087	.128	.138	.148	.146		
.070	.106	.116	.127	.146	.144	
.058	.089	.099	.109	.129	.149	.148

PRIMEIRO MODELO DE MOAGEM EM CONTÍNUO

ALIMENTAÇÃO FINA/DESENLAMEADA



ALIMENTACAO FINA/DESENLAMEADA.

ENSAIO A121/N

RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS			CUMULOS INFERIORES		
	.000	10.000	20.000	40.000	60.000	80.000
10	34.070	99.890	99.999	100.000	100.000	100.000
2.362	5.499	85.019	95.871	99.683	99.975	99.998
1.651	.000	75.729	88.627	95.846	98.021	99.008
1.168	.000	69.919	83.082	91.906	95.398	97.289
.589	.000	58.573	71.098	81.489	86.935	90.543
.295	.000	48.186	59.185	69.283	75.281	79.670
.149	.000	39.379	48.667	57.616	63.246	67.564
.074	.000	31.853	39.500	47.050	51.937	55.773

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15108	.318209	1.18254

MATRIZ [S]

.640307	.128443448	.0340769473
.0226901626	.0132594154	6.01467765E-03
2.72184926E-03	1.23251839E-03	

MATRIZ [B]

.306						
.068	.071					
.060	.078	.069				
.104	.146	.152	.145			
.087	.128	.138	.148	.146		
.070	.106	.116	.127	.146	.144	
.058	.089	.099	.109	.129	.149	.148

ALIMENTACAO FINA/DESENLAMEADA (CONT.)

ENSAIO A121/N

RESULTADOS DO MODELO

PARA VARIOS TEMPOS DE RESIDENCIA

CALIBRES MM	TEMPOS					CUMULOS INFERIORES
	100.000	110.000	120.000	130.000	140.000	150.000
10	100.000	100.000	100.000	100.000	100.000	100.000
2.362	99.999	99.999	99.999	99.999	99.999	99.999
1.651	99.499	99.643	99.746	99.819	99.871	99.908
1.168	98.380	98.743	99.022	99.238	99.405	99.534
.589	93.061	94.033	94.857	95.560	96.160	96.674
.295	83.048	84.457	85.717	86.848	87.867	88.789
.149	71.046	72.552	73.931	75.200	76.372	77.459
.074	58.938	60.332	61.624	62.826	63.949	65.004

PARAMETROS AJUSTADOS

A	K	W	G
.640307	1.15108	.318209	1.18254

MATRIZ [S]

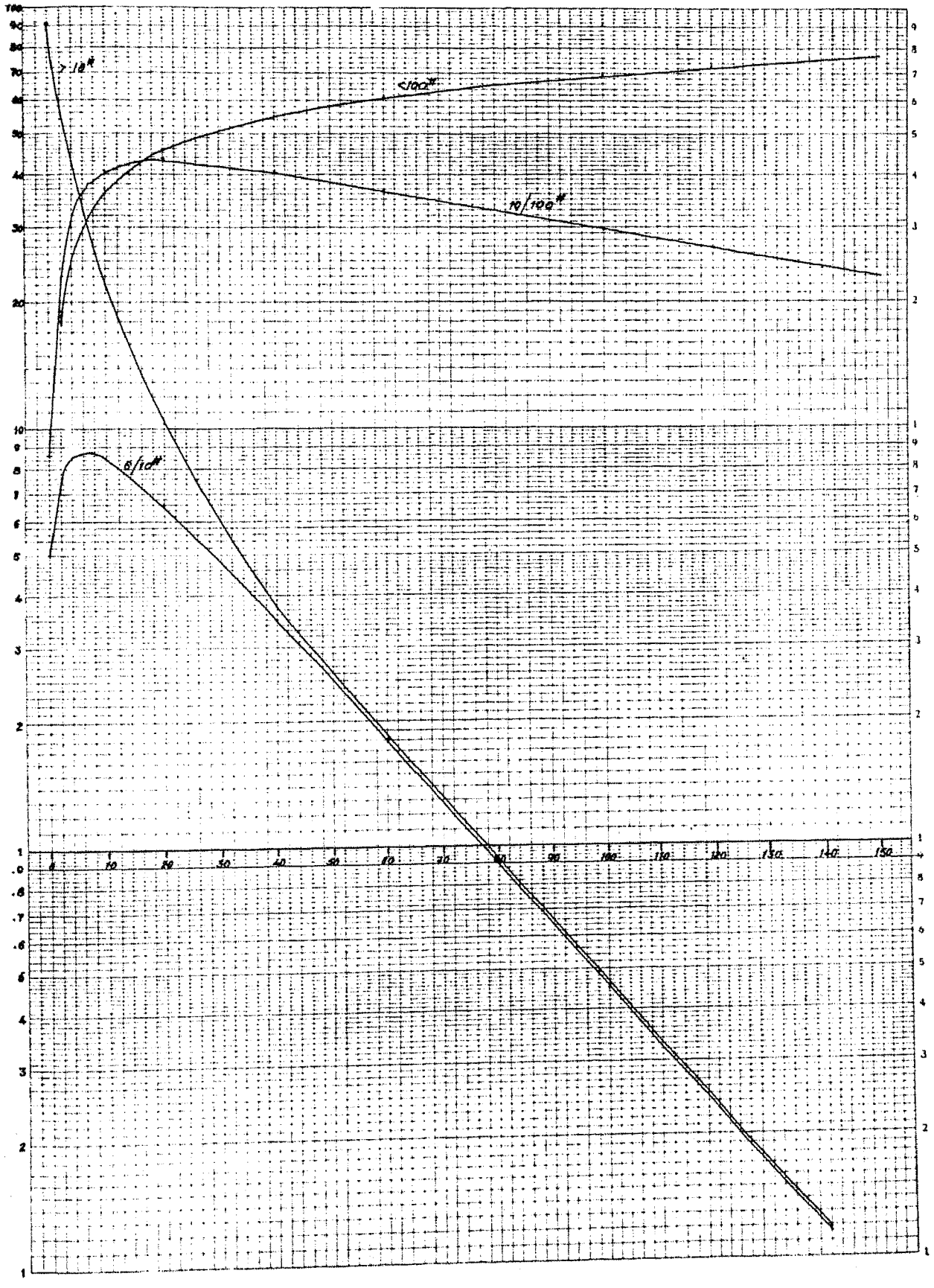
.640307	.128443448	.0340769473
.0226901626	.0132594154	6.01467765E-03
2.72184926E-03	1.23251839E-03	

MATRIZ [B]

.306						
.068	.071					
.060	.078	.069				
.104	.146	.152	.145			
.087	.128	.138	.148	.146		
.070	.106	.116	.127	.146	.144	
.058	.089	.099	.109	.129	.149	.148

PRIMEIRO MODELO DE MOAGEM EM CONTÍNUO

ALIMENTAÇÃO FINA/BRUTA



ANEXO XIV

ENSAIOS DE MOAGEM EM CONTÍNUO

SOBRE A AMOSTRA A

- XISTO GRAFITOSO DE NISA
- BARRAS GROSSAS (35 MM)
- ENCHIMENTO BAIXO (25 %)

. RESULTADOS DOS ENSAIOS REAIS

- ANÁLISES GRANULOMÉTRICAS
- CAUDAIS DE SÓLIDOS

ENSAIO CONTINUO

AMOSTRA C6/ A122

LXD= 500*295
VEL= 75%VC= 58 RPM

PESOS PARCIAIS GR

AMOSTRAS DE 1 MINUTO AOS TEMPOS:

LUZ-MM	6.0	7.0	8.0	9.0
+ 8	11.00	9.90	8.20	3.20
+ 3	98.80	136.40	115.00	85.80
+ 1.68	99.30	111.50	99.00	86.10
+ 1.19	78.30	87.70	74.50	66.90
+ .841	75.00	82.70	71.70	66.30
+ .595	72.20	78.80	68.50	65.60
+ .42	93.00	101.80	88.10	87.50
+ .297	73.00	78.60	65.50	68.30
+ .21	71.00	75.80	64.80	67.20
+ .149	65.80	69.90	58.20	60.50
+ .104	68.80	71.70	65.50	64.50
+ .084	31.70	38.60	36.60	33.40
- .084	823.00	809.00	796.00	795.00

ANALISE GRANULOMETRICA %

AMOSTRAS DE 1 MINUTOS AOS TEMPOS:

LUZ-MM	6.0	7.0	8.0	9.0
+ 8	.66	.56	.50	.20
+ 3	5.94	7.78	7.13	5.53
+ 1.68	5.97	6.36	6.14	5.55
+ 1.19	4.71	5.00	4.62	4.31
+ .841	4.51	4.71	4.44	4.27
+ .595	4.34	4.49	4.25	4.23
+ .42	5.59	5.80	5.46	5.64
+ .297	4.39	4.48	4.06	4.40
+ .21	4.27	4.32	4.02	4.33
+ .149	3.96	3.98	3.61	3.90
+ .104	4.14	4.09	4.06	4.16
+ .084	1.90	2.20	2.27	2.15
- .084	49.55	46.16	49.39	51.28
CAUDAL SOLIDOS GR/MIN	1660.	1752.	1611.	1550.

CAUDAL MEDIO = 1644 GR/MIN

ENSAIO CONTINUO

AMOSTRA C5/ A122

LXD= 500*295
VEL= 75%VC= 58 RPM

PESOS PARCIAIS GR

AMOSTRAS DE 1 MINUTO AOS TEMPOS:

LUZ-MM	1.0	3.0	5.0
+ 8	15.50	9.40	3.70
+ 3	368.30	231.00	210.00
+ 1.68	231.10	214.20	148.40
+ 1.19	163.00	156.50	124.20
+ .841	136.40	128.70	109.80
+ .595	116.90	111.00	96.70
+ .42	134.80	126.50	115.60
+ .297	102.10	90.40	85.60
+ .21	78.90	78.50	78.30
+ .149	81.50	74.60	73.10
+ .104	76.50	79.60	75.00
+ .084	44.50	43.10	38.80
- .084	1060.00	1000.00	919.00

ANALISE GRANULOMETRICA %

AMOSTRAS DE 1 MINUTOS AOS TEMPOS:

LUZ-MM	1.0	3.0	5.0
+ 8	.59	.40	.17
+ 3	14.11	9.85	10.10
+ 1.68	8.85	9.14	7.14
+ 1.19	6.24	6.67	5.97
+ .841	5.22	5.49	5.28
+ .595	4.47	4.73	4.65
+ .42	5.16	5.39	5.56
+ .297	3.91	3.85	4.11
+ .21	3.02	3.34	3.76
+ .149	3.12	3.18	3.51
+ .104	2.93	3.39	3.60
+ .084	1.70	1.83	1.86
- .084	40.62	42.67	44.22
CAUDAL SOLIDOS GR/MIN	2609.	2343.	2078.

CAUDAL MEDIO = 2344 GR/MIN