Iberográfica Capa Rota - Portugal	Comparison Whip Reaction	**Compressibility** Indentation	Doc. PROC - LAB - 016 Data: 08 - 07 - 2011 Folha. 1 de 21 Rev. 0

Item #	Brand /Model	Sample #/ / Job #	D0	D01	D04	D4k/3	D5k/3	D1	D4	D5	I1	I5	Ip1	Ip5	Comp. Loss	Gauge Loss @ 1st cycle	Gauge Loss @ 60kPa	Gauge Loss @ 1060kPa	Hysteresis Wk/3	Hysteresis Energy	Elastic Energy	Damping Capacity	Test Time	HW /T	D_{04}-H_W /T	LW /T	L_W-D_5 /T
			Thickness								Indentation																
			mm	mm	mm	mm	mm	mm	mm	mm	µm	µm	%	%	%	µm	1st%	µm	µm	µm	HENmm	EENmm	(DC)%	s	N/s	N/s	N/s	N/s
1	B / III	57F/-	1,74	1,72	1,71	1,64	1,65	1,57	1,57	1,57	170	144	9,7	8,4	15,3	24	82,6	29	3	6,9	0,03	6,7	0,5	84,8	-2,5	-11,33	2,19	11,57
2	D / V	23F/889311	1,98	1,95	1,95	1,89	1,90	1,82	1,82	1,82	152	127	7,7	6,5	16,4	27	87,8	30	5	9,6	0,50	6,7	8,1	73,8	-5,86	-12,96	2,44	13,55
3	K / II	64F/-	1,98	1,93	1,92	1,86	1,88	1,80	1,79	1,79	175	130	8,8	6,8	25,6	49	85,8	57	12	19,6	1,10	7,1	15,6	77	-7,16	-12,24	3,91	12,94
4	J / I	19F/-	1,98	1,93	1,92	1,83	1,86	1,76	1,75	1,74	226	175	11,4	9,1	22,4	50	79,8	62	12	32,6	1,96	9,4	20,8	102,9	-7,01	-9,24	3,36	9,33
5	I / I	65F/-	1,93	1,85	1,82	1,56	1,68	1,41	1,37	1,38	518	450	26,9	24,6	13,1	75	74,3	101	33	121,0	6,50	24,3	26,7	252	-6,74	-3,51	2,75	3,6

LEGEND

Test Details

Standard:
ISO 12636 section 4.5

Equipment:
Lloyd LR 10K Plus

Speed: 1 mm/min
Test Time: (D5-D0) s

Thickness (mm)

D0; D01; D04: @ 60kPa
D4k/3; D5k/3: @ 393kPa
D1; D4, D5: @ 1060kPa

Indentation

I1 = (D0 - D1) mm
I5 = (D04 - D5) mm

Ip1 = [((D0 - D1) / D0) * 100] %
Ip5 = [((D04 - D5) / D04) * 100] %

Compressive Loss

Indentation reduction @ 1060kPa:
from the 1st to the 5th
compression cycles.
CL = [((Ip1 - Ip5)/Ip1)*100] %

Gauge Loss @

60kPa 1stCycle: (D0 - D01) µm
1st%: 1stCycle/Full Test %
[((D0 - D01)/(D0 - D04))*100] %
Full Test: (D0 - D04) µm
1060kPa: (D1 - D5) µm

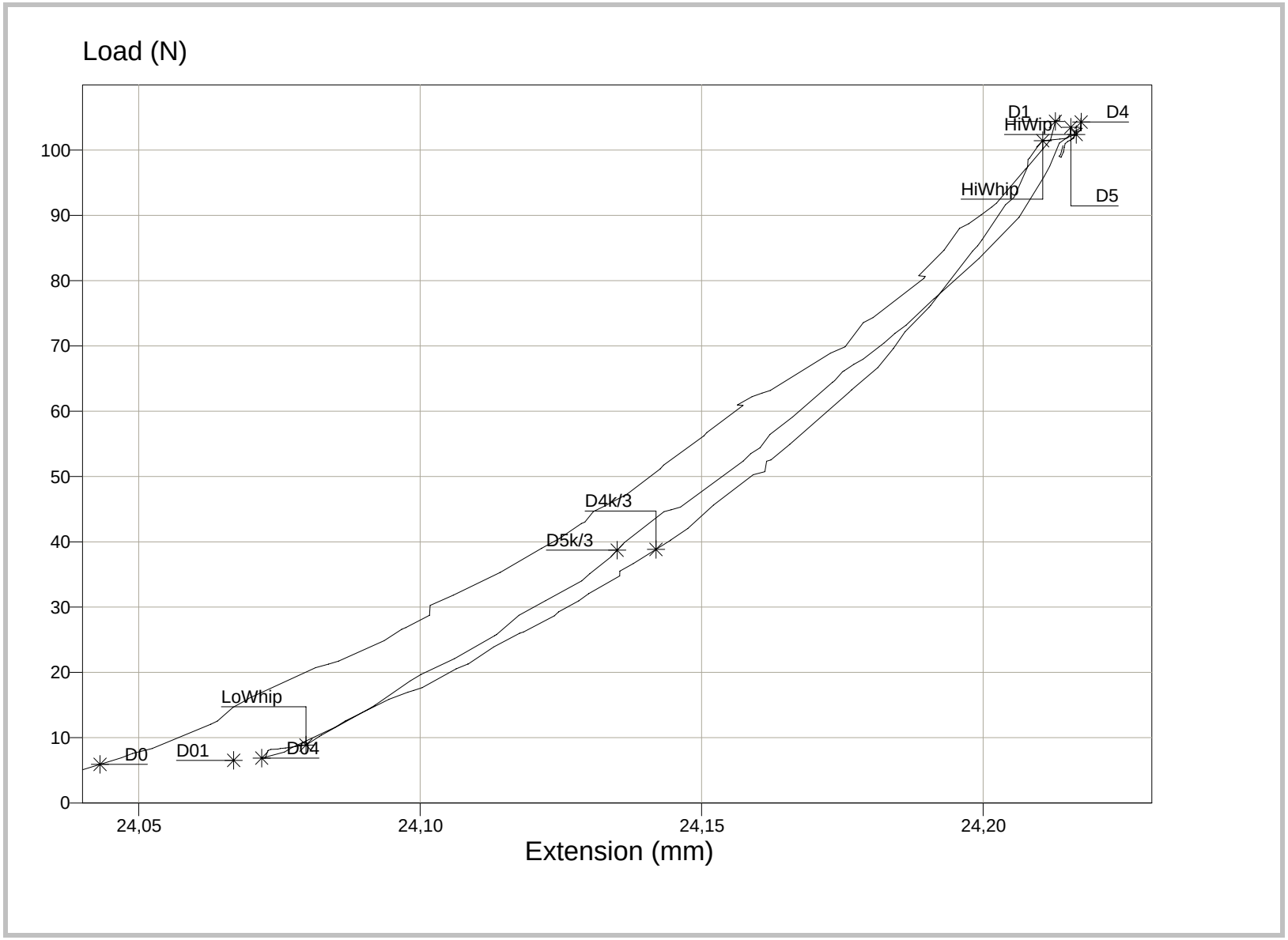
Hysteresis

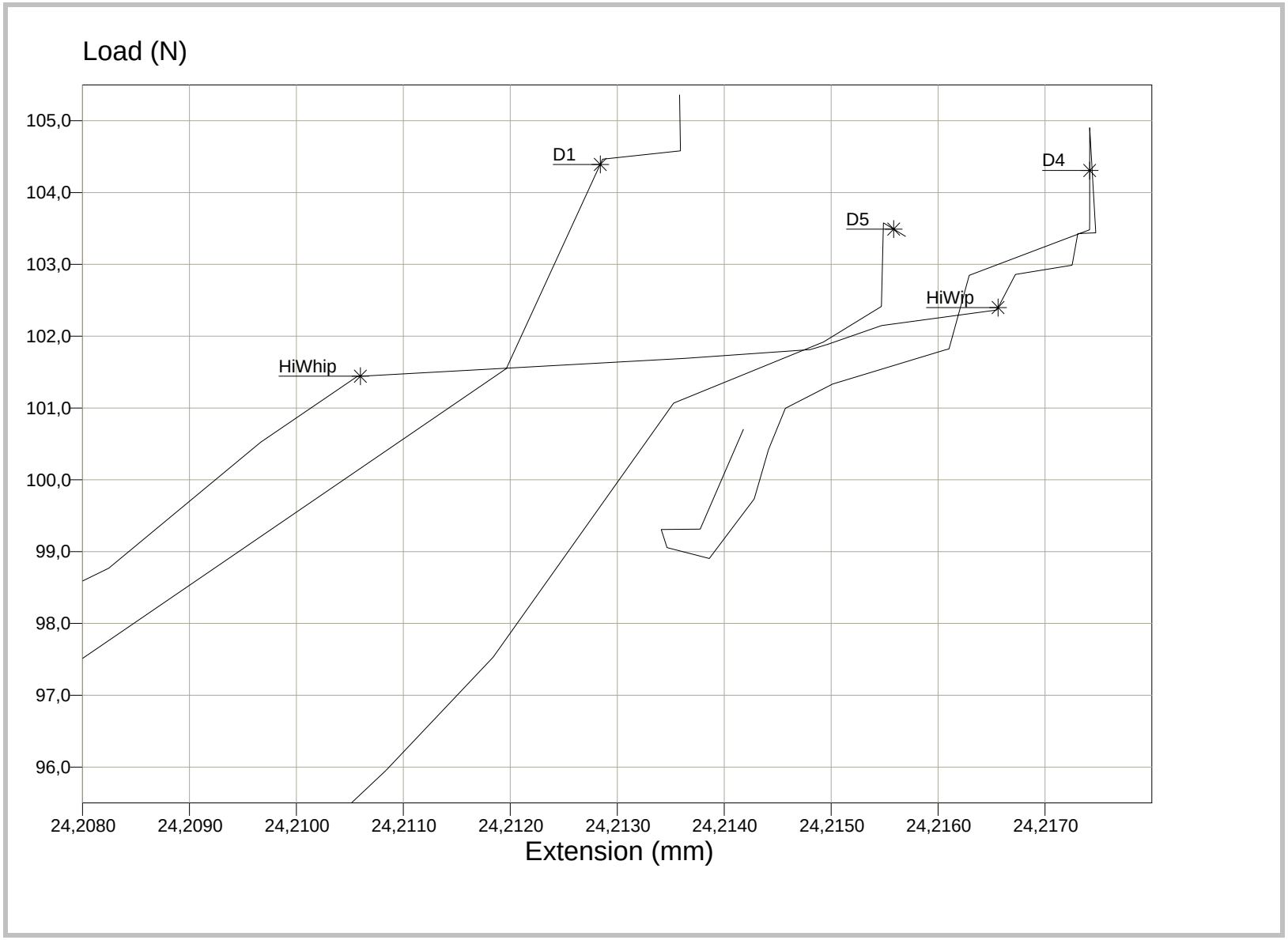
Values valid for a specific stress cycle
W(window):Gauge variation due to stress history
Wk/3: Gauge variation@393kPa (D5k/3-D4k/3) µm

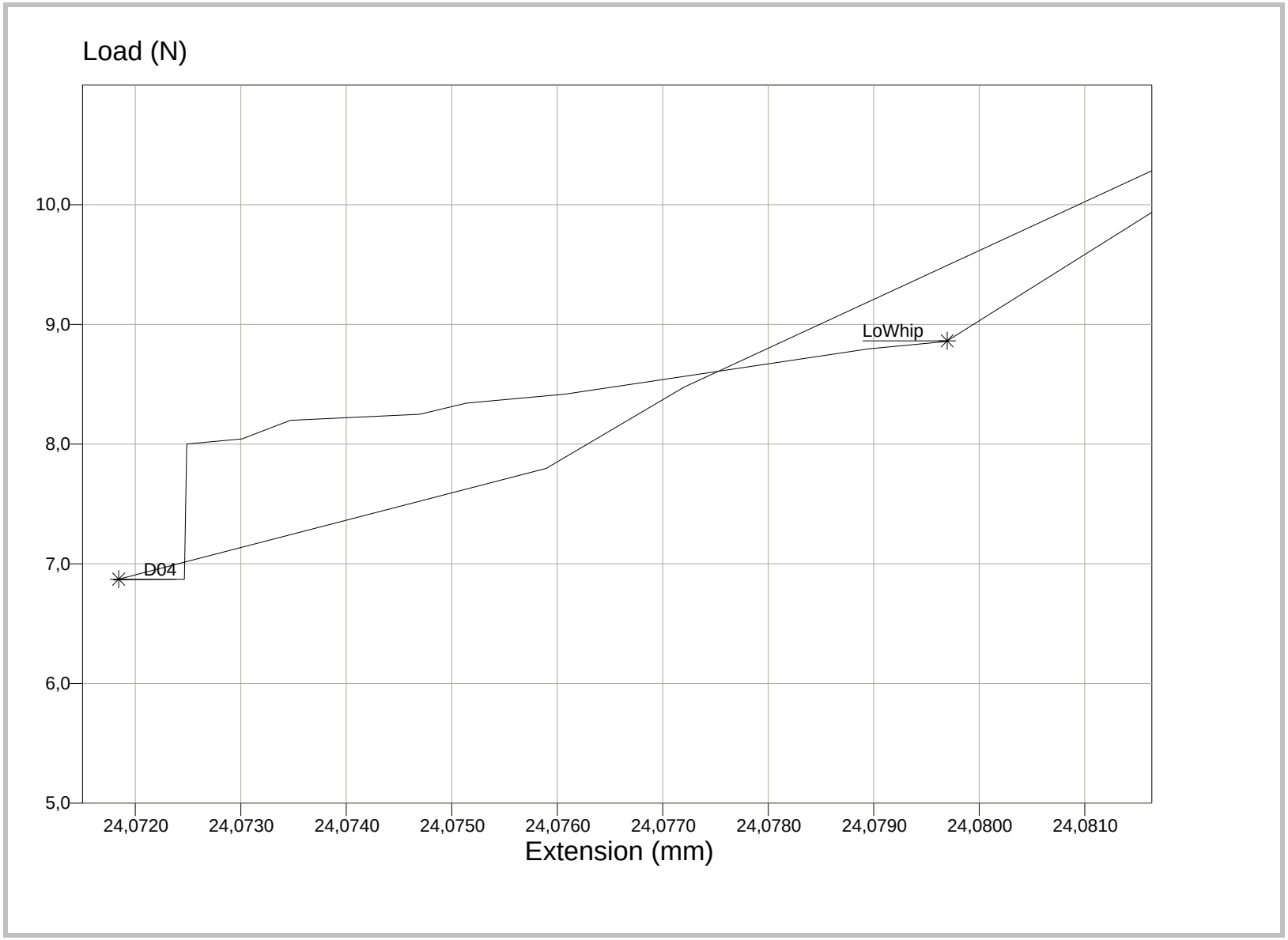
HE: Heat generated in one cycle (D5-D4) Nmm
EE: Elastic deformation energy (D5-D04) Nmm
DC: Damping Capacity [((D5-D4)/(D5-D04))*100] %

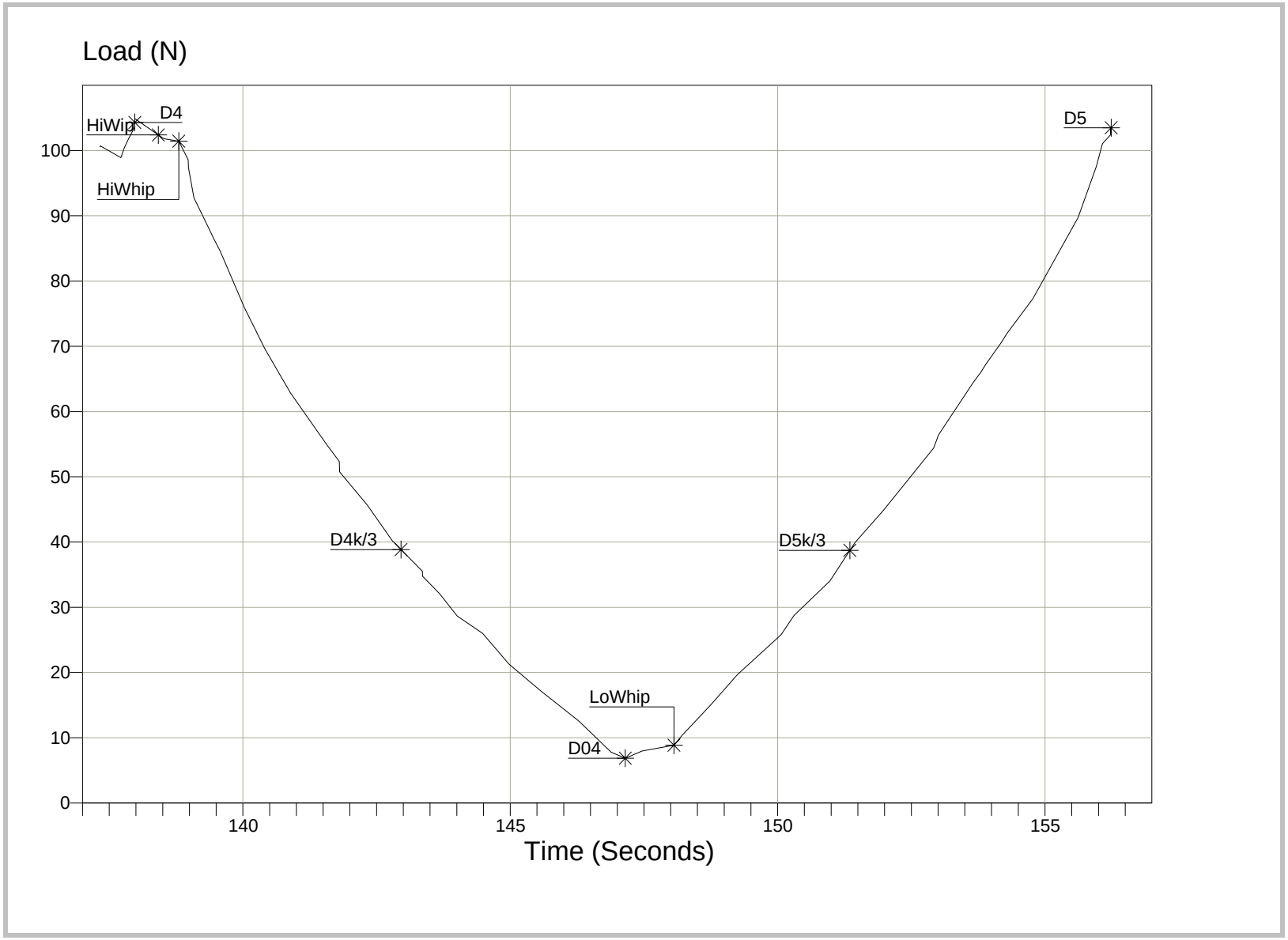
Whip Reaction

HW: Blanket reaction (HiWhip) @ maximum cycle load
HW/T: Load variation rate with time during HiWhip reaction N/s
D_{04}-H_W/T: Load variation rate with time during decompression N/s
LW: Blanket reaction (LoWhip) @ minimum cycle load
LW/T: Load variation rate with time during LoWhip reaction N/s
L_W-D_5/T: Load variation rate with time during compression N/s

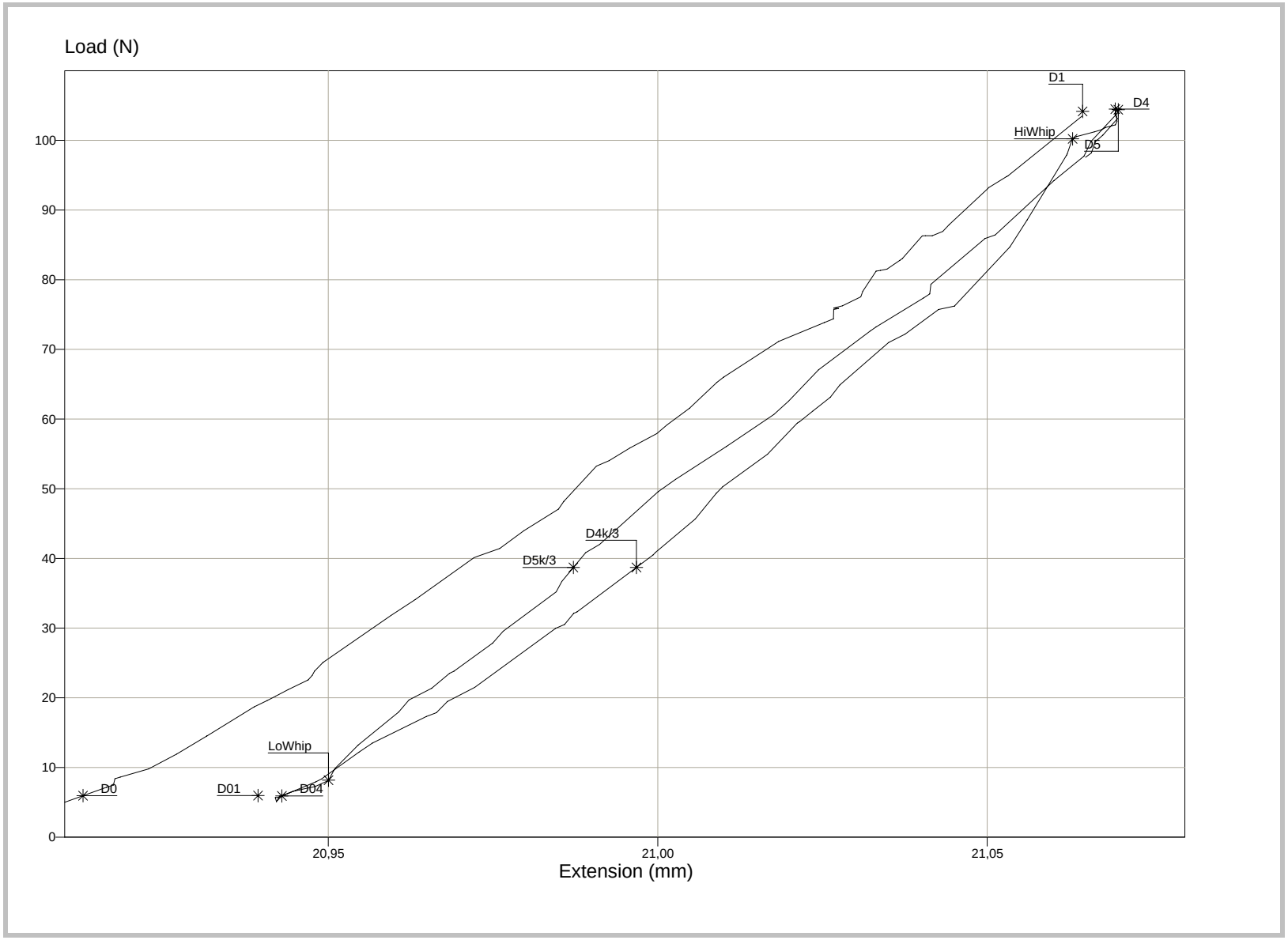

Load (N)
100
90
80
70
60
50
40
30
20
10
0
24,05
24,10
24,15
24,20
Extension (mm)
D1
HiWhip
D4
HiWhip
D5
D4k/3
D5k/3
LoWhip
D0
D01
D04

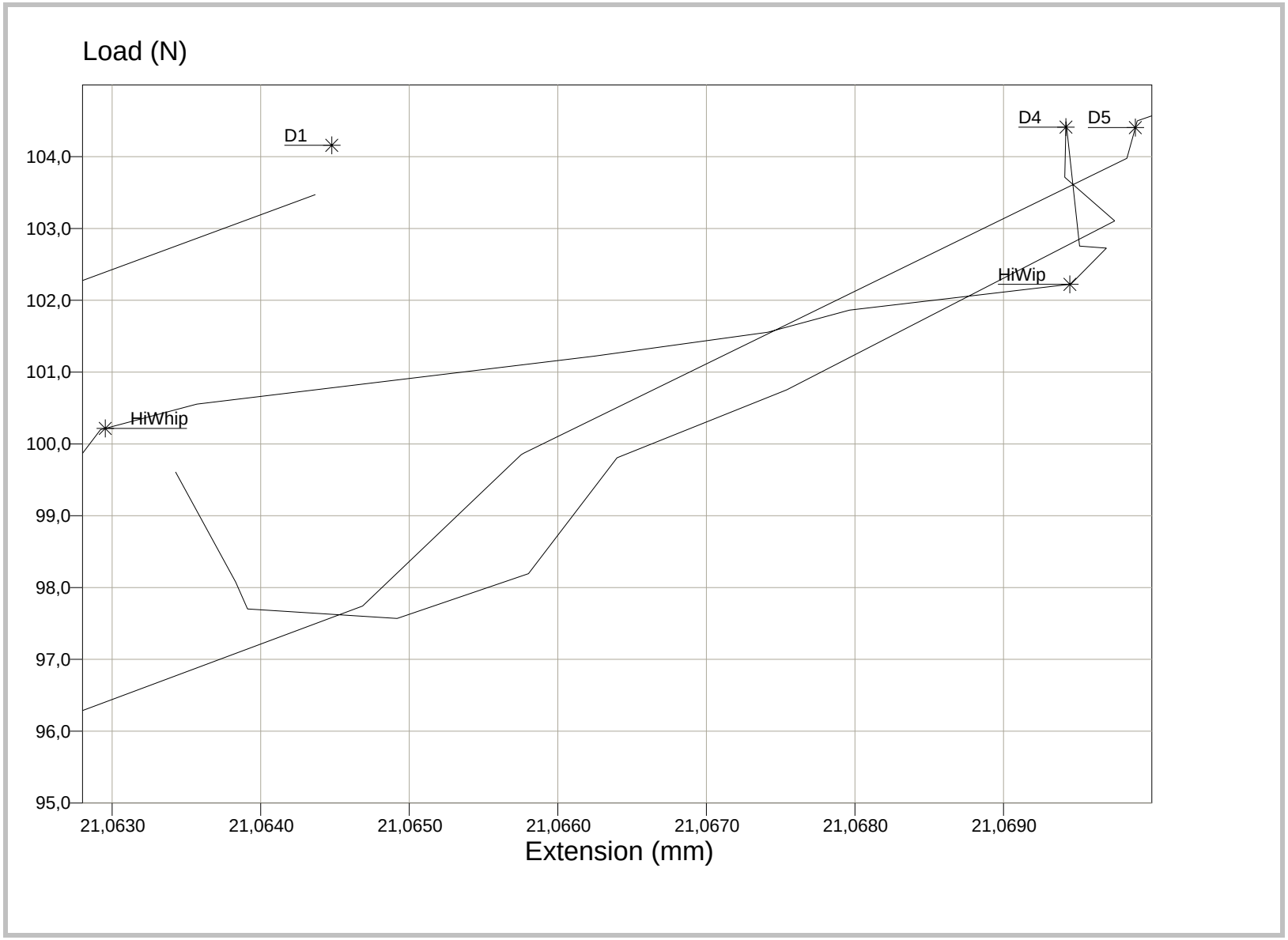

Load (N)
105,0
104,0
103,0
102,0
101,0
100,0
99,0
98,0
97,0
96,0
D1
D4
D5
HiWhip
HiWhip
24,2080
24,2090
24,2100
24,2110
24,2120
24,2130
24,2140
24,2150
24,2160
24,2170
Extension (mm)


Load (N)
10,0
9,0
8,0
7,0
6,0
5,0
D04
LoWhip
24,0720
24,0730
24,0740
24,0750
24,0760
24,0770
24,0780
24,0790
24,0800
24,0810
Extension (mm)

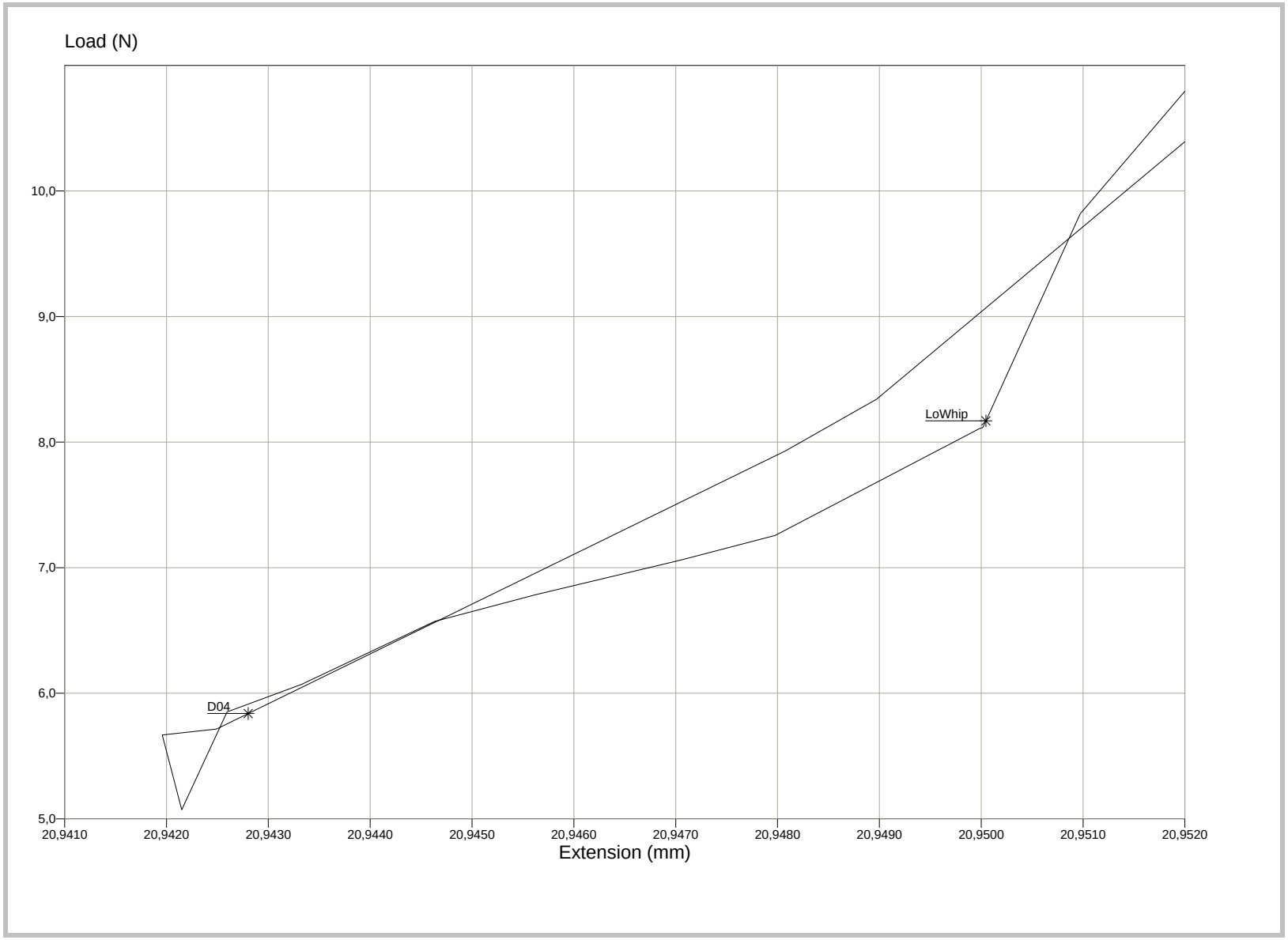

Load (N)
HiWip
D4
HiWhip
D5
D4k/3
D5k/3
LoWhip
D04
100
90
80
70
60
50
40
30
20
10
0
140
145
150
155
Time (Seconds)

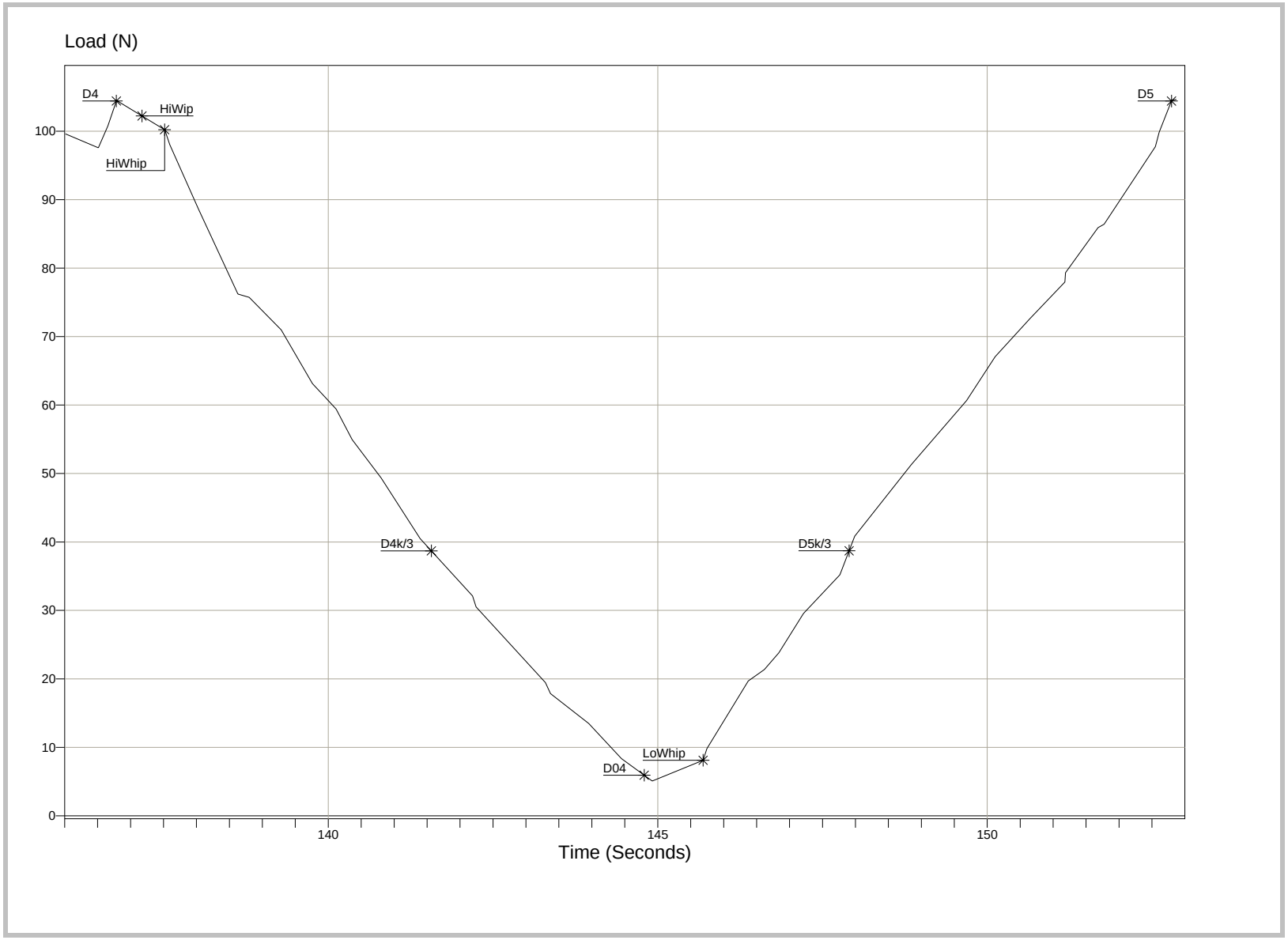
Iberográfica Capa Rota - Portugal	**Compressibility** Indentation - D / V	**"Whip" Reaction** Distorted Hysteresis Cycle	Doc. PROC - LAB - 017 Data: 14 - 06 - 2011 Folha. 6 de 21 Rev. 0

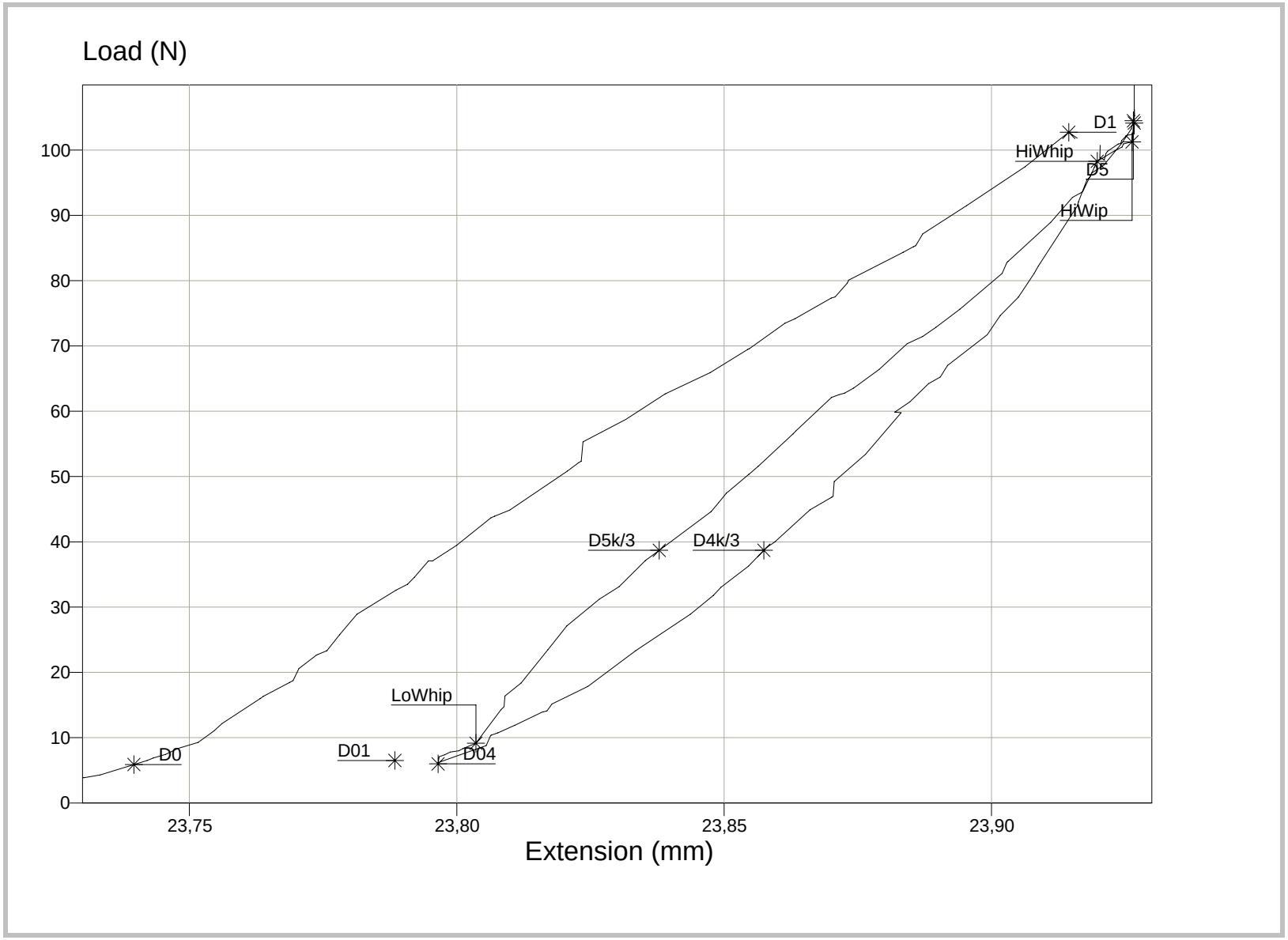


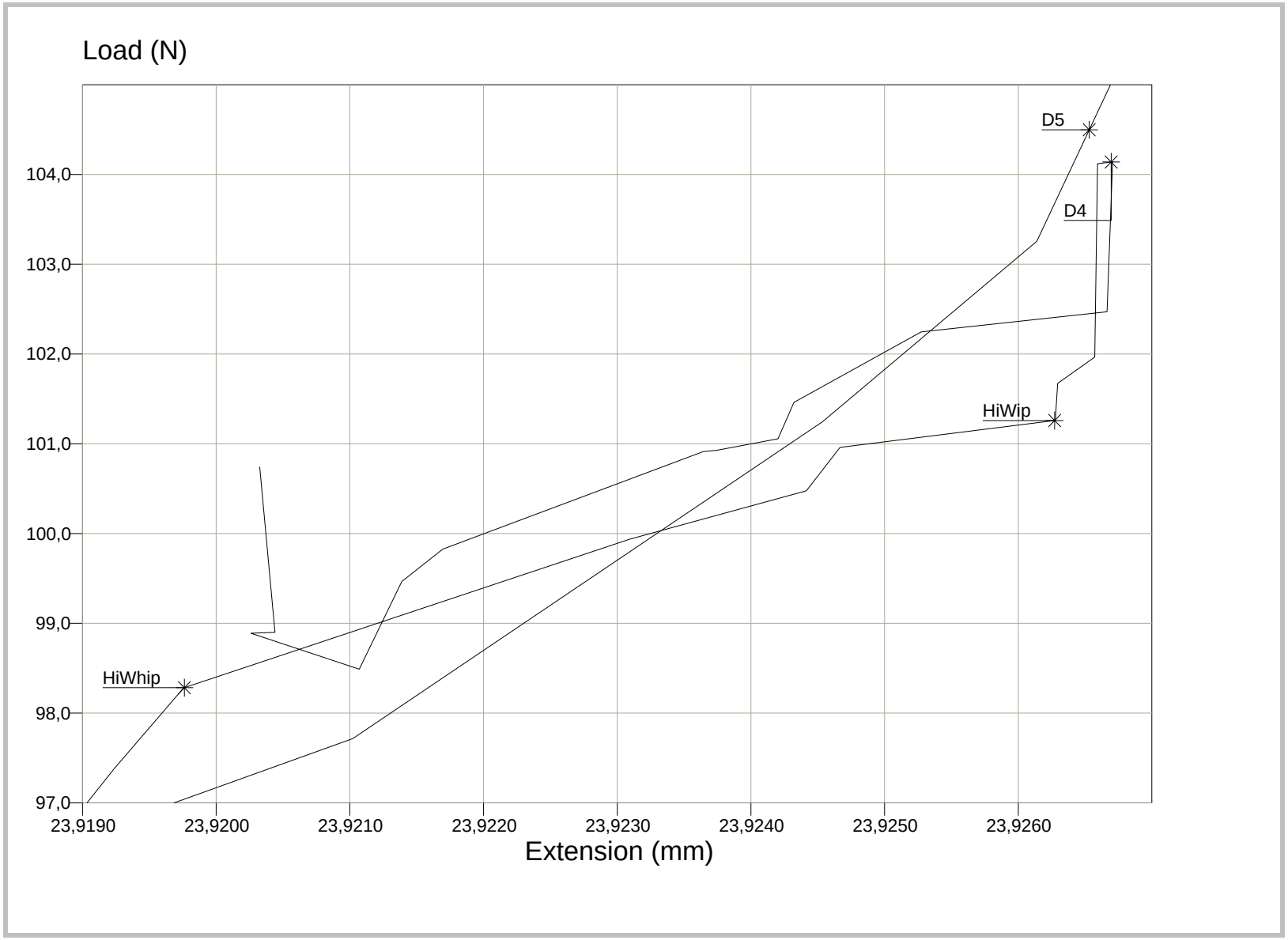

Load (N)
104,0
103,0
102,0
101,0
100,0
99,0
98,0
97,0
96,0
95,0
D1
D4
D5
HiWip
HiWhip
21,0630
21,0640
21,0650
21,0660
21,0670
21,0680
21,0690
Extension (mm)

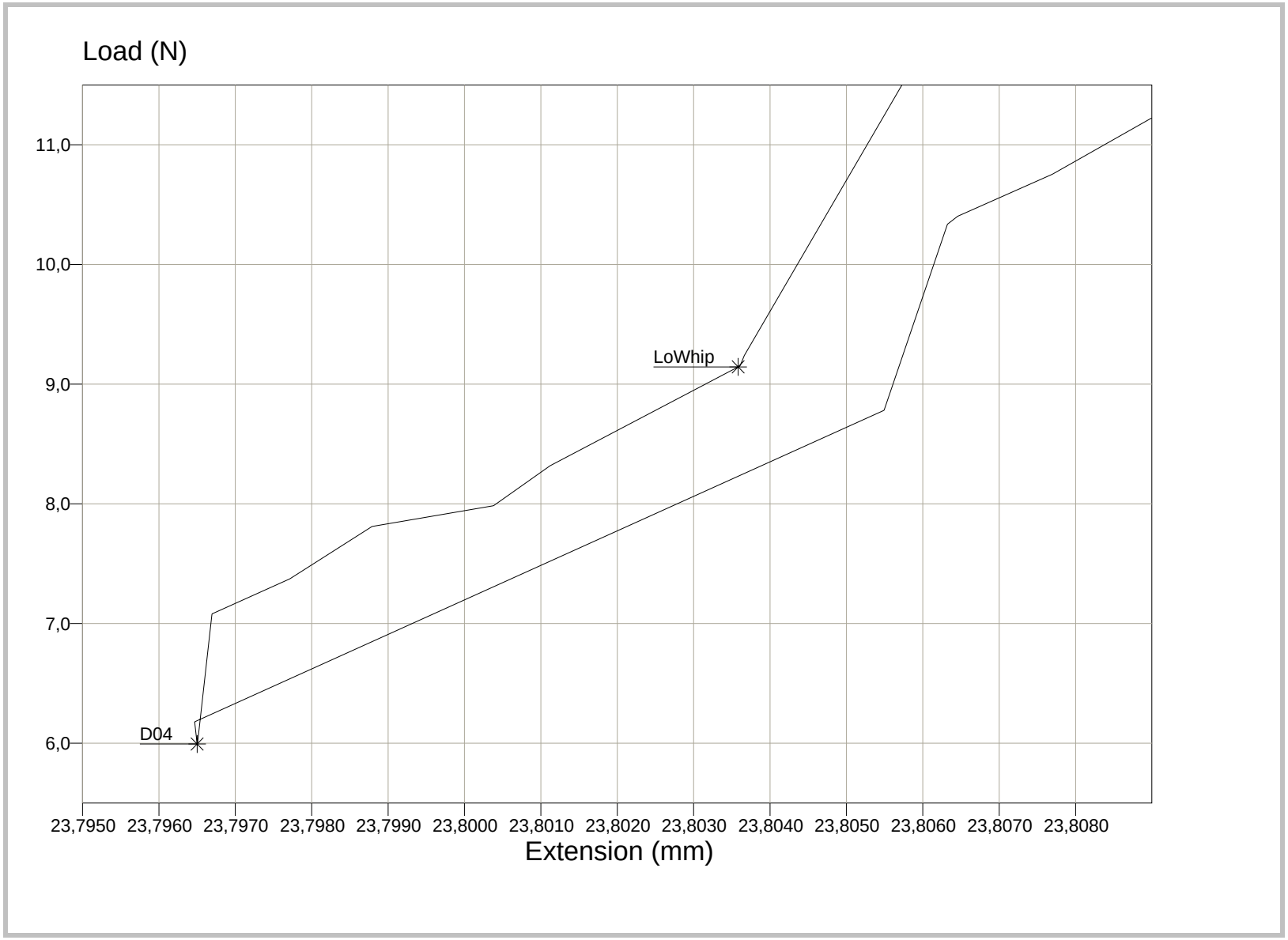
Iberográfica Capa Rota - Portugal	**Compressibility** Indentation - D / V	**"Whip" Reaction** Distorted Hysteresis Cycle	Doc. PROC - LAB - 017 Data: 14 - 06 - 2011 Folha. 8 de 21 | Rev. 0

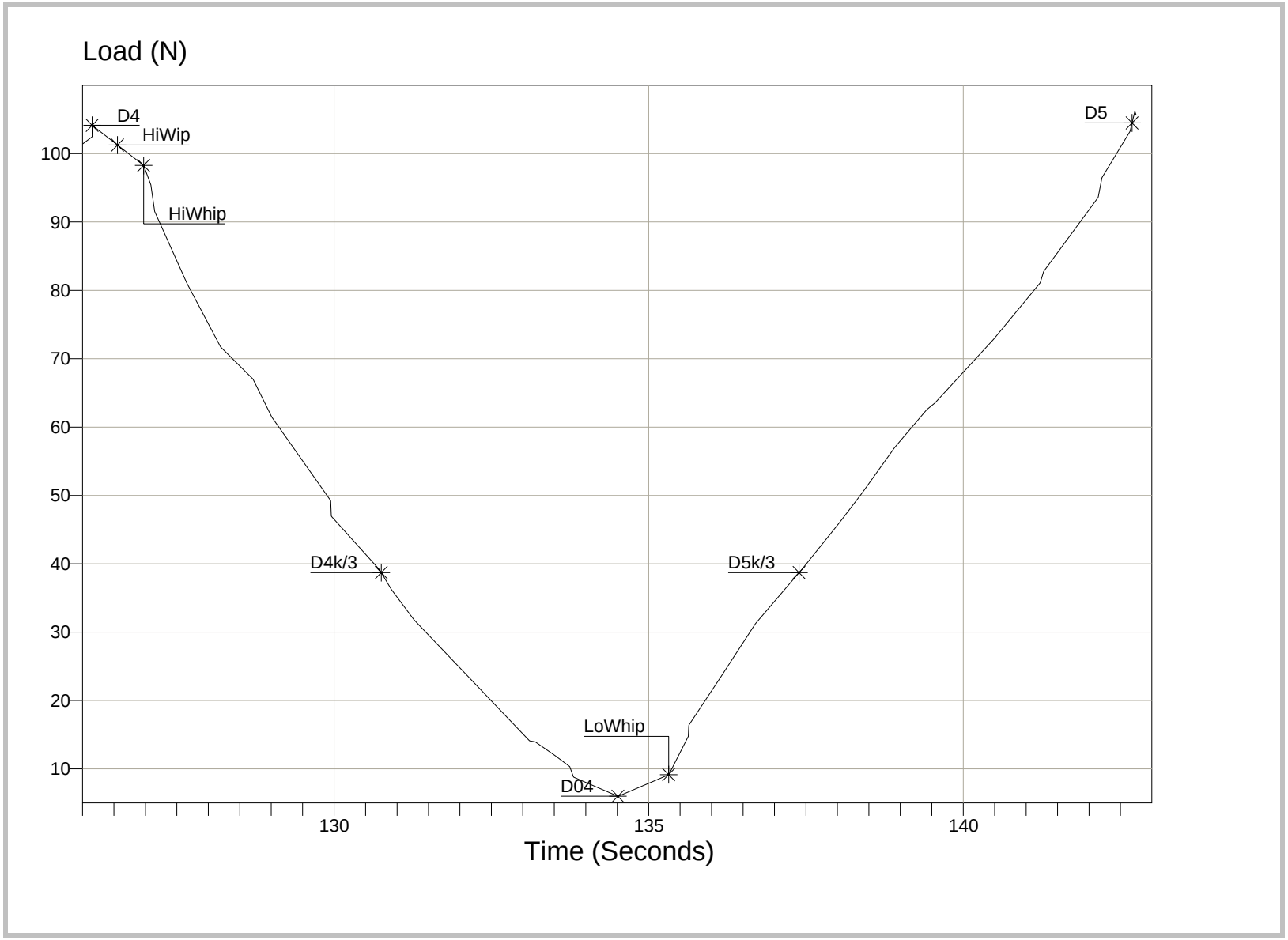


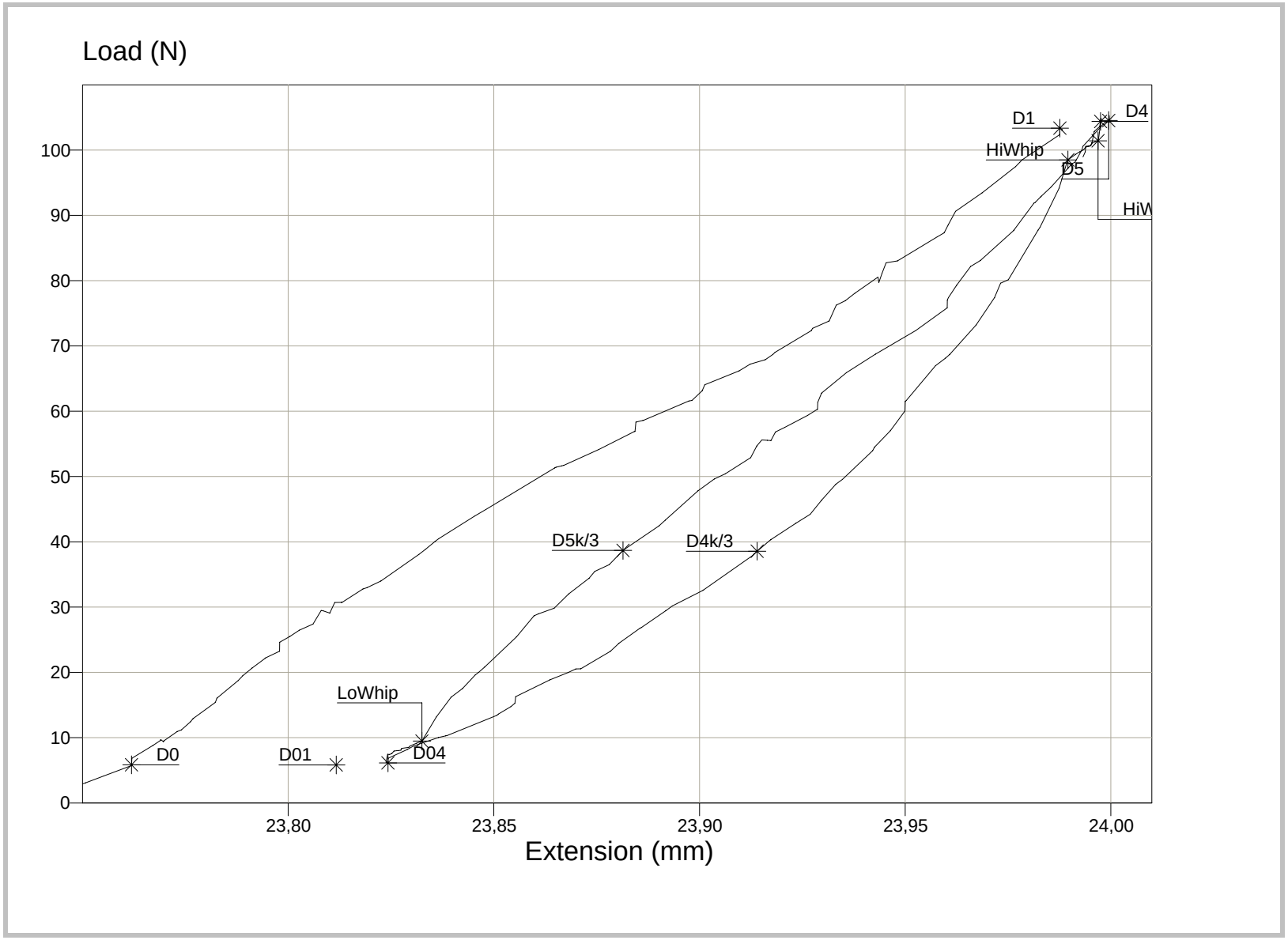

Load (N)
D4
HiWip
HiWhip
D5
D4k/3
D5k/3
LoWhip
D04
100
90
80
70
60
50
40
30
20
10
0
140
145
150
Time (Seconds)

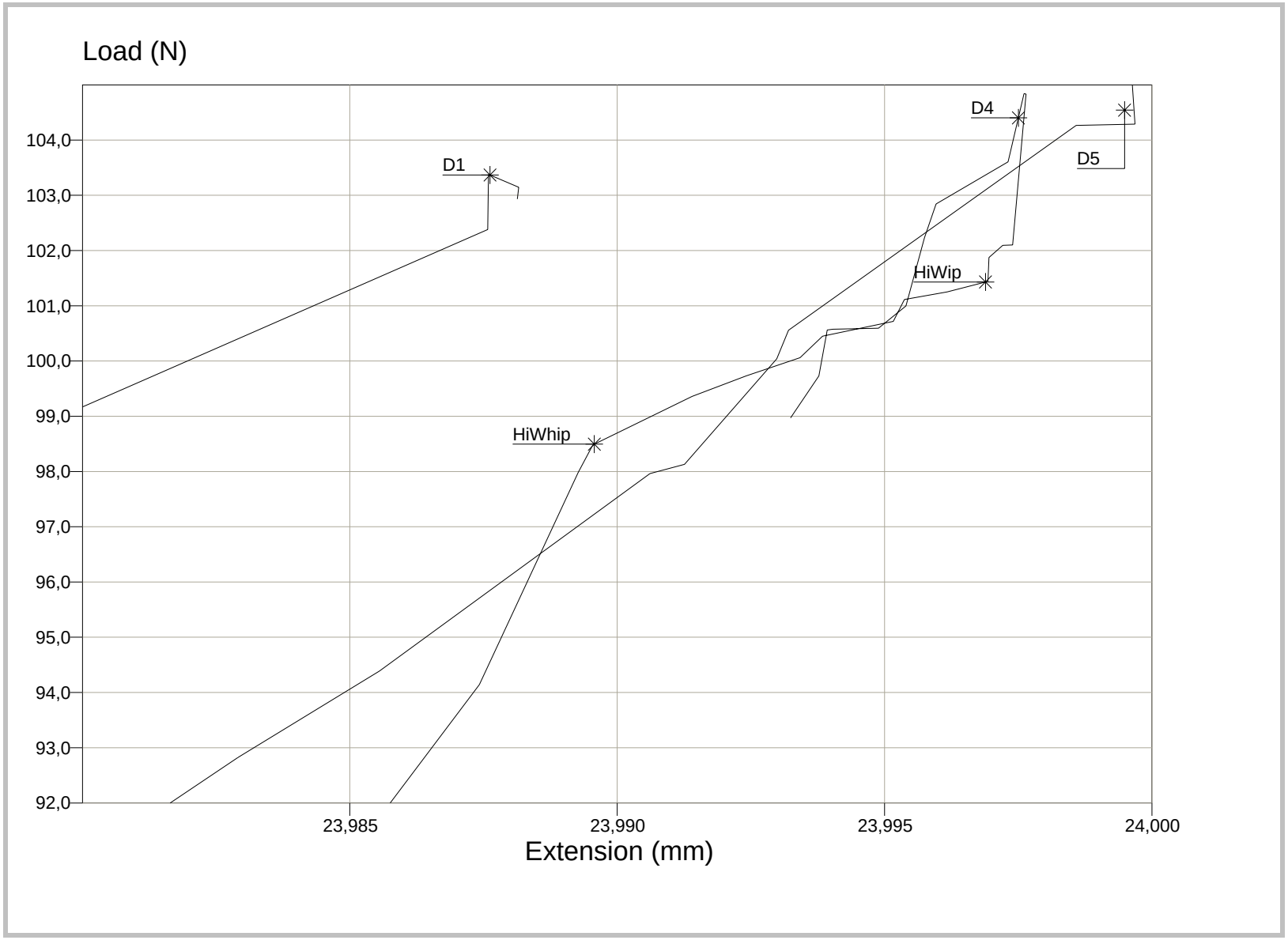

Load (N)
100
90
80
70
60
50
40
30
20
10
0
D1
HiWhip
D5
HiWip
D5k/3
D4k/3
LoWhip
D0
D01
D04
23,75
23,80
23,85
23,90
Extension (mm)

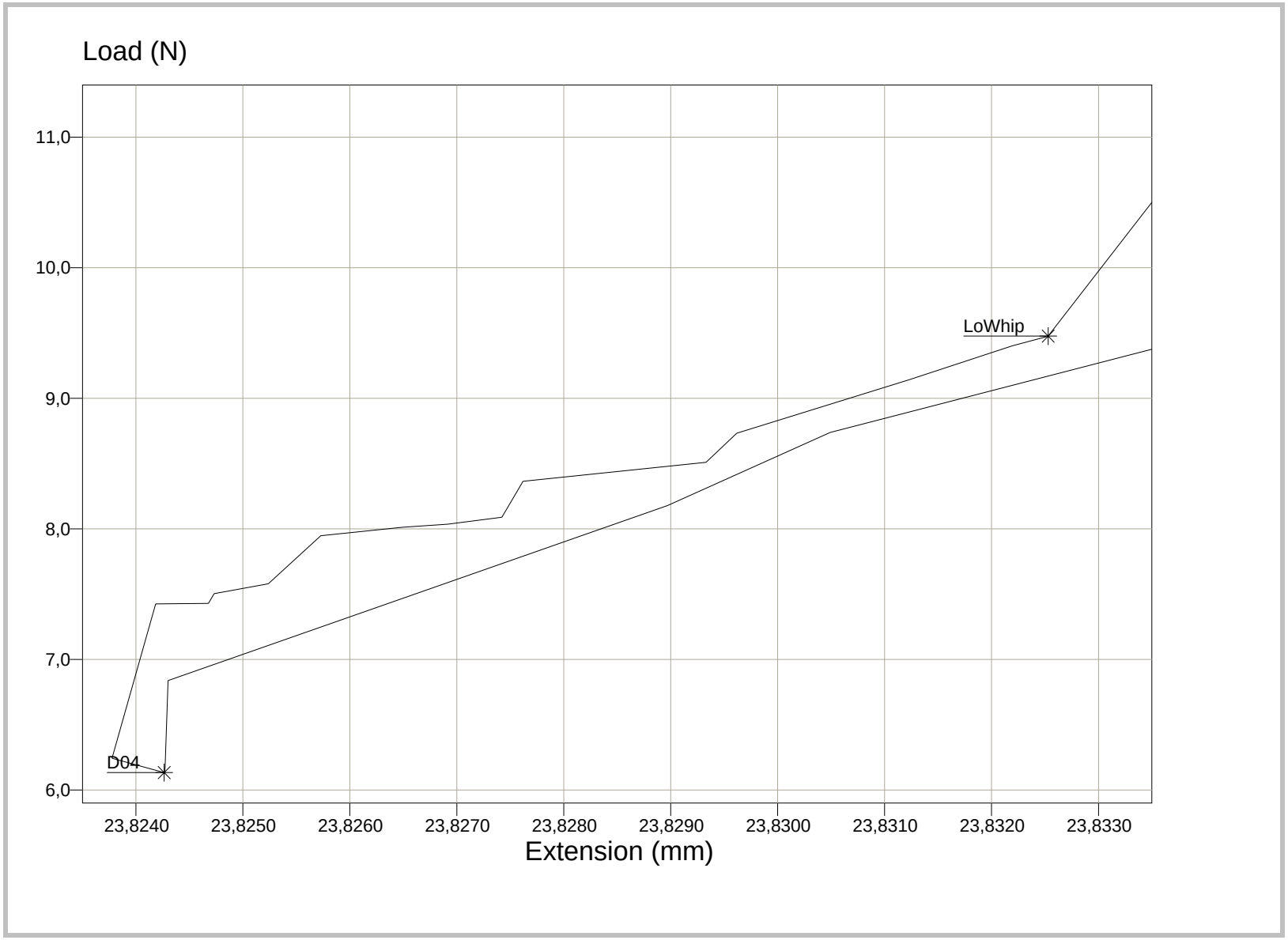

Load (N)
104,0
103,0
102,0
101,0
100,0
99,0
98,0
97,0
D5
D4
HiWip
HiWhip
23,9190
23,9200
23,9210
23,9220
23,9230
23,9240
23,9250
23,9260
Extension (mm)

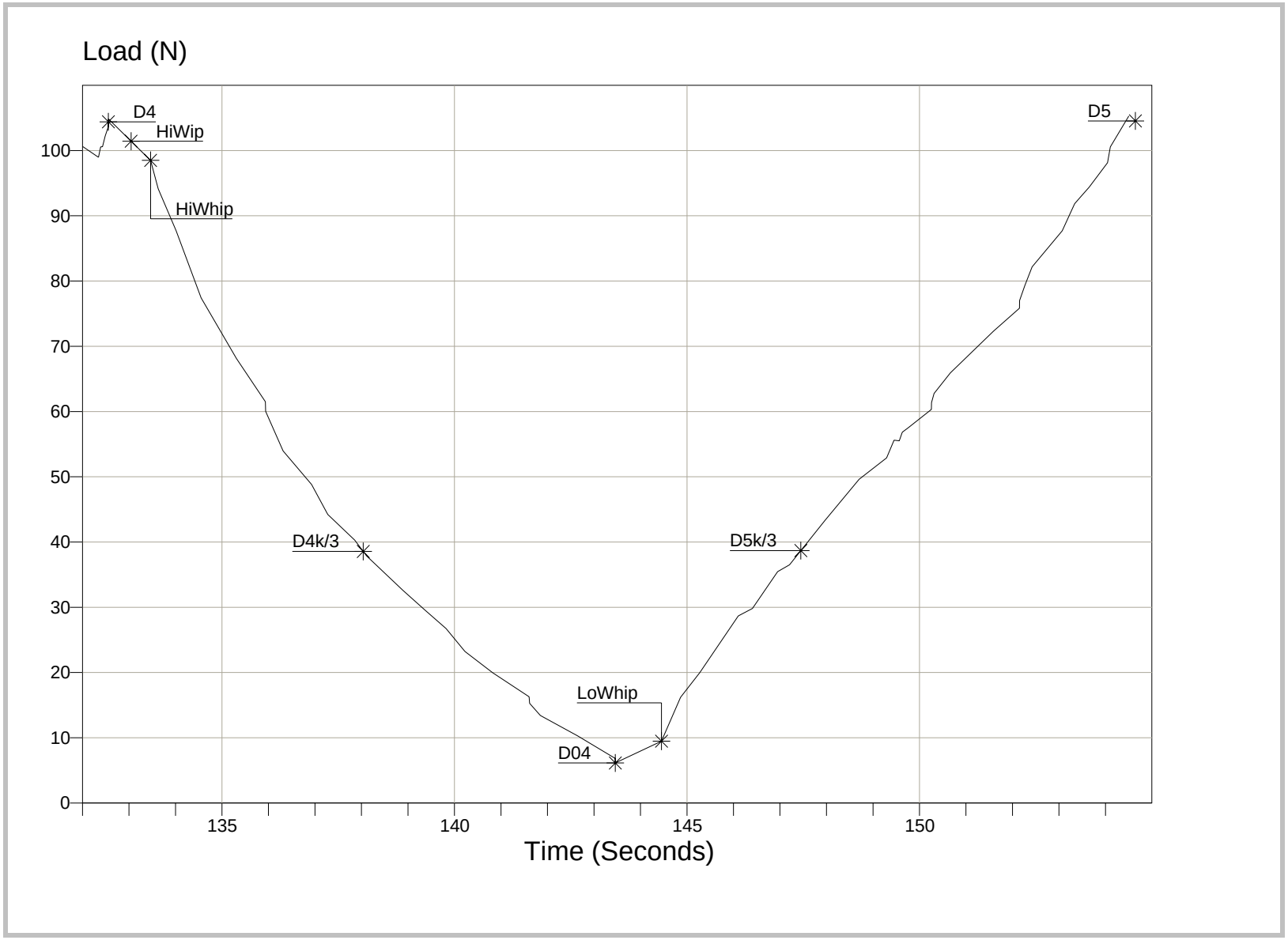

Load (N)
11,0
10,0
9,0
8,0
7,0
6,0
LoWhip
D04
23,7950
23,7960
23,7970
23,7980
23,7990
23,8000
23,8010
23,8020
23,8030
23,8040
23,8050
23,8060
23,8070
23,8080
Extension (mm)


Load (N)
D4
HiWip
HiWhip
D5
D4k/3
D5k/3
LoWhip
D04
100
90
80
70
60
50
40
30
20
10
130
135
140
Time (Seconds)

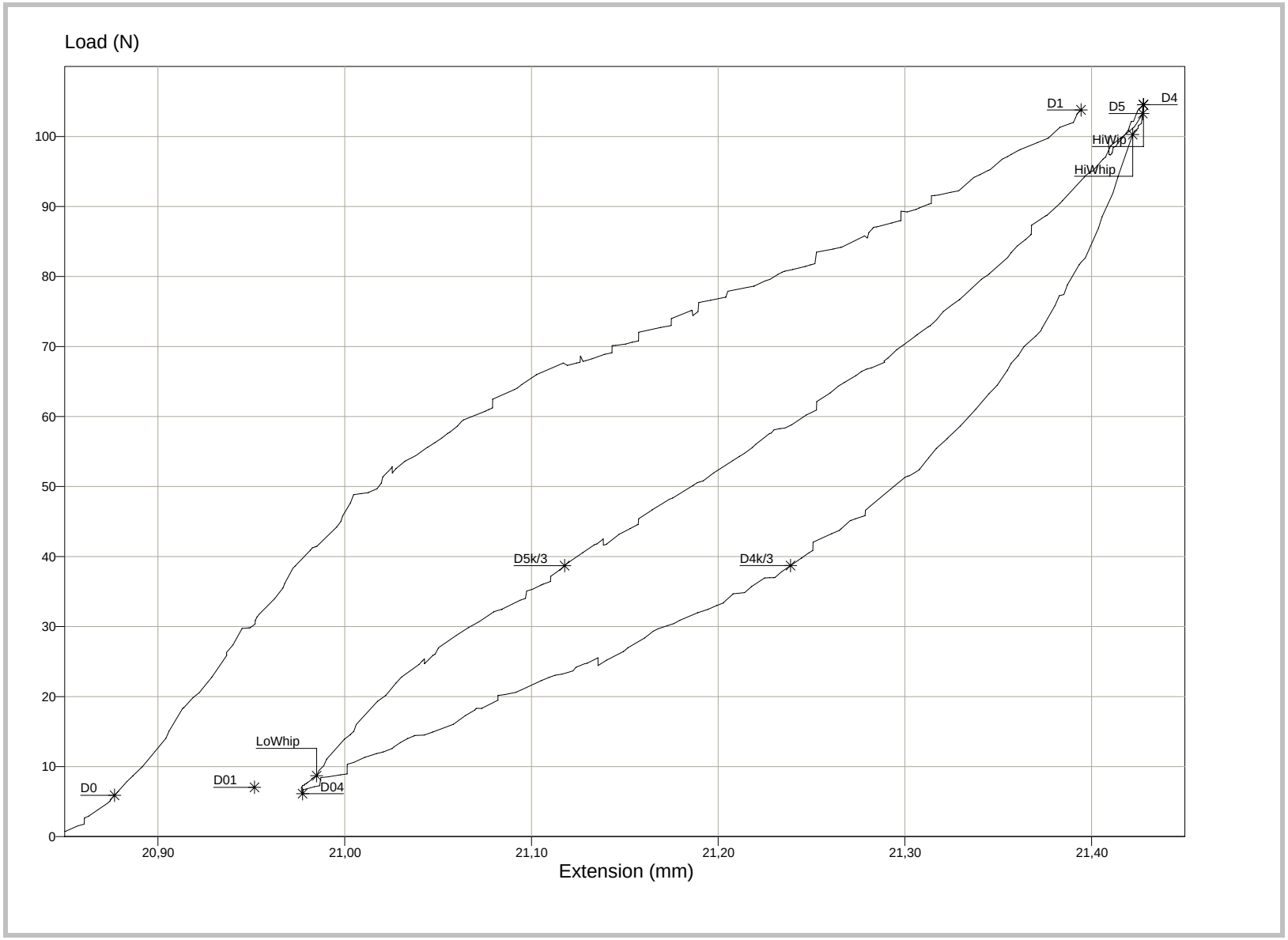

Load (N)
100
90
80
70
60
50
40
30
20
10
0
D1
D4
HiWhip
D5
HiW
D5k/3
D4k/3
LoWhip
D0
D01
D04
23,80
23,85
23,90
23,95
24,00
Extension (mm)


Load (N)
104,0
103,0
102,0
101,0
100,0
99,0
98,0
97,0
96,0
95,0
94,0
93,0
92,0
D1
D4
D5
HiWip
HiWhip
23,985
23,990
23,995
24,000
Extension (mm)

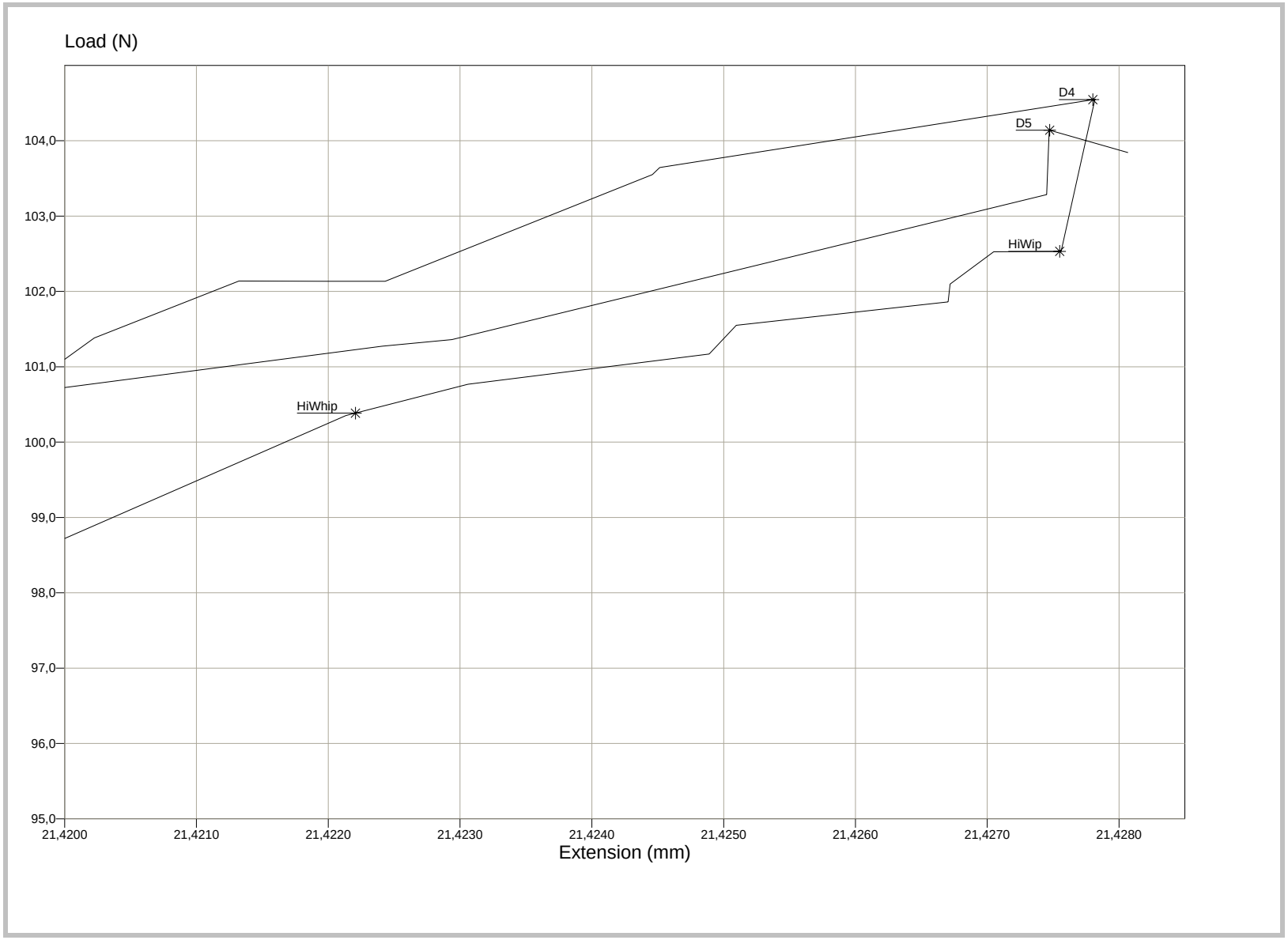

Load (N)
11,0
10,0
9,0
8,0
7,0
6,0
LoWhip
D04
23,8240
23,8250
23,8260
23,8270
23,8280
23,8290
23,8300
23,8310
23,8320
23,8330
Extension (mm)


Load (N)
D4
HiWip
HiWhip
D5
D4k/3
D5k/3
LoWhip
D04
100
90
80
70
60
50
40
30
20
10
0
135
140
145
150
Time (Seconds)

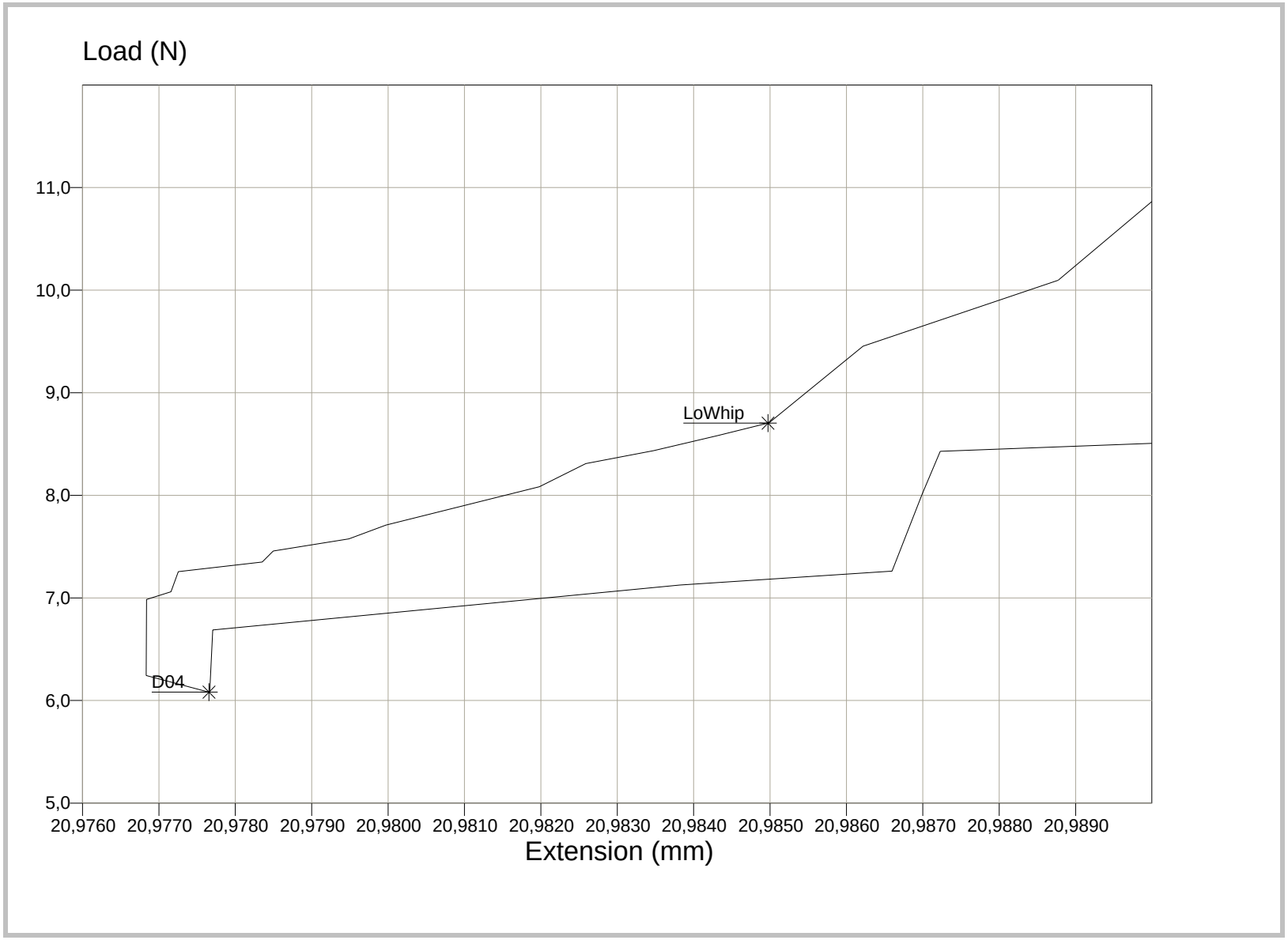
Iberográfica Capa Rota - Portugal	**Compressibility** Indentation - I / I	**"Whip" Reaction** Distorted Hysteresis Cycle	Doc. PROC - LAB - 017 Data: 20 - 06 - 2011 Folha. 18 de 21 | Rev. 0



Iberográfica Capa Rota - Portugal	**Compressibility** Indentation - I / I	**“Whip” Reaction** Distorted Hysteresis Cycle	Doc. PROC - LAB - 017 Data: 20 - 06 - 2011 Folha. 19 de 21 | Rev. 0



Iberográfica Capa Rota - Portugal	**Compressibility** Indentation - I / I	**"Whip" Reaction** Distorted Hysteresis Cycle	Doc. PROC - LAB - 017 Data: 20 - 06 - 2011 Folha. 20 de 21 | Rev. 0



Iberográfica Capa Rota - Portugal	**Compressibility** Indentation - I / I	**"Whip" Reaction** Distorted Hysteresis Cycle	Doc. PROC - LAB - 017 Data: 20 - 06 - 2011 Folha. 21 de 21 | Rev. 0