Simple elongation

Fig. 5.4 (Fig. 5.6) Extension ratio λ	Curve (a) F (kg/cm^2)
1.00	0
1.02	0.26
1.12_5	1.37
1.24	2.30
1.39	3.23
1.58_5	4.16
1.90	5.1
2.18	6.0
2.42	6.9
3.02	8.8
3.57	10.7
4.03	12.5
4.76	16.2
5.36	19.9
5.75	23.6
6.15	27.4
6.4	31.0
6.6	34.8
6.8_5	38.5
7.0_5	42.1
7.1_5	45.8
7.2_5	49.6
7.4	53.3
7.5	57.0
7.6	64.4

$$F = \sum_{n=1}^{N} \mu_n \left(\lambda^{\alpha_n - 1} - \lambda^{-\frac{1}{2}\alpha_n - 1} \right)$$

2-dimensional extension

Fig. 5.5 Lower curve

Extension ratio λ_4	f/do(kg/cm^2)
0	0
1.027	0.92
1.065	1.50
1.11_5	2.17
1.14	2.30
1.20	2.77
1.31	3.38
1.42	3.65
1.68	3.93
1.94	4.01
2.49	3.93
3.03	4.17
3.43	4.28
3.75	4.64
4.07	4.94
4.26	5.27
4.45	5.54

Equivalent compression

Fig. 5.6

λ_3	F (kg/cm^2)
1.0	0
0.95	1.02
0.88	1.93
0.80	3.37
0.77	3.90
0.69	5.76
0.58	10.0
0.49	14.9
0.35	31.3
0.265	57.0
0.161	153
0.109	352
0.085	596
0.071	910
0.060	1360
0.055	1740
0.050	2180

$$F = \sum_{n=1}^{N} \mu_n \left(\lambda^{\alpha_n - 1} - \lambda^{-2\alpha_n - 1} \right)$$

Pure shear

Fig. 5.8

Extension ratio λ	f(kg/cm^2)
0	0
1.03	0.68
1.12	1.62
1.19	2.50
1.31	3.39
1.46	4.27
1.84	6.04
2.38	7.8
2.97	9.6
3.47	11.4
3.95	13.1
4.37	14.9
4.69	16.6
4.97	18.4
Decreasing	
4.72	16.6
4.43	14.9
4.07	13.1
3.65	11.4
3.13	9.6
2.54	7.8
1.98	6.04
1.52	4.27
1.36	3.39
1.24	2.50
1.12	1.62
1.04	0.68

$$F = \sum_{n=1}^{N} \mu_n \left(\lambda^{\alpha_n - 1} - \lambda^{-\alpha_n - 1} \right)$$

Equivalent simple shear

Fig. 5.9

λ	F_λ (interpolated)	Shear strain	Shear stress (kg/cm^2)
1.0	0	0	0
1.1	1.45	0.191	0.79
1.2	2.5	0.367	1.48
1.3	3.3	0.531	2.08
1.4	4.0	0.686	2.65
1.6	5.0_3	0.975	3.62
1.8	5.9	1.244	4.5_0
2.0	6.6_3	1.5	5.3_0
2.4	7.8_5	1.98	6.6_8
2.8	9.1	2.44	8.1
3.2	10.4	2.89	9.4_7
3.6	11.8	3.32	11.0
4.0	13.3	3.75	12.5
4.5	15.6	4.28	14.8
4.97	18.4	4.77	17.5