



ASTM D 882 - Tensile Testing of Thin Plastic Sheeting

Application Report

Introduction

Tensile testing of thin plastic sheeting in accordance with ASTM D 882, "Standard Test Method for Tensile Properties of Thin Plastic Sheeting", is a common testing requirement for many Instron customers. Gripping of these delicate specimens is the prevalent challenge in most tests. The gripping technique must prevent slipping of the material at high loads but not tear into the material and cause premature specimen failure.

Test Configuration

EM system: 3345

Load cell: 200 lb

Grips: 200 lb pneumatic side action grips with 1 in x 1 in rubber-coated faces

Grip pressure: 90 psi

Gauge length (grip separation): 2.0 in

Test speed: 20 in/min

Specimen dimensions: 1 in width x 5 in length



Figure 1:
Test configuration for performing tensile test on thin plastic sheeting specimens.

Results

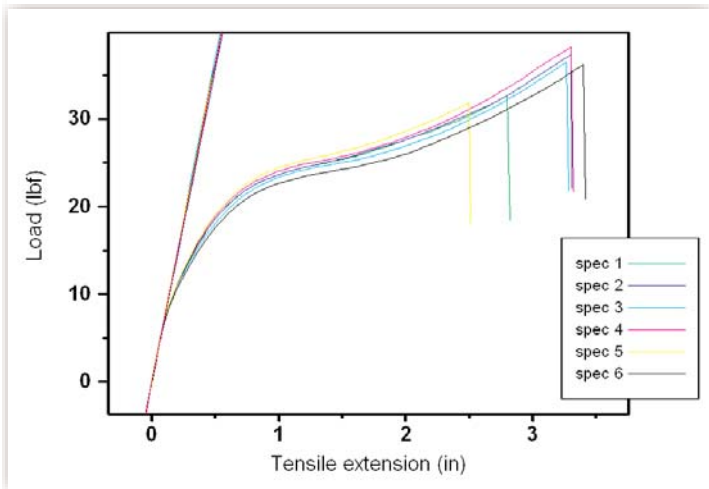


Figure 2:
Load vs. extension results for six specimens tested in tension to failure.

Specimen	Max Load (lbf)	Strain at Break (%)	Tensile Strength(ksi)	Modulus (ksi)
1	32.64	140.00	9.33	42.26
2	37.31	165.00	10.66	40.77
3	36.49	163.33	10.42	42.42
4	38.19	165.00	10.91	41.40
5	31.77	125.00	9.08	42.12
6	36.23	170.00	10.35	41.61
Mean	35.44	188.006	10.13	41.76
S.D	2.61	0.605	0.75	0.62

Table 1:
Results for thin plastic sheeting testing on six specimens.

Conclusions

The purpose of this testing was to recommend a set of grips and faces that would prevent slipping of the plastic sheeting during tensile testing and not lead to specimen failure. The 1 inch x 1 inch rubber-coated faces on the 200 lb capacity pneumatic side action grips and a gripping pressure of 90 psi were successful in achieving this goal. The rubber-coated faces cushion the specimen at high loads and the large capacity grips allow for an increased gripping force to prevent slipping. Each specimen was evaluated for slipping by marking the position of the faces on the material with a black permanent marker. It should also be noted that material failure occurred within the gauge area for every specimen.