

TABLES



TABLE 1

FULL SCALE TEST RESULTS BY UPHOLSTERY FABRIC TYPE

(Shaded areas are UFAC chairs)

CELLULOSIC

CHAIR NUMBER	UFAC FABRIC CLASS	BACK CREVICE	SIDE CREVICE	SEAT CUSHION	PILLOW CREVICE	WELT EDGE	NUMBER OF CIGARETTES W/IGNITIONS	TOTAL NUMBER OF CIGARETTES USED
29	I	0	1	0	0	N/A	1	12
41	I	0	0	0	0	N/A	0	12
42	I	0	3	0	N/A	0	3	12
51	II	3	2	3	N/A	3	11	12
55	I	3	3	3	N/A	3	12	12
57	I	0	0	3	N/A	N/A	3	9
58	I	1	0	0	N/A	N/A	1	9
63	II	3	2	3	N/A	3	11	12
66	I	0	3	0	0	N/A	3	12
77	I	0	0	0	N/A	N/A	0	9
79	II	2	0	0	N/A	0	2	12
80	II	3	2	3	N/A	3	11	12
52	II	3	0	3	N/A	N/A	6	9
67	I	0	0	0	0	0	0	15
70	I	NT	3	3	3	N/A	9	9
73	I	3	0	0	N/A	0	3	12
76	I	2	2	0	N/A	0	4	12
84	I	0	0	0	0	N/A	0	12

NT means location was not tested. N/A means test location not applicable.



Table 1, continued

THERMOPLASTIC

CHAIR NUMBER	UFAC FABRIC CLASS	BACK CREVICE	SIDE CREVICE	SEAT CUSHION	PILLOW CREVICE	WELT EDGE	NUMBER OF CIGARETTES WIGNITIONS	TOTAL NUMBER OF CIGARETTES USED
28	I	0	0	0	N/A	N/A	0	12
32	I	0	0	0	N/A	N/A	0	9
34	I	0	0	0	N/A	N/A	0	9
37	I	0	0	0	N/A	0	0	12
40	I	0	0	0	0	N/A	0	12
56	I	0	0	0	N/A	0	0	12
65	I	0	0	0	N/A	N/A	0	9
72	I	0	0	0	N/A	0	0	12
82	I	0	0	0	N/A	N/A	0	9
83	I	0	0	0	N/A	N/A	0	9

BLEND

30	I	0	0	0	N/A	N/A	0	8
31	I	0	0	0	N/A	N/A	0	9
33	I	0	0	0	0	N/A	0	12
35	I	0	0	0	0	N/A	0	12
36	I	0	0	0	0	0	0	15
38	I	0	0	0	N/A	0	0	12
39	I	0	0	0	N/A	0	0	12
43	I	0	0	0	0	N/A	0	15
44	I	0	0	0	N/A	N/A	0	9
45	I	0	0	0	N/A	N/A	0	9
46	I	0	0	0	1	1	2	15



Table 1, continued

CHAIR NUMBER	UFAC FABRIC CLASS	BACK CREVICE	SIDE CREVICE	SEAT CUSHION SURFACE	PILLOW CREVICE	WELT CORD EDGE	NUMBER OF CIGARETTES W/IGNITIONS	TOTAL NUMBER OF CIGARETTES USED
47	I	0	0	0	N/A	0	0	12
48	I	0	0	0	N/A	N/A	0	12
49	I	0	0	0	0	N/A	0	15*
54	I	0	0	0	N/A	0	0	12
59	I	0	0	0	N/A	N/A	0	9
60	I	0	0	0	N/A	0	0	12
61	I	0	0	0	N/A	0	0	12
62	I	0	0	0	N/A	N/A	0	9
64	I	0	0	0	0	0	0	15
78	I	3	2	2	N/A	N/A	7	9
50	I	1	0	2	1	0	4	15
53	I	0	0	0	N/A	0	0	12
68	I	0	0	0	N/A	0	0	12
71	I	0	0	0	N/A	N/A	0	9
74	I	0	0	0	N/A	0	0	12
75	I	0	0	0	N/A	0	0	12
81	I	2	1	0	N/A	0	3	12

LEATHER

85	I	0	0	0	N/A	N/A	0	9
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SILK

69	I	N/A	N/A	3	N/A	N/A	3	3
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*blend fabrics having at least 50% thermoplastic fibers.

**includes 3 cigarettes placed in bolster crevice.



TABLE 2
FULL SCALE TEST RESULTS BY UPHOLSTERY FABRIC AND TYPE OF COMPONENT

(Shaded areas are UFAC chairs)

CELLULOSIC

CHAIR NUMBER	FABRIC CONSTRUCTION	BACKCOATED	FABRIC WEIGHT (oz/yd ²)	UFAC FABRIC CLASS	BACK CREVICE	SIDE CREVICE	SEAT CUSHION	PILLOW CREVICE	WELT EDGE	NUMBER OF CIGARETTES W/IGNITIONS
29	print	no	5.1	I	0	1	0	0	N/A	1
41	print	no	6.5	I	0	0	0	0	N/A	0
42	plain	no	6.8	I	0	3	0	N/A	0	3
51	plain	no	11.4	II	3	2	3	N/A	3	11
55	plain	yes	14.0	I	3	3	3	N/A	3	12
57	print	no	7.5	I	0	0	3	N/A	N/A	3
58	print	no	6.6	I	1	0	0	N/A	N/A	1
63	plain	no	15.6	II	3	2	3	N/A	3	11
66	plain	no	12.8	I	0	3	0	0	N/A	3
77	plain	no	7.1	I	0	0	0	N/A	N/A	0
79	jacquard	no	9.2	II	2	0	0	N/A	0	2
80	plain	no	13.9	II	3	2	3	N/A	3	11
52	chenille	yes	9.6	II	3	0	3	N/A	N/A	6
67	print	no	6.0	I	0	0	0	0	0	0
70	jacquard	no	8.6	I	NT	3	3	3	N/A	9
73	print	no	6.2	I	3	0	0	N/A	0	3
76	plain	no	13.8	I	2	2	0	N/A	0	4
84	plain	no	11.0	I	0	0	0	0	N/A	0

NT means location was not tested. N/A means test location not applicable.



Table 2, continued

THERMOPLASTIC

CHAIR NUMBER	FABRIC CONSTRUCTION	BACKCOATED	FABRIC WEIGHT (oz/yd ²)	UFAC FABRIC CLASS	BACK CREVICE	SIDE CREVICE	SEAT CUSHION	PILLOW CREVICE	WELT EDGE	NUMBER OF CIGARETTES W/IGNITIONS
28	velvet	yes	10.1	I	0	0	0	N/A	N/A	0
32	suede	no	7.2	I	0	0	0	N/A	N/A	0
34	corduroy	yes	12.6	I	0	0	0	N/A	N/A	0
37	plain	yes	6.6	I	0	0	0	N/A	0	0
40	velvet	yes	9.4	I	0	0	0	0	N/A	0
56	plain	no	6.8	I	0	0	0	N/A	0	0
65	velvet	yes	12.4	I	0	0	0	N/A	N/A	0
72	plain	yes	6.0	I	0	0	0	N/A	0	0
82	plain	yes	14.2	I	0	0	0	N/A	N/A	0
83	suede	no	11.0	I	0	0	0	N/A	N/A	0

BLEND

30	velvet	no	7.9	I	0	0	0	N/A	N/A	0
31	plain	yes	14.7	I	0	0	0	N/A	N/A	0
33	plain	yes	10.9	I	0	0	0	0	N/A	0
35	velvet	yes	12.9	I	0	0	0	0	N/A	0
36	plain	yes	7.1	I	0	0	0	0	0	0
36	jacquard	no	11.1	I	0	0	0	N/A	0	0
39	velvet	no	7.5	I	0	0	0	N/A	0	0
43	plain	yes	6.0	I	0	0	0	0	N/A	0
44	plain	yes	8.3	I	0	0	0	N/A	N/A	0
45	jacquard	no	6.0	I	0	0	0	N/A	N/A	0
46	jacquard	no	9.8	I	0	0	0	1	1	2



Table 2, continued

CHAIR NUMBER	FABRIC CONSTRUCTION	BACKCOATED	FABRIC WEIGHT (oz/yd ²)	UFAC FABRIC CLASS	BACK CREVICE	SIDE CREVICE	SEAT CUSHION SURFACE	PILLOW CREVICE	WELT CORD EDGE	NUMBER OF CIGARETTES W/IGNITIONS
47	jacquard	no	6.9	I	0	0	0	N/A	0	0
48	plain	no	8.2	I	0	0	0	N/A	N/A	0
49	plain	no	6.8	I	0	0	0	0	N/A	0
54	plain	no	6.9	I	0	0	0	N/A	0	0
59	velvet	no	8.7	I	0	0	0	N/A	N/A	0
60	plain	no	6.2	I	0	0	0	N/A	0	0
61	plain	no	10.2	I	0	0	0	N/A	0	0
62	velvet	no	11.2	I	0	0	0	N/A	N/A	0
64	jacquard	no	11.8	I	0	0	0	0	0	0
78	plain	yes	9.4	I	3	2	2	N/A	N/A	7
50	plain	no	11.9	I	1	0	2	1	0	4
53	plain	no	7.0	I	0	0	0	N/A	0	0
68	jacquard	no	8.6	I	0	0	0	N/A	0	0
71	plain	yes	10.9	I	0	0	0	N/A	N/A	0
74	jacquard	yes	8.5	I	0	0	0	N/A	0	0
75	plain	no	8.8	I	0	0	0	N/A	0	0
81	plain	yes	15.2	I	2	1	0	N/A	0	3

LEATHER

85	plain	no	21.0	I	0	0	0	N/A	N/A	0
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SILK

69	plain	no	8.4	I	N/A	N/A	3	N/A	N/A	3
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*includes 3 cigarettes placed in bolster crevice, no ignitions



TABLE 3
UFAC COMPONENT TEST RESULTS

(Shaded areas are UFAC chairs)

CHAIR NUMBER	UFAC FABRIC CLASS	FILL/PAD BACK	FILL/PAD SIDE	FILL/PAD SEAT	BARRIER	FILL/PAD PILLOW	WELT CORD	DECKING	INTERIOR FABRIC	DECORATIVE TRIM	COMPONENT TEST PERFORMANCE
28	I	0	S	3	3	N/A	N/A	N/A	0	N/A	FAIL
29	I	0	0	0	0	0	0	0	N/A	N/A	ALL PASS
30	I	0	S	0	0	N/A	N/A	0	N/A	N/A	ALL PASS
31	I	0	S	4	0	N/A	N/A	N/A	N/A	N/A	FAIL
32	I	0	S	0	0	N/A	N/A	0	N/A	N/A	ALL PASS
33	I	S	0	3	1*	0	N/A	0	0	N/A	FAIL
34	I	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	ALL PASS
35	I	0	S	0	0	0	N/A	0	N/A	N/A	ALL PASS
36	I	0	S	0	0	0	0	0	0	N/A	ALL PASS
37	I	0	0	0	0	N/A	0	0	N/A	N/A	ALL PASS
38	I	S	0	1*	1*	N/A	0	0	N/A	N/A	ALL PASS
39	I	0	0	0	N/A	N/A	0	0	N/A	N/A	ALL PASS
40	I	0	S	0	0	0	N/A	0	0	N/A	ALL PASS
41	I	NT	0	0	0	0	0	0	N/A	N/A	ALL PASS
42	I	0	0	0	0	N/A	0	0	N/A	N/A	ALL PASS
43	I	0	0	0	N/A	0	N/A	0	0	0	ALL PASS
44	I	S	0	0	0	N/A	N/A	0	N/A	N/A	ALL PASS
45	I	0	0	0	0	N/A	0	N/A	N/A	N/A	ALL PASS
46	I	0	S	0	1*	0	0	0	0	N/A	ALL PASS

NT means location was not tested N/A means test location not applicable S means same material used in another location.

*Passed after retest. **Fill/Pad Test performed on feather barrier (same as pillow)

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Table 3, continued

CHAIR NUMBER	UFAC FABRIC CLASS	FILL/PAD BACK	FILL/PAD SIDE	F/P SEAT	BARRIER	FILL/PAD PILLOW	WELT CORD	DECKING	INTERIOR FABRIC	DECORATIVE TRIM	COMPONENT TEST PERFORMANCE
47	I	0	0	0	1*	N/A	0	0	0	N/A	ALL PASS
48	I	0	0	0	0	N/A	N/A	0	0	N/A	ALL PASS
49	I	0	S	0	N/A**	0	N/A	0	0	N/A	ALL PASS
51	II	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
54	I	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
55	I	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
56	I	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
57	I	S	0	0	0	N/A	N/A	N/A	N/A	N/A	ALL PASS
58	I	0	0	0	0	N/A	N/A	0	N/A	N/A	ALL PASS
59	I	0	0	0	0	N/A	N/A	0	N/A	N/A	ALL PASS
60	I	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
61	I	0	0	0	0	N/A	0	0	N/A	N/A	ALL PASS
62	I	0	0	0	0	N/A	N/A	N/A	N/A	N/A	ALL PASS
63	II	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
64	I	0	S	0	0	0	0	0	0	N/A	ALL PASS
65	I	0	S	0	0	N/A	N/A	N/A	N/A	N/A	ALL PASS
68	I	0	0	0	0	0	N/A	0	0	N/A	ALL PASS
77	I	0	0	0	0	N/A	N/A	N/A	N/A	N/A	ALL PASS
78	I	0	0	0	N/A	N/A	N/A	N/A	N/A	N/A	ALL PASS



Table 3, continued

CHAIR NUMBER	UFAC FABRIC CLASS	FILL/PAD BACK	FILL/PAD SIDE	FILL/PAD SEAT	BARRIER	FILL/PAD PILLOW	WELT CORD	DECKING	INTERIOR FABRIC	DECORATIVE TRIM	COMPONENT TEST PERFORMANCE
79	II	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
80	II	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
50	I	0	0	0	2	0	0	0	0	N/A	FAIL
52	II	0	0	0	0	N/A	N/A	N/A	N/A	N/A	ALL PASS
53	I	0	0	0	0	N/A	4	0	0	N/A	FAIL
67	I	0	0	0	0	0	0	0	0	N/A	ALL PASS
68	I	NT	0	0	0	N/A	0	0	0	N/A	ALL PASS
69	I	3	N/A	3	3	N/A	N/A	N/A	N/A	N/A	FAIL
70	I	0	0	0	0	0	N/A	0	0	N/A	ALL PASS
71	I	0	0	0	0	N/A	N/A	0	0	N/A	ALL PASS
72	I	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
73	I	0	0	0	0	N/A	0	0	N/A	N/A	ALL PASS
74	I	0	0	0	0	N/A	3	0	0	N/A	FAIL
75	I	0	0	0	2	N/A	0	0	0	N/A	FAIL
76	I	0	0	0	0	N/A	0	0	0	N/A	ALL PASS
81	I	0	0	0	N/A	N/A	0	0	N/A	N/A	ALL PASS
82	I	0	0	0	0	N/A	N/A	N/A	0	N/A	ALL PASS
83	I	0	S	0	0	N/A	N/A	N/A	N/A	N/A	ALL PASS
84	I	0	0	0	N/A**	0	N/A	0	0	0	ALL PASS
85	I	0	0	0	0	N/A	N/A	0	N/A	N/A	ALL PASS



TABLE 4
UFAC TEST RESULTS FOR FILLING MATERIAL TYPES

(Shaded areas are UFAC chairs)

CHAIR NUMBER	BACK FILLING	FILL/PAD BACK	SIDE FILLING	FILL/PAD SIDE	SEAT FILLING	FILL/PAD SEAT	BARRIER	PILLOW FILLING	FILL/PAD
28	thermoplastic loose fill	0	thermoplastic loose fiberfill	0	thermoplastic barrier over foam	3	3	N/A ¹	N/A
29	predom. thermoplastic filling	0	predom. thermoplastic filling over foam	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0
30	thermoplastic fiberfill	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	0	N/A	N/A
31	thermoplastic loose fill	0	thermoplastic loose fiberfill	0	thermoplastic barrier over foam	4	0	N/A	N/A
32	thermoplastic loose fill	0	thermoplastic loose fiberfill	0	thermoplastic barrier over foam	0	0	N/A	N/A
33	predom. cellulosic batting over foam	0	predom. cellulosic batting over foam	0	thermoplastic barrier over foam	3	1*	thermoplastic loose fiberfill	0
34	thermoplastic loose fiberfill	0	foam	0	foam	0	N/A	N/A	N/A
35	thermoplastic and cellulosic filling	0	thermoplastic and cellulosic filling	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0
36	thermoplastic and cellulosic filling over foam	0	thermoplastic and cellulosic filling over foam	0	thermoplastic barrier over foam	0	0	thermoplastic fiberfill	0

¹N/A means test location not applicable. NT means location was not tested. S means same material used in another location. * Passed after retest. **Fill/Pad Test performed on feather barrier (same as pillow).

CHAIR NUMBER	BACK FILLING	FILL/PAD BACK	SIDE FILLING	FILL/PAD SIDE	SEAT FILLING	FILL/PAD SEAT	BARRIER	PILOW FILLING	FILL/PAD
37	thermoplastic fiberfill	0	predom. cellulosic batting	0	thermoplastic barrier over foam	0	0	N/A	N/A
38	foam	0	foam	0	thermoplastic barrier over foam	1*	1*	N/A	N/A
39	shredded foam	0	foam	0	foam	0	N/A	N/A	N/A
40	predom. thermoplastic filling	0	thermoplastic loose fiberfill	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0
41	predom. thermoplastic filling	NT	foam	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0
42	foam	0	foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
43	foam	0	foam	0	foam	0	N/A	thermoplastic loose fiberfill	0
44	thermoplastic loose fiberfill	0	thermoplastic loose fiberfill	0	thermoplastic barrier over foam	0	0	N/A	N/A
45	thermoplastic and cellulosic filling	0	thermoplastic and cellulosic filling	0	thermoplastic and cellulosic barrier over foam	0	0	N/A	N/A
46	thermoplastic and cellulosic filling	0	thermoplastic and cellulosic filling over foam	0	thermoplastic barrier over foam	0	1*	thermoplastic loose fiberfill	0
47	thermoplastic fiberfill over foam	0	thermoplastic and cellulosic filling	0	thermoplastic barrier over foam	0	1*	N/A	N/A
48	thermoplastic loose fiberfill	0	predom. thermoplastic filling	0	thermoplastic barrier over foam	0	0	N/A	N/A
49	thermoplastic fiberfill	0	thermoplastic fiberfill	0	feathers over foam	0	0	feathers	0

CHAIR NUMBER	BACK FILLING	FILL/PAD BACK	SIDE FILLING	FILL/PAD SIDE	SEAT FILLING	FILL/PAD SEAT	BARRIER	PILLOW FILLING	FILL/PAD
51	thermoplastic loose fiberfill	0	predom. thermoplastic filling	0	thermoplastic barrier over foam	0	0	N/A	N/A
54	predom. thermoplastic filling	0	predom. thermoplastic filling over foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
55	thermoplastic fiberfill	0	predom. thermoplastic filling	0	thermoplastic barrier over foam	0	0	N/A	N/A
56	thermoplastic loose fiberfill	0	predom. thermoplastic filling over foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
57	thermoplastic and cellulosic filling	0	thermoplastic and cellulosic filling	0	thermoplastic and cellulosic barrier over foam	0	0	N/A	N/A
58	thermoplastic fiberfill	0	thermoplastic fiberfill over foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
59	thermoplastic fiberfill	0	thermoplastic fiberfill over foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
60	thermoplastic loose fiberfill	0	foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
61	thermoplastic fiberfill over foam	0	thermoplastic fiberfill over foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
62	foam	0	predom. thermoplastic filling over foam	0	predom. thermoplastic barrier over foam	0	0	N/A	N/A
63	thermoplastic loose fiberfill	0	predom. thermoplastic filling over foam	0	thermoplastic barrier over foam	0	0	N/A	N/A



CHAIR NUMBER	BACK FILLING	FILL/PAD BACK	SIDE FILLING	FILL/PAD SIDE	SEAT FILLING	FILL/PAD SEAT	BARRIER	PILLOW FILLING	FILL/PAD
64	predom. thermoplastic filling over foam	0	predom. thermoplastic over foam	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0
65	thermoplastic and cellulosic filling over foam	0	thermoplastic and cellulosic filling over foam	0	thermoplastic and cellulosic barrier over foam	0	0	N/A	N/A
66	foam	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0
77	predom. thermoplastic filling	0	thermoplastic fiberfill over foam	0	thermoplastic barrier over foam	0	0	N/A	0
78	foam	0	foam	0	foam	0	N/A	N/A	0
79	thermoplastic fiberfill	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	0	N/A	0
80	thermoplastic fiberfill	0	foam over thermoplastic and cellulosic filling	0	thermoplastic barrier over foam	0	0	N/A	N/A
50	foam over thermoplastic and cellulosic filling	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	2	thermoplastic loose fiberfill	0
52	thermoplastic fiberfill	0	thermoplastic fiberfill over foam	0	thermoplastic and cellulosic barrier over foam	0	0	N/A	N/A
53	predom. thermoplastic filling over foam	0	predom. thermoplastic filling	0	thermoplastic barrier over foam	0	0	N/A	N/A
67	predom. thermoplastic filling	0	predom. thermoplastic filling over foam	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0

CHAIR NUMBER	BACK FILLING	FILL/PAD BACK	SIDE FILLING	FILL/PAD SIDE	SEAT FILLING	FILL/PAD SEAT	BARRIER	PILLOW FILLING	FILL/PAD
68	foam	NT	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	0	N/A	N/A
69	cellulosic batting over foam	3	N/A	N/A	cellulosic barrier over foam	3	3	N/A	N/A
70	predom. thermoplastic filling	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	0	thermoplastic loose fiberfill	0
71	predom. thermoplastic filling	0	predom. thermoplastic filling over foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
72	thermoplastic fiberfill	0	foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
73	thermoplastic fiberfill	0	foam	0	thermoplastic barrier over foam	0	0	N/A	N/A
74	foam	0	predom. thermoplastic filling	0	thermoplastic barrier over foam	0	0	N/A	N/A
75	thermoplastic loose fiberfill	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	2	N/A	N/A
76	thermoplastic fiberfill	0	predom. thermoplastic filling	0	thermoplastic barrier over foam	0	0	N/A	N/A
81	thermoplastic and cellulosic filling	0	foam	0	foam	0	N/A	N/A	N/A
82	thermoplastic fiberfill	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	0	N/A	N/A
83	thermoplastic fiberfill	0	thermoplastic fiberfill	0	thermoplastic barrier over foam	0	0	N/A	N/A
84	thermoplastic fiberfill	0	thermoplastic fiberfill	0	feathers over foam	0	N/A**	feathers and loose fiberfill	0
85	thermoplastic loose fiberfill	0	thermoplastic loose fiberfill	0	thermoplastic barrier over foam	0	0	N/A	N/A



TABLE 5
UFAC TEST RESULTS FOR TYPES OF WELT CORDS
 (Shaded areas are UFAC chairs)

CHAIR NUMBER	WELT CORD	UFAC WELT CORD	UPHOLSTERY FABRIC
29	paper w/aluminum core	0	cellulosic
36	paper w/aluminum core	0	blend
37	polyethylene w/aluminum core	0	thermoplastic
38	paper w/aluminum core	0	blend
39	twisted paper	0	blend
41	paper w/aluminum core	0	cellulosic
42	paper w/aluminum core	0	cellulosic
45	paper w/aluminum core	0	blend
46	thermoplastic braid w/thermoplastic core	0	blend
47	paper w/aluminum core	0	blend
51	thermoplastic nonwoven w/aluminum core	0	cellulosic
54	paper w/aluminum core	0	blend
55	thermoplastic nonwoven w/aluminum core	0	cellulosic
56	paper w/aluminum core	0	thermoplastic
60	polyethylene	0	blend
61	paper w/aluminum core	0	blend
63	paper w/aluminum core	0	cellulosic
64	paper w/aluminum core	0	blend
79	paper w/aluminum core	0	cellulosic
80	paper w/aluminum core	0	cellulosic



Table 5, continued

CHAIR NUMBER	WELT CORD	WELT CORD	UPHOLSTERY FABRIC
50	paper w/aluminum core	0	blend
53	twisted paper	4	blend
67	twisted paper	0	cellulosic
68	twisted paper	0	blend
72	paper w/polyethylene core & copper wire	0	thermoplastic
73	twisted paper	0	cellulosic
74	twisted paper	3	blend
75	paper w/aluminum core	0	blend
76	twisted nonwoven thermoplastic	0	cellulosic
79	paper w/aluminum core	0	cellulosic
80	paper w/aluminum core	0	cellulosic
81	twisted paper	0	blend

TABLE 6
UFAC TEST RESULTS FOR TYPES OF DECKING MATERIALS
(Shaded areas are UFAC chairs)

CHAIR NUMBER	DECKING FILLING	DECKING FABRIC	UFAC DECKING
29	predom. thermoplastic filling	woven/blend	0
30	predom. thermoplastic fiber pad	woven/blend	0
32	predom. thermoplastic filling	woven/blend	0
33	predom. thermoplastic fiber pad	woven/blend	0
35	polyether polyurethane foam	woven/blend	0
36	polyether polyurethane foam	woven/blend	0
37	predom. thermoplastic fiber pad	woven/blend	0
38	thermoplastic fiberfill	jacquard/blend	0
39	polyether polyurethane foam	woven/blend	0
40	thermoplastic fiber pad	woven/blend	0
41	predom. thermoplastic fiber pad	nonwoven/thermoplastic	0
42	predom. thermoplastic fiber pad	nonwoven/thermoplastic	0
43	predom. thermoplastic fiber pad	nonwoven/thermoplastic	0
44	predom. thermoplastic fiber pad	woven/blend	0
46	predom. thermoplastic filling	woven/blend	0
47	predom. thermoplastic filling	woven/blend	0
48	thermoplastic fiber pad	woven/blend	0
49	thermoplastic fiber pad	woven/cellulosic	0
51	predom. thermoplastic filling	woven/blend	0
54	thermoplastic fiberfill & fiber pad	woven/blend	0
55	predom. thermoplastic filling	woven/blend	0
56	thermoplastic fiberfill	knit/thermoplastic	0
58	predom. thermoplastic filling	woven/thermoplastic	0
59	thermoplastic fiber pad	woven/blend	0
60	thermoplastic fiber pad	woven/blend	0
61	predom. thermoplastic filling & fiber pad	jacquard/blend	0
63	predom. thermoplastic filling	woven/blend	0
64	predom. thermoplastic fiber pad	woven/blend	0
66	thermoplastic fiber pad	woven/blend	0
79	thermoplastic fiber pad	woven/blend	0
80	thermoplastic fiber pad	woven/blend	0

Table 6, continued

CHAIR NUMBER	DECKING FILLING	DECKING FABRIC	UFAC DECKING
50	thermoplastic fiber pad	woven/blend	0
53	predom. thermoplastic fiber pad	woven/blend	0
67	predom. thermoplastic fiber pad	woven/blend	0
68	thermoplastic fiber pad	woven/blend	0
70	thermoplastic fiberfill & fiber pad	woven/blend	0
71	predom. thermoplastic filling & foam	woven/blend	0
72	predom. thermoplastic filling	woven/blend	0
73	predom. thermoplastic filling	woven/cellulosic	0
74	predom. thermoplastic filling	woven/blend	0
75	predom. thermoplastic fiber pad	woven/blend	0
76	predom thermoplastic fiber pad	woven/blend	0
79	thermoplastic fiber pad	woven/blend	0
80	thermoplastic fiber pad	woven/blend	0
81	predom. thermoplastic fiber pad	woven/blend	0
84	thermoplastic fiber pad	woven/blend	0
85	thermoplastic fiber pad	nonwoven/thermoplastic	0

TABLE 7
UFAC TEST RESULTS FOR TYPES OF INTERIOR FABRICS

(Shaded areas are UFAC chairs)

CHAIR NUMBER	SEAT CUSHION INTERIOR FABRIC	BACK INTERIOR FABRIC	PILLOW INTERIOR FABRIC	BOLSTER INTERIOR FABRIC	UFAC INTERIOR FABRIC
28	nonwoven/thermoplastic	N/A	N/A	N/A	0
33	nonwoven/thermoplastic	N/A	nonwoven/thermoplastic	N/A	0
36	nonwoven/thermoplastic	N/A	nonwoven/thermoplastic	N/A	0
40	nonwoven/thermoplastic	N/A	N/A	N/A	0
43	N/A	N/A	nonwoven/thermoplastic	N/A	0
46	nonwoven/thermoplastic	N/A	nonwoven/thermoplastic	N/A	0
47	nonwoven/thermoplastic	N/A	N/A	N/A	0
48	nonwoven/thermoplastic	nonwoven/thermoplastic	N/A	N/A	0
49	woven/blend	N/A	woven/blend	woven/blend	0
51	nonwoven/thermoplastic	nonwoven/thermoplastic	N/A	N/A	0
54	nonwoven/thermoplastic	N/A	N/A	N/A	0
55	nonwoven/thermoplastic	N/A	N/A	N/A	0
56	nonwoven/thermoplastic	nonwoven/thermoplastic	N/A	N/A	0
60	N/A	nonwoven/thermoplastic	N/A	N/A	0
63	nonwoven/thermoplastic	woven/blend	N/A	N/A	0
64	nonwoven/thermoplastic	N/A	nonwoven/thermoplastic	N/A	0
66	nonwoven/thermoplastic	N/A	nonwoven/thermoplastic	N/A	0
79	woven/blend	N/A	N/A	N/A	0
80	nonwoven/thermoplastic	nonwoven/thermoplastic	N/A	N/A	0
50	nonwoven/thermoplastic	N/A	nonwoven/thermoplastic	N/A	0
53	nonwoven/thermoplastic	N/A	N/A	N/A	0
67	nonwoven/thermoplastic	N/A	nonwoven/thermoplastic	N/A	0
68	woven/cellulosic	N/A	N/A	N/A	0
70	woven/blend	N/A	nonwoven/thermoplastic	N/A	0
71	nonwoven/thermoplastic	N/A	N/A	N/A	0
72	N/A	nonwoven/thermoplastic	N/A	N/A	0
74	nonwoven/thermoplastic	N/A	N/A	N/A	0
75	woven/blend	nonwoven/thermoplastic	N/A	N/A	0
76	N/A	nonwoven/thermoplastic	N/A	N/A	0
82	nonwoven/thermoplastic	N/A	N/A	N/A	0
84	woven/cellulosic	N/A	woven/cellulosic	N/A	0

N/A = not applicable



APPENDIX B.

**RESULTS OF SURVEYS OF MANUFACTURERS OF UPHOLSTERED
FURNITURE**

**Results of Surveys of Manufacturers
of Upholstered Furniture**

**Charles Smith
Directorate for Economic Analysis
September 1996**

EXECUTIVE SUMMARY

The Consumer Product Safety Commission (CPSC) is considering action that would lead to a voluntary or mandatory flammability standard, accompanied by appropriate labeling and other requirements, to address the hazards of open flame ignition of household upholstered furniture. CPSC also is evaluating the effectiveness of the Upholstered Furniture Action Council's (UFAC) Voluntary Action Program in addressing cigarette ignition hazards. In support of these activities, the agency contracted with Abt Associates to conduct a survey of upholstered furniture manufacturers in 1995. The survey sought information on upholstery fabrics, filling materials, and other components of upholstered furniture that could affect the likelihood that an item of furniture might ignite from a small open flame or a burning cigarette.

An important goal in the design of the questionnaires was comparability with similar surveys done in 1981 and 1984, where possible, to enable evaluation of trends in materials used. Completed questionnaires were received from 120 manufacturing establishments participating in the voluntary Upholstered Furniture Action Council (UFAC) Program. UFAC participants account for 90 percent or more of the total value of upholstered furniture shipments. More than 2,000 furniture manufacturing establishments do not participate in the UFAC Program. These include some larger firms; however, most are smaller producers. Completed questionnaires were received from 42 establishments not participating in the program.

Analysis of the survey data revealed very few significant differences between the responses of UFAC and non-UFAC establishments. It appears reasonable to conclude that the data from the UFAC establishments can reasonably portray the upholstered furniture market, including the approximately 10 percent represented by other firms.

Compared to information on fabrics and filling materials used by manufacturers in previous surveys, the 1995 survey shows increased use of materials generally found to result in items with greater resistance to ignition from cigarettes: non-cellulosic fabrics and polyester fiberfill filling materials. However among manufacturers surveyed in 1995, smaller establishments were more likely to use fabrics with higher propensities to ignite from cigarettes, heavy weight cellulosic fabrics.

INTRODUCTION

The Consumer Product Safety Commission (CPSC) is considering action that would lead to a voluntary or mandatory flammability standard, accompanied by appropriate labeling and other requirements, to address the hazards of open flame ignition of household upholstered furniture. CPSC also is evaluating the effectiveness of the Upholstered Furniture Action Council's (UFAC) Voluntary Action Program in addressing cigarette ignition hazards.¹

The development of appropriate strategies to address furniture fires started by cigarettes and small open flames requires up-to-date national estimates of the types and quantities of materials used as components of upholstered furniture. Such information will complement knowledge gained from CPSC laboratory furniture flammability testing and from staff analysis of fire incident data. To obtain the necessary market estimates, CPSC contracted with Abt Associates (Abt) to conduct a 1995 survey of upholstered furniture manufacturers. Similar surveys were conducted in 1981 and 1984, the results of which were reported by the Directorate for Economic Analysis.²

Following a brief overview of the 1995 survey design and methodology, this report provides an analysis of the survey results. Where possible, the report compares results with the findings of the previous surveys. The final section discusses the findings and their relevance to future strategies to reduce the risks of furniture fires started by cigarettes and small open flames.

SURVEY DESIGN AND METHODOLOGY

The CPSC cooperated with the American Furniture Manufacturers Association in the development of two nearly identical questionnaires (one for participants in the UFAC Program and one for nonparticipating establishments). The main difference in the questionnaires was specific references to the UFAC program in the questionnaire for UFAC participants. An important goal in the design of the questionnaires was comparability with the 1981 and 1984 surveys, where possible, to enable evaluation of trends in materials used. Draft questionnaires were supplied by CPSC staff. The questionnaires are included in a report prepared by Abt, "Survey of Upholstered Furniture Manufacturers - Methodology Report," May 1996, which is attached as Appendix A.

¹ UFAC was formed by major furniture industry associations in 1974. The Voluntary Action Program was developed in the late 1970's, and amended (as "Phase 2") in 1983. The program requires classification of upholstery fabrics into either "Class I" or "Class II," based on a performance test. All conforming furniture must comply with specified construction criteria for welt cords, decking substrates, filling materials, and interior fabrics; and more cigarette ignition-prone Class II fabrics used with polyurethane foam seat cushions must have a barrier material between the fabric and foam that passes a barrier performance test. Conforming furniture is to be labeled with a UFAC tag.

² Charles Smith, Directorate for Economic Analysis, CPSC, "Fabrics and Filling Materials Used in Upholstered Furniture," March 1985.

The survey asked manufacturers for information on principal fiber types and the types of fabrics used the preceding year. The smolder resistance of upholstery fabrics is a critical factor in determining the cigarette ignition resistance of furniture.

The survey also asked manufacturers about the types of filling materials used in seats, backs, and arms of furniture. Tests of chairs and mockups over the years provide convincing evidence that filling materials used in contact with upholstery fabric in key locations play an important role in determining the ignition resistance of furniture. This evidence formed the basis for UFAC's construction criteria in its Voluntary Action Program, and for the cigarette ignition component tests mandated by the state of California in its Technical Bulletin 117.

Since welt cord can be a factor in the cigarette ignition resistance of furniture, it was important to ask manufacturers for information about its use. Welt cord is commonly used in seat cushions (and other locations) where two sections of fabric are joined. Depending on the fabric and characteristics of the welt cord, its presence can improve or worsen the likelihood of ignition if a cigarette should come to rest upon it. "Box-edged" welt is used around the top and bottom perimeter of a seat cushion. This type of welt is one likely resting place for a carelessly dropped cigarette. "Knife-edged" welt is used when the cushion fabric is joined at one seam around the middle of the cushion. Some cushions are made with stitched seams without any welt cord. Until recent years, the use of box-edged welt was the dominant form of cushion construction. Knife-edged welt and weltless constructions have become more common in the last 10 to 15 years. One of the early UFAC program modifications (in 1983) led to the use of heat-conducting welt cord. Testing has shown that heat-conducting welt cord can improve the ignition resistance by dispersing the heat from a burning cigarette.

The survey contained questions about two other components of upholstered furniture: interior fabrics and dust covers. The UFAC Program includes a component test for interior fabrics, which are fabrics used between the upholstery fabrics and the filling materials. Earlier testing by UFAC and the CPSC found that these fabrics affect the cigarette ignition resistance of furniture. Dust covers are fabrics on the undersides of chairs or sofas to protect their interiors from dust, and to improve the appearance of the items. They are being evaluated for ignitability from small open flames.

Previous surveys and other information showed some general differences by firm size in the use of fabrics and filling materials. Therefore, respondents were asked to estimate value of shipments for their establishments.



About 260 companies reportedly participate in the UFAC Voluntary Action Program.³ Based on telephone screening of company headquarters and branch locations, Abt determined that 289 manufacturing establishments were eligible to respond to the survey. This total included headquarters of multiple-location firms only if upholstered furniture was manufactured at the location. Officials with the most knowledge about the types and amounts of materials used in their establishments' manufacture of upholstered furniture in 1994 were identified, and the questionnaire was mailed during the week of September 11, 1995. Completed questionnaires were returned by 120 UFAC participants.

Recent data show that UFAC participants continue to account for the preponderance of upholstered furniture shipments. A report on the results of a 1994 survey of upholstered furniture manufacturers by Heiden Associates (under contract to UFAC) estimated that 89 percent of the total value of shipments of wood frame upholstered furniture in 1993 complied with the UFAC program. Adding sleep furniture to upholstered wood furniture brought estimated compliance up to 90 percent of the dollar value of shipments of these two major categories of upholstered furniture.⁴

The sampling frame for the survey of establishments that are not UFAC participants comprised the more than 2,000 other establishments producing wood upholstered household furniture or dual purpose furniture (such as sleep sofas) as their primary or secondary product (based on Dun & Bradstreet data obtained by Abt). Abt selected a random sample of 199 non-participating establishments, stratified by number of employees. Abt mailed questionnaires to knowledgeable officials. Completed questionnaires were returned by 42 non-UFAC establishments.

The survey was not designed to characterize futons, which are flexible mattresses on convertible frames. These may be used as sofas or as beds, and, as such, might fall within the scope of CPSC actions addressing the flammability of upholstered furniture. However, the nature of the product, with frames, cushions, and outer fabric coverings being produced and marketed separately, would require a separate effort by CPSC to characterize the materials used in its manufacture.

³ The 260 companies now participating in the UFAC program are fewer than the 376 firms that reportedly were involved in the middle-1980's. However, this change is most likely related to consolidation of firms within the industry. Also, the earlier enrollment may have included branch locations in addition to company headquarters.

⁴ Heiden Associates, Inc., Report on Survey of UFAC Members re: Compliance with Upholstered Furniture Cigarette Ignition Flammability Standard, December 15, 1994.

SURVEY RESULTS: Comparison of UFAC and Non-UFAC Establishments

As noted above, completed questionnaires were returned to Abt by 120 furniture manufacturing establishments that were participants in the UFAC Voluntary Action Program and 42 establishments that were not participants. Survey responses for the UFAC sample and each of the four non-UFAC employee size categories were assigned weights by Abt corresponding to the estimated nonresponse for each stratum. (A detailed explanation of the weighting methodology may be found in Abt's report, attached as Appendix A). The adjustment for nonresponse enabled Abt and CPSC staff to use the SUDAAN statistical software program to derive summary statistics for UFAC and non-UFAC responses to the survey questions, and to test the statistical significance of the differences between the responses of the UFAC and non-UFAC establishments to each question. These statistics do not weight responses by value of shipments of each establishment. Consequently, any statistically significant effects simply reveal differences between the two types of establishments: those participating in the UFAC Voluntary Action Program and those that do not participate.

Analysis of the survey data revealed very few significant differences (even at the 90 percent confidence level) between the responses of UFAC and non-UFAC establishments. It should be noted that the relatively small sample of non-UFAC establishments made it less likely that small differences would be statistically significant. However, since there is no reason to believe that non-response was related to survey content, it appears logical to conclude that the data from the UFAC establishments can reasonably portray *all* of the upholstered furniture market, including the approximately 10 percent represented by other firms. Information on fabrics, filling materials, and other furniture components used by UFAC participants is presented in the following sections. When the responses of UFAC and non-UFAC establishments were found to differ significantly, that fact will be highlighted.

Previous surveys showed that, in some important respects, larger furniture manufacturers tended to use different types of fabrics or filling materials than smaller firms. Therefore, to present a more reasonable characterization of furniture being purchased by households, the survey results are weighted in consideration of the greater number of units produced by establishments with higher values of shipments. Weighting also allows comparisons with findings from 1981 and 1984 surveys of UFAC participants. Responses of all 120 UFAC establishments are weighted using Dun & Bradstreet data obtained separately by Abt on value of their shipments. Of 114 UFAC participants that responded to the survey question on value of shipments, 50 reported annual sales exceeding \$20 million, 46 between \$5 and \$20 million, and 18 less than \$5 million. Of 40 non-UFAC establishments that responded, two had sales of over \$20 million, four had \$5 to \$20 million, and 34 reported sales of less than \$5 million. This is illustrative of the generally smaller firms that are not participants in the UFAC Program.

SURVEY RESULTS: Upholstery Fabrics

Upholstery fabrics play a critical role in determining the ignitability of an item of furniture. The following sections present information from the survey on different characteristics of fabrics: *fabric type*, *principal fiber (or material) type*, and *fabric class*.

Fabric Type

Fabric Type refers to commonly-accepted descriptions of the ways in which fabrics are manufactured or of their distinctive characteristics. Types of fabric include jacquards (usually heavier fabrics with intricate designs made on jacquard looms), velvets (with their distinctive piles), dobbies (generally heavy geometric-patterned fabrics), prints (with printed rather than woven patterns on generally lighter-weight cotton or thermoplastic fabrics), vinyl-coated fabrics, and flocked fabrics. Table 1 compares information obtained from the three historical surveys on types of fabrics used. Compared to the findings of the earlier surveys, the 1995 survey shows greater use of jacquards, dobbies, and thermoplastic prints and less use of velvets and flocked fabrics.

Table 1. Upholstery Fabric Types Used by Manufacturers Surveyed in 1981, 1984 & 1995 (Percent of Yardage Used)

Fabric Type	1981	1984	1995
Jacquards	14%	21%	28%
Velvets	32%	31%	17%
Cotton Prints	16%	17%	17%
Dobbies	9%	9%	16%
Thermoplastic Prints	3%	4%	13%
Vinyl Coated	3%	4%	5%
Flocks	11%	8%	4%
Other Fabric Types	13%	6%	*see note

Note: For 1984 and 1995 surveys, vinyl-coated fabrics were reported under "Fibers," rather than under "Fabric Type." For those years, the estimated percentages of vinyl-coated fabrics (in Table 2) have been subtracted from the totals for "Other Fabric Types." This resulted in a negative value for "Other Fabric Types" for 1995.

Fiber Type

Fiber (or material) Type refers to the fibers or materials used in the manufacture of the fabrics or upholstery. Most upholstery fabric fibers are classified as *cellulosic* (e.g. cotton and rayon) or *thermoplastic* (e.g., polyester, polyolefin, and nylon); other materials used to make upholstery include vinyl (which is coated on a base fabric), wool, and leather. Table 2 summarizes information from the three surveys on the primary fiber types or materials of upholstery covers. The most notable change is the increase in use of wool or leather at the expense of both cellulosic and thermoplastic fibers. Information from articles in the trade press confirms that leather has been increasing in use, and it is likely that most of the increase seen in the category is attributable to greater use of leather. There also reportedly has been an increase in the use of leather on furniture imported from Italy and other countries. Therefore, the importance of leather as an upholstery material may be even greater than indicated by the findings of the 1995 survey. Test data show that leather and wool generally resist ignition from cigarettes.

**Table 2. Primary Fiber or Material of Upholstery Fabrics/Covers
Used by Manufacturers Surveyed in 1981, 1984 & 1995
(Percent of Yardage Used)**

Fiber Type	1981	1984	1995
Cellulosic	36%	35%	31%
Thermoplastic	55%	57%	51%
Wool or Leather*	1%	1%	10%
Vinyl-Coated	4%	4%	5%
Other Fiber Types	3%	3%	2%

* Leather was not grouped with wool in 1981 and 1984 surveys.

Fabrics made from predominantly cellulosic fibers (the first fiber type shown in Table 2) include heavier-weight fabrics, such as many jacquards and velvets, and lighter-weight fabrics (mainly cotton prints). The share of heavier-weight cellulosic fabrics may be approximated by subtracting the percentage of fabrics that were cotton prints (from Table 1). This leads to an estimate of heavier cellulosic fabrics comprising about 19 percent of fabric yardage in 1981 and about the same, 18 percent, in 1984 (estimates

have been rounded). The approximation of heavier-weight cellulosic fabrics' share from 1995 survey data is about 14 percent, suggesting a decline in use of these fabrics, which generally show less resistance to cigarette ignition. However, discrepancies in answers of three respondents may have led to an underestimation of the weighted average share of heavier cellulosic fabrics. Analysis of responses without contradictory responses shows the average share of heavier cellulosic fabrics to be about 17 percent for 1995.

Establishments with lower annual sales are more likely to use cellulosic fabrics. In the 1995 survey, 15 establishments with under \$5 million in annual shipments provided answers to questions on fabric fibers. The average response was that 45 percent of fabric yardage was made of primarily cellulosic fibers. The average cellulosic fabric yardage share for 47 establishments with more than \$20 million in annual sales was 27 percent. Smaller establishments also show higher percent use of *heavier* cellulose: those with under \$5 million and \$5 to \$20 million in annual sales averaged 20 percent, whereas the average for establishments with over \$20 million in sales was 14 percent. These data generally suggest that smaller establishments were more likely to use fabrics with higher propensities to ignite from cigarettes.

Overall, there is no evidence of increased use of fabrics that are more likely to ignite from burning cigarettes since the middle 1980's. The data indicate, however, that the significant shift to greater use of thermoplastic fabrics that began in the 1950's, and was most pronounced in the 1970's, has probably peaked.

Fabric Class

Fabric class refers to the results of UFAC's Fabric Classification Test, which involves placement of a burning cigarette in the crevice of a vertical and horizontal surface to test each fabric over a standard urethane foam substrate. Fabrics are classified as *Class I* or *Class II*, depending on the length of the vertical char from the Fabric Classification Test results. Class I fabrics generally are more resistant to cigarette ignition, and result in a vertical char of less than 1¾ inches. Most fabrics made from predominantly thermoplastic or wool fibers, leather upholstery, and vinyl-coated fabrics are Class I. Most fabrics made from predominantly cellulosic fibers, especially heavier fabrics, are Class II. The UFAC program requires the use of an acceptable barrier material, usually polyester fiberfill, between Class II fabrics and standard polyurethane foam.

Weighted average responses from the 1995 survey show that 82 percent of the fabric yardage was Class I and 18 percent was Class II. These weighted data can be interpreted as the percent of upholstered furniture pieces made with Class I and Class II upholstery fabrics. They show an increase in use of Class I fabrics from levels found in the 1981 (75 percent) and 1984 (about 72 percent) surveys.

The earlier surveys found that use of Class I fabrics generally was positively correlated with firm size. This relationship was not found in the 1995 survey; Class I fabrics comprised about the same percentage of fabrics used by small establishments as was reported for those with greater dollar volume shipments.

SURVEY RESULTS: Filling Materials

This section presents information on filling materials used by UFAC program participants in the years covered by CPSC-sponsored surveys. Ignition resistance of finished items depends not only on fabric type, but also on the types and proportions of filling materials in use. Findings regarding seat cushions, backs, and inside arms are shown in Tables 3, 4, and 5, respectively.

Table 3 shows a continuation of a trend towards the use of polyester fiberfill as the filling material in contact with upholstery fabric in seat cushions. Polyester in seat cushions typically is applied to the top and bottom of a polyurethane foam core, or it is completely wrapped around the foam core. This construction results in a softer, more rounded seat cushion. Tests have shown that polyester filling materials generally result in a finished item with greater resistance to cigarette ignition than if polyurethane foam is used in contact with the fabric. A significant shift towards use of polyester fiberfill over polyurethane foam occurred in the late 1970's.

Table 3. Filling Materials Used in Seat Cushions by Manufacturers Surveyed in 1981, 1984 & 1995 (Percent of Units)

Seat Filling Materials	1981	1984	1995
Polyester Fiberfill over Urethane	67%	69%	76%
Urethane Foam Only	28%	26%	17%
Other Materials	6%	4%	6%

Table 4 shows survey results for filling material use in loose and tight furniture back cushions. As with seat cushions, polyester fiberfill wrapped over a polyurethane core is the most common filling material in contact with upholstery fabric for furniture backs. The 1995 survey results show that this material is used in about two-thirds of the back cushions manufactured by UFAC participants. About 18 percent of back cushion filling materials were said to be "other materials," without specification.



Table 4. Filling Materials Used in Furniture Backs by Manufacturers Surveyed in 1981, 1984 & 1995 (Percent of Units)

Back Filling Materials	1981	1984	1995
Polyester Fiberfill*	58%	64%	67%
Urethane Foam Only	31%	25%	13%
FR-Cotton Batting**	5%	6%	N/A
Other Materials	7%	6%	18%

* Most polyester fiberfill was used as a topper or wrap over polyurethane foam.

** "FR" means chemically-treated with a flame-retardant.

Note: some FR-cotton batting might be reflected in "Other Materials" for the 1995 survey.

Table 5 shows filling material use in inside arms. Much greater use of polyester fiberfill as filling materials in inside arms of upholstered furniture was found in the 1995 survey (43 percent) than in 1981 and 1984 (20 and 19 percent, respectively).

Table 5. Filling Materials Used in Inside Arms by Manufacturers Surveyed in 1981, 1984 & 1995 (Percent of Units)

Inside Arm Filling Materials	1981	1984	1995
Polyester Fiberfill	20%	19%	43%
Urethane Foam	30%	34%	28%
FR-Cotton Batting	38%	34%	17%
Polyester/Cotton Blend Batting	unknown	10%	8%
Untreated Cotton Batting	<1%	2%	1%
Other Materials*	12%	<1%	3%

* Much of the "Other Materials" in 1981 may have been batting made from polyester/cotton blends, which was not given as a choice on the survey form.

SURVEY RESULTS: Welt Cord, Interior Fabrics, and Dust Covers

Three other components of upholstered furniture are factors in the risk of fire from cigarettes or small open flames. Following is a brief report on the survey results with regard to welt cord, interior fabrics, and dust covers.

Welt Cord

Based on the 1995 survey, an estimated 37 percent of seat cushions have box-edged welt, about 18 percent have knife-edged welt, and about 45 percent have no welt. Since box-edged welt is around the top of the cushion, a cigarette may be more likely to come to rest against it than is the case with knife-edged welt, which is around the middle of the cushion. The 1984 survey showed that about 43 percent of seat cushions had box-edged welt cord, about 27 percent had knife-edged welt cord, and 31 percent were made without welt cord. In the early 1980's UFAC officials estimated that 75 percent of furniture seat cushions contained welt cord; their judgment was that most of this was box-edged welt cord. Although welt cord usage and styles may change from year-to-year as styles dictate, the recent survey shows a continuation of the trend away from welt-cord use, and from the box-edged style specifically.

Weighted data from UFAC participants show that about 98 percent of welt cords used in seat cushions complies with the UFAC Welt Cord Test Method (*i.e.*, conducts heat away from the burning cigarette). This is similar to findings of the 1984 survey. UFAC participants also reported that complying welt cord also nearly always was used in other parts of the furniture item. One substantial difference in furniture construction between establishments that participate in the UFAC Program and those that do not (and statistically significant at the 95 percent confidence level) concerns type of welt cord used. The mean response of UFAC participants (not weighted by measures of sales volume or unit shipments) was that 93 percent of welt cords used in seat cushions complied with the UFAC Welt Cord Test Method (and are assumed to be heat-conducting welt cords). Of the non-UFAC establishments that gave estimates of the percentage of their welt cords that were the heat-conducting type, the mean was 51 percent (also not weighted to account for differences in sales).

Interior Fabrics

The 1995 survey found that about one-third of the seat cushions, loose arm cushions, and loose and tight back cushions produced by UFAC establishments included a layer of interior fabrics. Interior fabrics were used in about 12 percent of inside arms and about 20 percent of the inside backs of loose-back cushion constructions. All but two respondents said that 100 percent of the interior fabrics used were in compliance with the UFAC Interior Fabric Test Method.

UFAC participants with under \$5 million in sales were more likely to use interior fabrics. The average response for these establishments was that about 50 percent of seat, back, and loose arm cushions were made with interior fabrics. The average for the establishments with over \$20 million in sales was about 30 percent for these locations.

Dust Covers

The 1995 survey asked Ufac Program participants to estimate the percentage of their furniture pieces that had 100 percent thermoplastic (woven or nonwoven) dust covers, cellulosic or cellulosic/thermoplastic blend dust covers, and no dust covers. Ufac participant responses showed that 72 percent of furniture items had thermoplastic dust covers, about 11 percent had cellulosic or blended fabrics as dust covers, and about 17 percent were made without dust covers. The types of products made without dust covers is not provided by the survey data. However, since reclining chairs and convertible furniture such as sofa beds typically are made without dust covers, most of the upholstered furniture made by Ufac participants without dust covers probably are such items.

Dust cover use varied slightly by establishment sales volume. Larger establishments were somewhat more likely to estimate a higher percentage of items without dust covers. Smaller establishments were more likely to use cellulosic and blended dust covers. The average use of thermoplastic dust covers was about the same for all three sales volume categories, ranging from 70 to 74 percent.

Dust cover use was another of the few areas where a statistically significant difference was found in the responses of Ufac and non-Ufac establishments. Without weighting responses by measures of unit shipments or sales volumes, Ufac participants were more likely to manufacture items without dust covers (mean of about 13 percent vs. about 2 percent for non-Ufac establishments). This difference was statistically significant at the 95 percent confidence level. This might reflect higher proportions of reclining chairs and sofa beds among total units produced by Ufac participants that responded to the survey.

DISCUSSION AND SUMMARY OF RESULTS

The findings of the 1995 surveys of upholstered furniture manufacturing establishments, along with those of previous surveys conducted for the CPSC and the furniture industry, enable some judgments to be made concerning the Ufac Program and characteristics of furniture that has been manufactured in recent years. Regarding industry participation in the Ufac Program, there is no evidence that support for the program has eroded significantly since the middle 1980's; available information indicates

that 90 percent or more of the dollar volume of upholstered furniture is produced by firms that participate in the UFAC Program. Compared to information on fabrics and filling materials used by UFAC participants in previous surveys, the 1995 survey shows increased use of materials generally found to result in items with greater resistance to ignition from cigarettes: non-cellulosic fabrics and polyester fiberfill filling materials. There has been a continuing trend towards greater use of polyester fiberfill (shown to be among the more cigarette ignition-resistant filling materials) in contact with fabrics in seats, backs, and inside arms of upholstered furniture, at the expense of urethane foam and other filling materials. However, among manufacturers surveyed in 1995, smaller establishments were more likely to use fabrics with higher propensities to ignite from cigarettes, heavy weight cellulosic fabrics.

The trend away from welt-cord use in seat cushions observed in prior surveys has continued. Interior fabrics were used in about one-third of seat, back, and loose arm cushions (and somewhat less in other areas). Nearly all of the welt cords and interior fabrics used by UFAC participants were said to be in conformance with the Program's applicable component tests. With the presumed exception of items such as reclining chairs and convertible sofas, nearly all upholstered furniture were made with dust covers; woven or nonwoven thermoplastic fabrics were most commonly used.

The sample of non-UFAC establishments was not found to be using fabrics and filling materials significantly different from those used by the UFAC participants surveyed. Two areas in which components used to make furniture by non-UFAC establishments surveyed in 1995 were found to have statistically significant differences from those used by UFAC participants were welt cords (less use of heat-conducting welt cords in seat cushions) and dust covers (less likely to make furniture without dust covers, although this might reflect higher proportions of reclining chairs and sofa beds among total units produced by UFAC participants that responded to the survey). Compared to the previous survey of non-UFAC establishments, greater use of a generally more cigarette ignition-resistant filling material, polyester fiberfill, was found.

Findings on fabrics and filling materials used in the manufacture of furniture will be used in the evaluation of data from ignition testing of furniture items done by the CPSC's engineering laboratory. Based on previous information on the ignition propensities of fabrics and filling materials, it appears that, on balance, changes in fabrics and filling materials used since the 1980's could be expected to result in furniture having somewhat greater resistance to ignition from cigarettes.