Secondary Liners

4935 • 4986 • 4988 • 4994 • 4996 • 4997 • 4998 4999 • 5002 • 5002D • 5051 • 5053 • 5932

Technical Data **February 2020**

Product Description

3M™ Secondary Liners are available in a variety of constructions ranging from silicone coated densified kraft, polycoated paper and polyester liners to non-silicone polyester liners. Some liners are available either silicone coated one side or both sides depending on the requirements of the application.

Construction

Product Number	Material / Color	Thickness (mils) (tolerance)	Release coating one or two sides	Printable
3M™ Secondary Liner 4935	Polyester / clear	2.91 (2.65 - 3.16)	1 (fluoropolymer, non-silicone)	No, not as is
3M™ Secondary Liner 4986	High density polyethylene	3.0 (2.5 - 3.5)	1	No
3M™ Secondary Liner 4988	85# Polycoated / Kraft	6.4 (6.05 - 6.75)	1	Yes
3M™ Secondary Liner 4994	55# Densified Kraft	3.2 (3.05 - 3.35)	2 (Outside = low, Inside = medium)	No
3M™ Secondary Liner 4996	Polyester / clear	1.4 (1.31 - 1.49)	1	Yes
3M™ Secondary Liner 4997	70# Densified Kraft	4.0 (3.5 - 4.7)	1	No
3M™ Secondary Liner 4998	58# Polycoated / Kraft	4.2 (3.85 - 4.55)	2 (Matte = low, Gloss = medium)	No
3M™ Secondary Liner 4999	55# Densified Kraft	3.2 (3.05 - 3.35)	1	Yes
3M™ Secondary Liner 5002	Polyester / clear	1.97 (1.91 - 2.03)	1	No, not as is
3M™ Secondary Liner 5002D*	Polyester / clear	1.97 (1.91 - 2.03)	2 (Inside = low, Outside =	No
3M™ Secondary Liner 5051	58# Polycoated / Kraft	4.2 (3.85 - 4.55)	1	Yes
3M™ Secondary Liner 5053	Polyester / clear	2.91 (2.65 - 3.16)	1 (fluoropolymer, non-silicone)	No, not as is
3M™ Secondary Liner 5932	Polyester / clear	1.97 (1.91 - 2.03)	1 (fluoropolymer, non-silicone)	No, not as is

Always test liners by sticking a single coated tape to each side to determine low vs. medium release sides just in case material has been re-slit and sides have been reversed.

*Manufactured with tissue between the layers. Once slit to size, after two months the silicone on each surface will start to interact and release levels may be negatively affected. We recommend the liner be used within two months of being slit to width without tissue placed between the layers. Once liner is applied there is no problem as the two silicone layers are no longer in contact with each other.

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Chart is for reference purposes only, testing with actual materials to be used is strongly recommended

3M™ Secondary Release Liners

Version 3.07		Liner #	4994 (outside)		4994 (inside)		4999		4997		4998 (outside)		4998 (inside)		5051	
		Liner Description	55# Densified Kraft (C2S) (Easy Side)		55# Densified Kraft (C2S) (Tight Side)		55# Densified Kraft (C1S)		70# Flatstock (C1S)		58# Polycoated Kraft (C2S)		58# Polycoated Kraft (C2S)		58# Polycoated Kraft (C1S)	
		Liner Thickness	3.2 mil (0.08 mm)		3.2 mil (0.08 mm)		3.2 mil (0.08 mm)		4.0 mil (0.10 mm)		4.2 mil (0.11 mm)		4.2 mil (0.11 mm)		4.2 mil (0.11 mm)	
Product Number	Adh. Thk. (mils)	Adh. #	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET
965	2	100	4	14	10	20	7	23	7	34	7	ATTL	8	14	5	20
966	2	100	4	7	14	28	9	20	7	11	8	7	8	6	4	9
9461P	1	100	3	7	6	24	5	24	5	7	4	6	4	4	2	9
9462P	2	100	4	8	11	53	10	ATTL	6	11	8	8	8	5	4	10
9082 / 9082UV	2	100HT	4	8	12	22	10	19	9	17	10	13	13	11	6	13
9085 / 9085UV	5	100HT	8	13	22	ATTL	18	ATTL	19	27	15	19	20	17	11	19
F9460PC	2	100MP VHB	4	6	10	25	9	25	9	14	7	8	9	6	5	8
F9473PC	10	100MP VHB	13	15	29	37	17	23	24	35	22	20	20	13	12	18
467MP	2	200MP	4	5	10	19	11	25	9	15	9	9	10	8	5	9
468MP	5	200MP	8	8	18	18	14	16	19	22	14	12	16	11	9	12
9502	2	220	5	6	13	23	10	21	10	15	8	8	11	8	6	9
9505	5	220	7	7	22	31	17	30	20	28	13	13	16	10	9	11
9471/927	2	300	4	6	17	19	11	15	10	12	8	9	15	12	7	9
9472/950	5	300	25	13	15	23	24	20	18	20	22	20	25	19	12	14
9458	1	300	8	9	4	12	8	9	9	9	8	10	11	11	6	7
9472LE	5	300LSE	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	28	37	50	30	20	26
6035PC	5	300MP	12	19	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	24	23	26	27	14	20
9772WL	2	300MP	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	16	16	21	11	ATTL	ATTL	9	11
9775WL	5	300MP	9	18	21	ATTL	23	ATTL	19	ATTL	9	15	13	13	9	13
9828HL	4 DC	340	5	11	17	19	12	19	12	17	15	10	14	11	8	12
9442	2	350	ND	9	8	ATTL	3	6	6	17	6	8	8	8	11	7
9485EK	5	350	12	16	20	45	12	14	20	30	41	18	23	26	20	17
9626	2	360	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL
9629	4 DC	360	14	20	28	59	30	44	27	30	14	10	22	14	12	13
9088	8.3 DC	375	12	21	68	ATTL	61	ATTL	30	38	18	20	33	20	16	24
9088FL	8.3 DC	375	16	24	39	77	38	101	36	44	22	22	26	19	16	21
9457	1	400	3	5	9	19	8	14	6	9	5	6	7	7	4	5
F9755PC	5	420	23	ATTL	ATTL	ATTL	ATTL	ATTL	67	69	14	21	22	21	12	27
9497	2	430	1	3	4	12	3	5	4	5	5	8	6	4	3	6
9851	3.5 DC	900R	21	14	25	20	27	19	19	19	19	18	13	15	11	13
F9465PC	5	Plasticizer Resistant	8	7	19	12	21	12	21	15	16	13	21	12	10	8
91022	2	Silicone	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL
55510DK	5	Specialty	10	16	13	25	12	26	13	22	9	11	13	14	5	11
3M VHB Tapes																
4611	45	VHB G-P	9	8	17	12	14	9	26	17	35	20	19	17	14	8
4941	45	VHB M-P	6	11	13	18	13	18	17	29	17	32	15	16	7	13
4950	45	VHB G-P	7	11	21	42	24	31	22	22	18	13	ND	ND	5	5
5925	25	VHB Modified	6	9	10	18	9	17	15	23	14	26	21	34	6	11
5952	45	VHB Modified	10	10	4	20	8	27	13	28	18	41	8	15	5	13
4951	45	VHB Low Temp Apply	6	10	13	25	12	18	17	21	16	22	14	13	9	11
4952	45	VHB LSE	4	5	9	41	7	12	10	11	13	19	11	13	5	8
RP45	45	VHB RP M-P	6	10	18	27	13	24	16	25	11	18	17	10	7	15

Liner release test is 3M TM 1717 or FINAT #FTM4 90 inches/minute rate of peel

DC = Double coated tape product with polyester or tissue carrier
3DRT = Three days at room temperature
3DET = Three days at elevated temperature
(158°F) C1S = release coated one side
C2S = release coated two sides

Liner release values are typically between 0 and 12 grams/inch. When adding a liner for selectively die cutting, 5 - 12 grams liner release is preferred. Testing under all actual application conditions is strongly recommended. Liner release values are typically between 12 and 50 grams/inch. When adding a liner after first laminating the adhesive to a substrate and removing the primary liner, 12 - 50 grams liner release is preferred.

Liner release values increase over 100% with heat (USE WITH CAUTION)

Liner release values are over 50 grams/inch or liner confusion occurs (NOT RECOMMENDED) Adhesive Transferred to Secondary Liner / Liner confusion (NOT RECOMMENDED)

ATTL

ND No Data, Testing in process

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4988		4996		5002		5002D (outside)		5002D (inside)		4935		5932		4986	
83# Polycoated Kraft (C1S)		1.4 mil Polyester Film (C1S)		1.97 mil Polyester Film (C1S)		1.97 mil Polyester Film (C2S) (Tight Side)		1.97 mil Polyester Film (C2S) (Easy Side)		2.9 mil Polyester Silicone free (C1S)		2.0 mil Polyester Silicone free (C1S)		3.0 mil HDPE Film, Clear (C1S)	
6.4 mil (0.16 mm)		1.4 mil (0.04 mm)		1.97 mil (0.05 mm)		1.97 mil (0.05 mm)		1.97 mil (0.05 mm)		2.9 mil (0.07 mm)		1.97 mil (0.05 mm)		3.0 mil (0.07)	
3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET	3DRT	3DET
18	21	3	17	12	17	10	17	9	16	6	7	5	5	9	20
19	11	3	7	10	10	9	9	8	7	5	6	4	4	9	9
9	8	3	4	7	8	5	6	5	5	3	6	2	5	6	7
16	13	4	6	10	ATTL	9	10	8	9	5	6	3	4	9	9
28	23	ND	ND	ATTL	ATTL	ATTL	ATTL	12	13	9	8	7	6	12	15
ATTL	ATTL	24	29	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	12	11	8	10	18	12
18	12	4	5	10	13	8	9	8	8	5	4	4	3	9	10
66	34	7	9	18	19	25	23	16	15	8	7	5	5	21	21
19	13	ND	ND	10	13	10	9	9	6	6	5	5	5	11	12
33	20	ND	ND	14	14	14	14	12	11	7	5	5	4	15	17
20	14	4	6	12	12	10	9	9	8	6	4	5	4	11	11
32	20	6	7	15	15	14	13	12	12	7	5	5	5	14	16
ATTL	ATTL	13	23	10	18	ATTL	ATTL	ATTL	ATTL	9	ATTL	6	9	15	ATTL
87	79	12	20	36	32	79	66	81	61	26	24	19	20	33	45
ATTL	ATTL	7	16	7	ATTL	ATTL	ATTL	ATTL	ATTL	15	20	10	13	10	ATTL
79	90	10	15	ATTL	ATTL	ATTL	ATTL	23	22	25	26	18	18	33	39
60	54	12	ATTL	ATTL	ATTL	20	21	17	20	14	17	10	10	34	29
53	ATTL	17	19	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	8	9	11	6	10	14
ATTL	ATTL	9	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	30	41	20	31	19	ATTL
35	20	ND	ND	7	10	12	12	11	13	8	8	6	7	13	12
5	ATTL	ATTL	ATTL	6	ATTL	ATTL	ATTL	ATTL	ATTL	5	5	5	5	11	11
47	39	9	11	31	38	57	64	55	51	20	18	16	16	14	23
ATTL	ATTL	ND	ND	ATTL	ATTL	ATTL	ATTL	16	14	11	12	12	9	21	ATTL
49	28	ND	ND	25	22	21	20	16	15	11	11	9	9	21	22
96	59	ND	ND	42	49	44	47	31	29	30	21	11	13	25	27
93	92	ND	ND	28	34	25	27	19	23	15	16	10	11	27	27
ATTL	ATTL	ND	ND	ATTL	ATTL	ATTL	ATTL	8	8	6	10	6	6	8	16
51	44	ND	ND	27	ATTL	26	28	19	21	11	12	7	9	19	30
11	11	6	14	12	18	22	20	14	11	3	4	3	9	5	8
36	24	ND	ND	4	20	16	25	15	23	8	23	5	16	17	15
ATTL	ATTL	ND	ND	ATTL	ATTL	21	13	15	10	15	10	10	9	17	16
ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	ATTL	8	13	4	6	ATTL	ATTL
28	26	5	8	10	12	ATTL	ATTL	14	ATTL	6	7	3	6	14	15
3M VHB Tapes															
81	57	7	7	15	21	16	19	19	24	5	5	4	5	15	18
47	60	ND	ND	8	11	15	16	16	20	8	9	5	5	12	16
42	68	ND	ND	8	8	11	12	11	13	5	9	3	5	18	18
54	67	8	10	15	24	20	33	32	25	5	15	4	8	15	19
85	76	ND	ND	7	11	13	16	12	18	4	9	3	7	16	10
38	40	ND	ND	15	14	16	17	18	17	15	8	5	8	14	15
42	38	ND	ND	8	19	10	13	11	16	5	6	3	4	10	11
43	31	ND	ND	6	9	14	19	13	19	8	6	6	6	11	14

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Available Sizes

3M™ Secondary Liner	Minimum Width (inches)	Maximum Width (inches)	Standard Length (yards)
4935	3.0	13	360
4986	3.0	50	360
4988	3.0	50	360
4994	1.0	54	180
4996	3.0	54	360
4997	3.0	48	360
4998	3.0	50	360
4999	3.0	54	360
5002	3.0	60	360
5002D	3.0	60	360
5051	3.0	48	360
5053	3.0	13	360
5932	3.0	13	360

Fluoropolymer Liners

Liners 4935, 5053 and 5932 utilize a proprietary 3M fluoropolymer. Fluropolymer (non-silicone) release liners generally offer lower liner release than silicone based release coatings and are typically utilized in industries where silicone can affect other processes. 5932 generally offers the tightest liner release, 4935 offers a medium liner release level and 5053 offers the lowest liner release and is typically utilized with silicone based adhesives.

Typical Physical Properties and Performance Characteristics

Note: The following technical information and data should be considered representative or typical only and should not be used for specification purposes.

When a 3M secondary liner is added to a pressure sensitive adhesive, in most cases the secondary liner will have lower liner release values than the original or primary liner. The chart on the preceding pages is for reference purposes only to provide some degree of information about the liner release values which may be expected when a given secondary liner is laminated to a selected adhesive family.

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Application Techniques

It is necessary to provide pressure during lamination (1.5-20 psi suggested) to allow the adhesive to come into direct contact with the liner. Using a hard-edged plastic tool or roller, which is the full width of the laminated tape or part, helps to provide the necessary pressure at the point of lamination.

The ideal adhesive application temperature range is 60°F (15°C) to 100°F (38°C). Application is not recommended if the surface and ambient temperature is below 50°F (10°C) because the adhesive becomes too firm to adhere readily. Once properly applied, at the recommended application temperature, low temperature holding is generally satisfactory.

See technical bulletin Guide to Converting 3M™ Laminating Adhesive 300LSE (70-0707-6205-2) for additional information on die cutting double linered laminating adhesive 300LSE products

Application Equipment

Wide web lamination; to apply liners and adhesives in a wide web format, lamination equipment is required to ensure acceptable quality. To learn more about working with pressure-sensitive adhesives, please refer to technical bulletin, Lamination Techniques for Converters of Laminating Adhesives (70-0704-1430-8).

For assistance in helping you determine the best dispenser for your application, contact your local 3M sales representative, or the toll free 3M sales assistance number at 1-800-362-3550.

Certification/ Recognition

TSCA: These products are defined as articles under the Toxic Substances Control Act and therefore, are exempt from inventory listing requirements.

MSDS: These products are not subject to the MSDS requirements of the Occupational Safety and Health Administration's Hazard Communication Standard, 29 C.F.R. 1910.1200(b)(6)(v). When used under reasonable conditions or in accordance with the 3M directions for use, the products should not present a health and safety hazard. However, use or processing of the products in a manner not in accordance with the directions for use may affect their performance and present potential health and safety hazards.

Technical Information

The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

Product Use

Many factors beyond 3M's control and uniquely within user's knowledge and control can affect the use and performance of a 3M product in a particular application. Given the variety of factors that can affect the use and performance of a 3M product, user is solely responsible for evaluating the 3M product and determining whether it is fit for a particular purpose and suitable for user's method of application.

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ISO 9001

This Industrial Adhesives and Tapes Division product was manufactured under a 3M quality system registered to ISO 9001 standards.

3M

Industrial Adhesives and Tapes Division
Converter Markets

3M Center, Building 225-3S-06
St. Paul, MN 55144-1000
800-223-7427 • 651-778-4244 (fax)
www.3M.com/converter

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