

## PRODUCT INFORMATION

# THE UL YELLOW CARD

The UL Yellow Card displays the key information for UL Recognized materials, based on testing according to UL Standards. The following tables show this information

for NOMEX® brand paper and pressboard products when tested per the noted Standard. Areas in the tables with no data have not been tested.

### Type 410 UL Ratings

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
2	0.05		0	4	220	220	3	3
3	0.08		0	4	220	220	3	3
5	0.13	V-0	0	4	220	220	3	3
7	0.18	V-0	0	4	220	220	3	3
10	0.25	V-0	0		220	220	3	3
12	0.30	V-0	0		220	220	3	3
15	0.38	V-0	0	0	220	220	3	3
20	0.51	V-0	0	0	220	220	3	3
24	0.61	V-0	0	0	220	220	3	3
29	0.74	V-0	0	0	220	220	3	3
30	0.76	V-0	0	0	220	220	3	3

### Type 411 UL Ratings

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
5	0.13		0	4	220	220	1	3
7	0.18	V-0	0	4	220	220	1	3
10	0.25	V-0	0	4	220	220	1	3
15	0.38	V-0	0	0	220	220	1	3
23	0.58	V-0	0	0	220	220	1	3

**Type 414 UL Ratings**

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
3.4	0.09		0		220	220	3	3
7	0.18	V-0	0	0	220	220	3	3
10	0.25	V-0	0	0	220	220	3	3
12	0.30	V-0	0	0	220	220	3	3
15	0.38	V-0	0	0	220	220	3	3

**Type 418 UL Ratings**

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
3	0.08	V-0	4	4	220	220	3	3
5	0.13	V-0	4	4	220	220	3	3
8	0.20	V-0	4	4	220	220	3	3
10	0.25	V-0	4	4	220	220	3	3
14	0.36	V-0	4	4	220	220	3	3

**Type 419 UL Ratings**

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
7	0.18	V-0		3	220	220	2	
13	0.33	V-0	4	4	220	220	2	

**Type E56 UL Ratings**

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
5	0.13	VTM-0	0		220	220		3
7	0.18	V-0	0		220	220		3
10	0.25	V-0	0		220	220		3
12	0.30	V-0	0		220	220		3
15	0.38	V-0	0	3	220	220		3
20	0.51	V-0	0	3	220	220		3

**Type 992 UL Ratings**

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
63	1.6	V-0	1		220	220	3	3
125	3.2	V-0	0		220	220	3	3

## Type 993 UL Ratings

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
40	1.0	V-0	3		220	220	2	3
60	1.5	V-0			220	220	2	3
80	2.0	V-0			220	220	2	3
95	2.4	V-0			220	220	2	3
120	3.0	V-0	0		220	220	2	3
160	4.0	V-0	0		220	220	2	3

## Type 994 UL Ratings

ASTM D374 Thickness (mils)	ASTM D374 Thickness (mm)	UL 94 Flame Class	UL746A HWI Rating	UL746A HAI Rating	UL746B RTI Elec. Rating	UL746B RTI Mech. Rating	UL746A HVTR Rating	UL746A CTI Rating
40	1.0	V-0			220	220	2	3
60	1.5	V-0			220	220	2	3
80	2.0	V-0	1		220	220	2	3
120	3.0	V-0	1		220	220	2	3
125	3.2	V-0	1		220	220	2	3
160	4.0	V-0	1		220	220	2	3
190	4.8	V-0	1		220	220	2	3
200	5.0	V-0	1		220	220	2	3
240	6.0	V-0	1		220	220	2	3
250	6.4	V-0	1		220	220	2	3
275	7.0	V-0	1		220	220	2	3
315	8.0	V-0	1		220	220	2	3
380	9.6	V-0	1		220	220	2	3

### UL 94 Flame Class – UL94 Flammability Classification

UL94 refers to the testing methods used to rate different plastics according to the ease of extinguishment after the ignition flame has been removed. Materials are classified as 94V-0, 94V-1, 94V-2, 94VTM-0, 94VTM-1, 94VTM-2, 94HF-1, 94HF-2, 94HBF, 94HB, 94-5VA, and 94-5VB.

### RTI Elec – Relative Temperature Index, Electrical Properties

Shows the hot spot temperature in °C at which after 100,000 hours (11.4 years) the most sensitive electrical property drops to 50% of its initial value.

### RTI Mech – Relative Temperature Index, Mechanical Properties Without Impact

Shows the hot spot temperature in °C at which after 100,000 hours (11.4 years) the most sensitive non-impact related mechanical property drops to 50% of its initial value.

### HWI – Hot Wire Ignition

Judges the ease of ignition of a material in contact with a heat source (not an open flame). Performance is expressed as the mean number of seconds needed either to ignite the standard specimens or to burn through the specimens without ignition.

Mean Ignition Time (IT in sec)	Rating
120 IT	0
60 IT < 120	1
30 IT < 60	2
15 IT < 30	3
7 IT < 15	4
0 IT < 7	5

## HAI – High Amperage Arc Ignition

This test simulates the situation when an arc occurs between two electrodes under low voltage but a high current. Performance is expressed as the number of arc rupture exposures which are necessary to ignite the material when they are applied at a standard rate, either on the surface of the material or at a specified distance from it.

Mean Number of Arcs to Cause Ignition (NA)	Rating
120 NA	0
60 NA < 120	1
30 NA < 60	2
15 NA < 30	3
0 NA < 15	4

## HVTR – High Voltage Arc Tracking Rate

This test is designed to determine the ability of a material to withstand repeated high-voltage low-current arcing at its surface without forming a conductive path. Performance is expressed as the rate (mm/minute) at which a tracking path can be produced on the surface of the material under standardized test conditions.

Tracking Rate (TR in mm/min.)	Rating
0 < TR 10	0
10 < TR 25.4	1
25.4 < TR 80	2
80 < TR 150	3
150 < TR	4

## CTI – Comparative Tracking Index

This test simulates the case when a current develops due to surface contamination of the plastic insulators in between two conductors. Performance is expressed as that voltage which causes tracking on a material after 50 drops of 0.1% ammonium chloride solution have fallen.

Tracking Index (TI in volts)	Rating
600 TI	0
400 TI < 600	1
250 TI < 400	2
175 TI < 250	3
100 TI < 175	4
0 TI < 100	5

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### Product safety information is available upon request.

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