Parylene Physical/ Mechanical Properties

Properties (1)	Method	Parylene N (2)	Parylene C	Parylene D	Epoxides (3)	Silicones (3)	Urethanes (3)
- Secant (Young's) Modulus (psi)	1	350,000	400,000	380,000	350,000	900	1,000-10,000
- Tensile Strength (psi)	2	6,000-11,000	10,000	11,000	4,000-13,000	800-1,000	175-10,000
- Yield Strength (psi)	2	6,100	8,000	9,000	-	-	-
- Elongation to Break (%)	2	20-250	200	10	3-6	100	100-1,000
- Yield - Elongation (%)	2	2.5	2.9	3.0	-	-	-
- Density (g/cm^3)	3	1.10-1.12	1.289	1.418	1.11-1.40	1.05-1.23	1.10-2.50
- Index of Refraction (n_D^{23})	4	1.661	1.639	1.669	1.55-1.61	1.43	1.50-1.60
- Water Absorption (% after 24 hrs)	5	Less than 0.1			0.08-0.15	0.12 (7 days)	0.02-1.50
- Rockwell Hardness	6	R85	R80	R80	M80-M110	40-45 (Shore A)	10A-25D (Shore)
- Coefficient of Friction Static Dynamic	7	0.25 0.25	0.29 0.29	0.33 0.31	-	-	-

Test Methods:
1. ASTM D 882 at 1% strain
2. ASTM D 882 at 10% strain, min.
3. ASTM D 1505
4. Abbe Refractometer
5. ASTM D 570
6. ASTM D 785
7. ASTM D 1894

(1) Properties measured on Parylene films, 0.001-0.003 in thick except where specified.
(2) Properties depend somewhat on deposition conditions.
(3) Properties and methods as reported in *Modern Plastics Encyclopedia*, issue for 1968, Vol. 45/No. 1A, McGraw Hill, New York, 1967. Modulus values are for tensile modulus.

(International Conversion Chart, Page 12)

Barrier and Chemical Properties

Gas Permeability at 25 °C, (cm³ (STP)·mil)/(100 in²/d·atm)*

Polymer	N_2	O_2	CO_2	H_2	Moisture Vapor Transmission at 90% RH, 37 °C, (g·mil/100 in²·d)**
Parylene N	7.7	39	214	540	1.5
Parylene C	1.0	7.2	7.7	110	0.21
Parylene D	4.5	32	13(a)	240	0.25
Epoxides	4	5-10	8	110	1.79-2.38(a)
Silicones	-	50,000	300,000	45,000	4.4 - 7.9(a)
Urethanes	80	200	3,000	-	2.4 - 8.7(a)

(a) Lacari, J.J. and Brands, E.R., *Machine Design*, May 25, 1967, p. 192.
* ASTM D 1434
** ASTM E 96

(International Conversion Chart, Page 12)

Thermal Properties

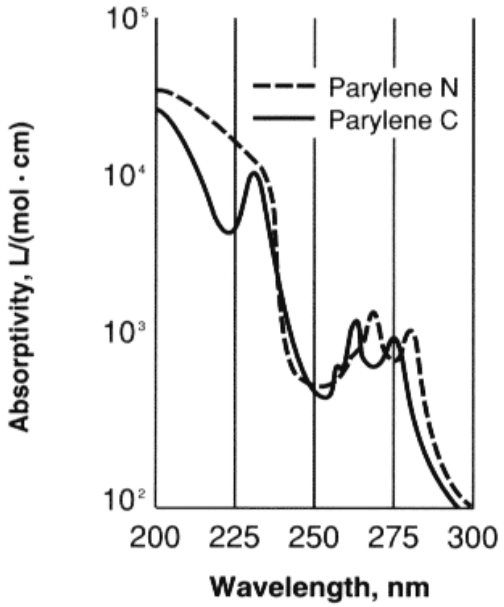
Properties	Method	Parylene N	Parylene C	Parylene D	Epoxides (1)	Silicones (1)	Urethanes (1)
Melting Point (°C)	1	420	290	380	cured	cured	~170
T5 Point (°C) (modulus = (10^5 psi)	1	160	125	125	110	~125	~30
T4 Point (°C) (modulus = (10^4 psi)	1	>300	240	240	120	~80	0
Linear Coef. of Expan. at 25 °C ($x10^5$, $(°C)^{-1}$)	-	6.9	3.5	3-8	4.5-6.5	25-30	10-20
Thermal Conductivity at 25 °C (10^{-4} cal/(cm·s· °C))	2	3.0	2.0	-	4-5	3.5-7.5	5.0
Specific Heat at 20 °C (cal/g· °C)	-	0.20	0.17	-	0.25	-	0.42

Test Methods: 1. Taken from Secant modulus-temperature curve
2. ASTM C 177

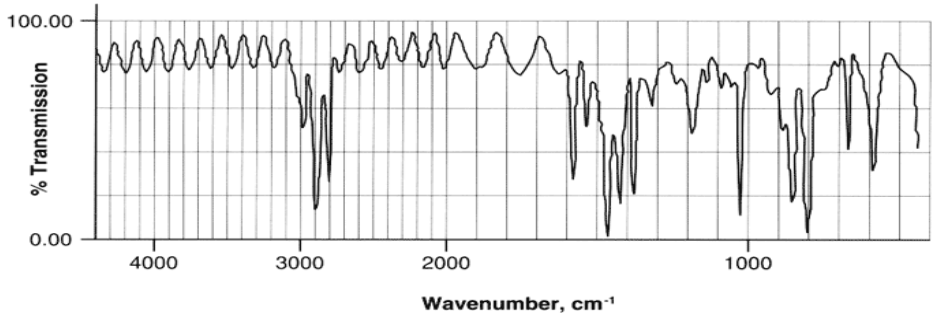
(1) Properties and methods as reported in *Modern Plastics Enclyclopedia*, issue for 1968, Vol. 45/No. 1A, McGraw Hill, New York, 1967.

(International Conversion Chart, Page 12)

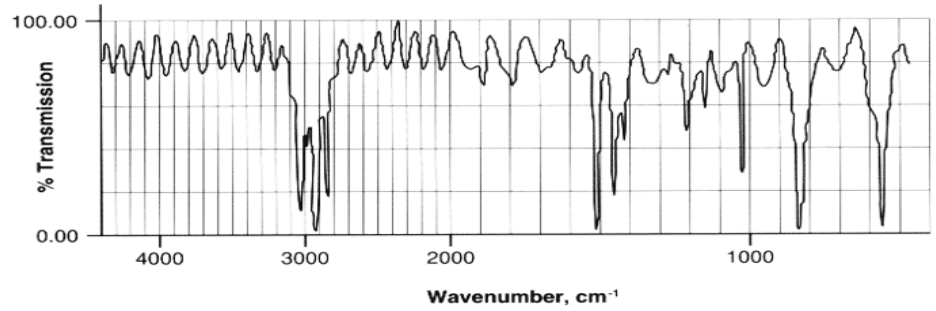
Absorption Spectra



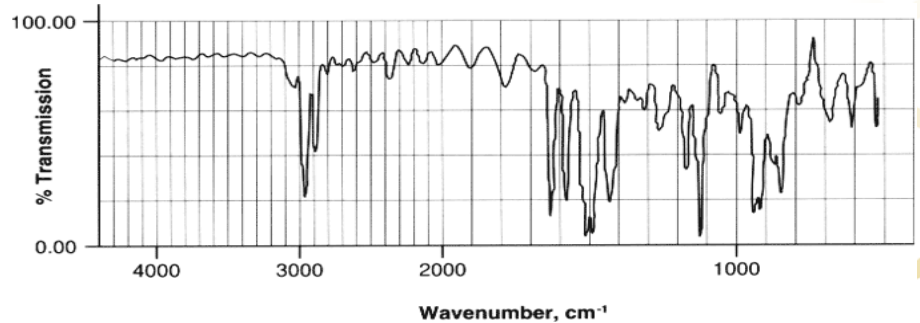
IR Transmission Parylene C



IR Transmission Parylene N



IR Transmission Parylene D



MRI