

Cross Reference Guide for Norplex-Micarta Grades to NEMA, ANSI/NEMA, ASTM Standards, IEC (International Electrotechnical Commission), Military and IPC Specification

NEMA LI 1-1998

NEMA LI 1-1998	Norplex-Micarta Laminated Sheet Grade	Norplex-Micarta Rolled Tube Grade	Norplex-Micarta Molded Rod Grade
C	GSC ¹ , NP310, NP310HT, NP342	RT310, RT310H, RT310S, RT342	RM310
CE	GSCE ¹ , NP310E	--	RM310E
FR-4	GSFR4 ¹ , GSFR4A ¹ , NP130, NP130HF, NP506A, NP510A, NP510WR ²	RT130, RT130M, RT130X	RM130
FR-5	MC511FR ³ , NP513FR ⁴	--	--
G-3	NP504, NP515LS	RT504, RT504F	RM504
G-5	NP509	RT505, RT505F, RT504M	RM505
G-7	MC507U ⁵	RT507, RT507F	--
G-9	NP509	RT509, RT509F	--
G-10	NP500A	RT500, RT500F, RT500M, RT500X, RT511, RT511F, RT511H, RT511M, RT571	RM500A, RM511A
G-11	MC511A, MC511AF, NP511, NP511EM, NP519, NP572	--	--
L	NP320	--	RM320
LE	MC320LE, NP320E	RTB320, RTB320H, RTB320X, RTB320Z	RM320LE
N-1	NP101	--	--
X	NP610	RT610	--
XP	NP611, NP660	--	--
XPC	NP612, NP625	--	--
XX	NP629	RT628, RT628H, RT629	RM629
XXX	NP630 ⁶	RT630, RT630H	RM630

¹ Imported economy grade material, unable to provide test reports.

² NP510WR meets NEMA Grade FR-4 with exceptions to permittivity and warp and twist under 0.200".

³ MC511FR meets NEMA Grade FR-5 in thicknesses of 0.250" - 4.000".

⁴ NP513FR meets NEMA Grade FR-5 in thicknesses of 0.500" - 4.000".

⁵ MC507U meets NEMA Grade G-7 with exception to permittivity and dissipation factor

⁶ NP630 meets NEMA Grade XXX with exception to dielectric breakdown

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ANSI/NEMA IM 60000-2021

ANSI/NEMA IM 60000-2021	Norplex-Micarta Laminated Sheet Grade	Norplex-Micarta Rolled Tube Grade	Norplex-Micarta Molded Rod Grade
C	GSC ¹ , NP310, NP310HT, NP342	RT310, RT310H, RT310S, RT342	RM310
CE	GSCE ¹ , NP310E	RT342 ²	RM310E
FR-4	GSFR4 ¹ , GSFR4A ¹ , NP130, NP130HF, NP506A, NP510A, NP510WR ³	RT130, RT130M, RT130X	RM130
FR-5	MC511FR ⁴ , NP513FR ⁵	--	--
G-3	NP504, NP515LS	RT504 ⁶ , RT504F ⁶ , RT504M ⁶	RM504
G-5	NP509	RT505, RT505F	RM505
G-7	MC507U ⁷	RT507, RT507F	--
G-9	NP509	RT509, RT509F	--
G-10	NP500A	RT500, RT500F, RT500M, RT500X, RT571	RM500A
G-11	MC511A, MC511AF, NP511, NP511EM, NP519, NP572	RT511, RT511F, RT511H, RT511M	RM511A
G-13	MC511FR ⁸	--	--
G-15	P95	--	--
L	NP320	--	RM320 ⁹
LE	MC320LE, NP320E	RTB320 ⁹ , RTB320H ⁹ , RTB320X ⁹ , RTB320Z ⁹	RM320LE
N-1	NP101	--	--
X	NP610	RT610	--
XP	NP611, NP660	--	--
XPC	NP612, NP625	--	--
XX	NP629	RT628, RT628H, RT629	RM629
XXX	NP630 ¹⁰	RT630, RT630H	RM630

¹ Imported economy grade material, unable to provide test reports.

² RT342 is an ANSI/NEMA CE "Type" because CE rolled tube is a recognized form but there are no performance requirements listed for a CE tube.

³ NP510WR meets ANSI/NEMA FR-4 with exceptions to permittivity and warp and twist under 0.200".

⁴ MC511FR meets ANSI/NEMA FR-5 in thicknesses of 0.250" - 4.000".

⁵ NP513FR meets ANSI/NEMA FR-5 in thicknesses of 0.500" - 4.000".

⁶ RT504 and RT504F are ANSI/NEMA G-3 "Types" because G-3 rolled tube is a recognized form but there are no performance requirements listed for a G-3 tube.

⁷ MC507U meets ANSI/NEMA G-7 with exception to permittivity and dissipation factor

⁸ MC511FR meets ANSI/NEMA G-13 in thicknesses of 0.250" and above with exception to FST requirements of EN 45545, NFPA 130 and BSS 7239. FST is a test method, not performance requirement. Please contact Norplex-Micarta for more info.

⁹ ANSI/NEMA has plus only tolerance, RM320, RTB320(H,X,and Z) will use NEMA LI 1-1998 +/- tolerance

¹⁰ NP630 meets ANSI/NEMA Grade XXX with exception to dielectric breakdown

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ASTM D2304, ASTM D709 Type, ASTM F2953, ASTM F3131

ASTM	Norplex-Micarta Laminated Sheet Grade	Norplex-Micarta Rolled Tube Grade	Norplex-Micarta Molded Rod Grade
ASTM 2304			
Class H	NP572	--	--
ASTM D709 Type			
I Grade X	NP610	RT610	--
I Grade XP	NP611	--	--
I Grade XPC	NP612	--	--
I Grade XX	NP629	RT629	RM629
I Grade XXX	NP630	RT630	RM630
II Grade C	GSC ¹ , NP310, NP310HT, NP342	RT310, RT310H, RT310S, RT342, RT342H	RM310
II Grade CE	GSCE ¹ , NP310E	--	RM310E
II Grade L	NP320	--	RM320
II Grade LE	MC320LE, NP320E	RTB320, RTB320H, RTB320X, RTB320Z	RM320LE
IV Grade FR-4	GSFR4 ¹ , GSFR4A ¹ , NP130, NP130HF, NP506A, NP510A, NP510WR ²	--	RM130
IV Grade FR-5	MC511FR ³ , NP513FR ⁴	--	--
IV Grade G-3	NP504	RT504, RT504F	RM504
IV Grade G-5	NP509	RT505, RT505F, RT504M	RM505
IV Grade G-7	MC507U ⁵	RT507, RT507F	--
IV Grade G-9	NP509	RT509, RT509F	--
IV Grade G-10	NP500A	RT500, RT500F, RT500M, RT500X, RT511, RT511F, RT511H, RT511M	RM500A, RM511A
IV Grade G-11	MC511A, MC511AF, NP511, NP511EM	--	--
V Grade N-1	NP101	--	--
ASTM F2953			
		RT630, RT630H	
12 Type FB	MC320LE, NP320E	RTB320H	--
12 Type FBEFW	--	RTB320X, RTB320Z	--
ASTM F3131			
	--	RTB326, RTB326H	--

¹ Imported economy grade material, unable to provide test reports.

² NP510WR meets ASTM D 709 Type IV Grade FR-4 with exceptions to permittivity and warp and twist under 0.200".

³ MC511FR meets ASTM D 709 Type IV Grade FR-5 in thicknesses of 0.250" - 4.000".

⁴ NP513FR meets ASTM D 709 Type IV Grade FR-5 in thicknesses of 0.500" - 4.000".

⁵ MC507U meets ASTM D 709 Type IV Grade G-7 with exception to permittivity and dissipation factor.

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IEC (International Electrotechnical Commission)

IEC	Norplex-Micarta Laminated Sheet Grade	Norplex-Micarta Rolled Tube Grade	Norplex-Micarta Molded Rod Grade
60216			
Class H	NP572	--	--
60893-			
3-2 EP GC 201	NP500A	--	--
3-2 EP GC 202	NP130, NP130HF, NP506A, NP510A	--	--
3-2 EP GC 203	MC511A, MC511AF, NP511, NP511EM, NP572	--	--
3-2 EP GC 205	MC511WR		
3-2 EP GC 308	NP572	--	--
3-3 MF GC 201	NP509	--	--
3-4 PF CC 201	NP310, NP310HT, NP342	--	--
3-4 PF CC 203	NP320	--	--
3-4 PF CP 201	NP610, NP611, NP660	--	--
3-4 PF CP 207	NP612, NP664	--	--
3-6 SI GC 201	MC507U ¹	--	--
3-7 PI GC 301	P95	--	--
61212-			
3-1 EP GC 21	--	RT511, RT511M, RT511F, RT521M	--
3-1 EP GC 22	--	RT511, RT511M, RT511F	--
3-1 EP GC 23	--	RT130, RT130X, RT130M ²	--
3-3 EP GC 41	--	--	RM511A
3-1 MF GC 21	--	RT509, RT509F	--
3-1 PF CC 21	--	RTB320, RTB320H, RTB320X, RTB320Z	--
3-1 PF CC 22	--	RT310, RT310S, RT342	--
3-1 PF CP 21	--	RT610	--
3-1 PF CP 23	--	RT629	--
3-1 PF GC 21	--	RT504	--
3-1 SI GC 21	--	RT507, RT507F	--

¹ MC507U meets IEC 60893-3-6 SI GC 201 with exception to permittivity and dissipation factor

² RT130M meets IEC 61212-3-1 RP CG 23 only for ID's up to and including 3.94".

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MIL-I-24768/ and MIL-P-18324

MIL-I-24768/	Norplex-Micarta Laminated Sheet Grade	Norplex-Micarta Rolled Tube Grade	Norplex-Micarta Molded Rod Grade
1 Type GME	NP509	RT509, RT509F	--
2 Type GEE	NP500A	RT500, RT500F, RT500M, RT500X, RT511, RT511H, RT511F, RT511M, RT571	RM500A, RM511A
3 Type GEB	MC511A, MC511AF, NP511, NP511EM, NP572	--	--
8 Type GMG	NP509	RT505, RT505F	RM505
9 Type NGP	NP101	--	--
10 Type PBE	NP630 ¹	RT630	RM630
11 Type PBG	NP629	RT628, RT628H, RT629	RM629
12 Type PBM	NP610	RT610	--
13 Type FBE	MC320LE, NP320E	RTB320, RTB320H, RTB320X, RTB320Z	RM320, RM320LE
14 Type FBG	GSCE ² , NP310E	--	RM310E
15 Type FBI	NP320	--	RM320, RM320LE
16 Type FBM	GSC ² , NP310, NP310HT, NP342	RT310, RT310H, RT310S, RT342	RM310
17 Type GSG	MC507U ³	RT507, RT507F	--
18 Type GPG	NP504	RT504, RT504F, RT504M	RM504
19 Type PBM-P	NP611	--	--
20 Type PBM-PC	NP612	--	--
27 Type GEE-F	GSFR4 ² , GSFR4A ¹ , NP130, NP130HF, NP506A, NP510A, NP510WR ⁴	RT130, RT130M, RT130X	RM130
28 Type GEB-F	MC511FR ⁵ , NP513FR ⁶	--	--
MIL-P-18324			
D	MC223	--	--

¹ NP630 meets MIL-I-24768/10 Type PBE with exception to dielectric breakdown

² Imported economy grade material, unable to provide test reports.

³ MC507U meets MIL-I-24768/17 Type GSG with exception to permittivity and dissipation factor

⁴ NP510WR meets MIL-I-24768/27 Type GEE-F with exceptions to permittivity and warp and twist under 0.200".

⁵ MC511FR meets MIL-I-24768/28 Type GEB-F in thicknesses of 0.250" - 4.000".

⁶ NP513FR meets MIL-I-24768/28 Type GE MIL-I-24768/28 Type GEB-F in thicknesses of 0.500" - 4.000".

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IPC 4101

IPC 4101	Norplex-Micarta Laminated Sheet Grade	Norplex-Micarta Rolled Tube Grade	Norplex-Micarta Molded Rod Grade
/20 Rev C	NP500A	--	--
/20 Rev D or E	NP500A ¹		
/21 Rev C	NP130, NP130HF, NP506A, NP510A	--	--
/21 Rev D or E	NP130, NP130HF, NP506A ² , NP510A ²	--	--
/22 Rev C	MC511A ³ , MC511AF ³ , NP511 ³ , NP511EM ³	--	--
/22 Rev D or E	MC511A ⁴ , MC511AF ⁴ , NP511 ⁵ , NP511EM ⁴	--	--
/40 Rev E	P95	--	--

¹ NP500A can be tested or certified to IPC 4101/20 Rev D or E with exception to filler content.

² NP506A and NP510A can be tested or certified to IPC 4101/21 Rev D or E with exception to filler content.

³ MC511A, MC511AF, NP511 and NP511EM can be tested or certified to IPC 4101/22 Rev C with the exception that T_g values may exceed the range listed (135°C-175°C).

⁴ MC511A, MC511AF and NP511EM can be tested or certified to IPC 4101/22 Rev D or E with the exception to filler content.

⁵ NP511 can be tested or certified to IPC 4101/22 Rev D or E with the exception that T_g values may exceed the range listed (135°C-175°C).