



ENGINEERING MATERIAL SPECIFICATION

LAMINATE, ELECTRICAL INSULATION (.08/.191/.08/.013)
LAMINATE, ELECTRICAL INSULATION (.127/.127/.127)
LAMINATE, ELECTRICAL INSULATION (.127/.254/.127)

ESF-M3L71-A
ESF-M3L71-A2
ESF-M3L71-A4

1. SCOPE

The materials defined by these specifications are a composite of aromatic polyamide (aramid) paper and polyester film.

2. APPLICATION

These specifications were released originally for material used where high temperature insulation is required such as slot insulation in the alternator stator.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.1	THICKNESS (ASTM D 374)	A	A2	A4
3.1.1	Total, mm	----	----	0.48 - 0.58
3.1.2	Nominal, mm			
	Aramid paper	0.08	0.127	0.127
	Polyester film	0.191	0.127	0.254
	Aramid paper	0.08	0.127	0.127
	Polyester film	0.013	----	----
3.2	BASIC WEIGHT, g/m ² , min (ASTM D 646)	440	430	605
3.3	BURST STRENGTH, g/m ² , min (ASTM D 774)	2.75	2.75	> 2.8
3.4	DIELECTRIC STRENGTH, KV/mm, min (ASTM D 149, short time 6.35 mm electrode)	52	43	36
3.5	STIFFNESS IN FLEXURE (ASTM D 747 12.7 mm span 0.11 Nm 60 deg)			
	WMD	45 – 55	54 – 66	56 - 76
	AMD	35 – 41	32 – 38	34 - 45

Date	Action	Revisions
2003 06 30	Revised	Para 3.0 inserted; Para 3.9, 3.10, 3.11, 3.12, 3.13, 4 deleted
1994 02 28	NGA1E10370437002	Rev. para 1, 3.1.2
1971 04 20		Released (was XF-M3LX19)





3.6 TENSILE STRENGTH, N/mm, min (ASTM D 828)

WMD	40	47	63
AMD	42	35	45

3.7 ELONGATION, %, min

WMD	25	25	20
AMD	70	50	20

3.8 TEAR STRENGTH, g/cm, min (ASTM D 689, at 85 °C)

WMD	--	780	1950
AMD	--	1300	2275