

# NOVALAC FM 4004

Phenolic

Vyncolit N.V.

## Message:

NOVALAC FM 4004 is a phenolic (Phenolic) material, and its filler is glass fiber reinforced material. This product is available in North America, Africa and the Middle East, Latin America, Europe or Asia Pacific. The processing methods are: resin transfer molding, compression molding or injection molding. The main features of NOVALAC FM 4004 are:

- flame retardant/rated flame
- chemical resistance
- high strength
- Creep resistance
- Good dimensional stability

Typical application areas include:

- Electrical/electronic applications
- engineering/industrial accessories
- electrical appliances
- House
- Tools

General Information	
Filler / Reinforcement	Glass fiber reinforced material
Features	Ultra high toughness
	Good dimensional stability
	Low smoke
	High strength
	Antibacterial property
	Solvent resistance
	Good creep resistance
	alkali resistance
Uses	acid resistance
	Membrane key switch
	Pump parts
	Gear
	Electrical/Electronic Applications
	Electrical appliances
	Power/other tools
	Connector
Agency Ratings	ASTM D 5948, Type MFH
	Application in Automobile Field
Forms	Shell
Processing Method	Particles
	Resin transfer molding

Compression molding

Injection molding

Physical	Nominal Value	Unit	Test Method
Specific Gravity	1.93	g/cm <sup>3</sup>	ASTM D792
Bulk Factor	3.0		ASTM D1895
Molding Shrinkage - Flow (Compression Molded)	0.20	%	ASTM D955
Water Absorption (23°C, 24 hr)	0.10	%	ASTM D570
Hardness	Nominal Value	Unit	Test Method
Rockwell Hardness (M-Scale)	110		ASTM D785
Mechanical	Nominal Value	Unit	Test Method
Tensile Strength	55.2	MPa	ASTM D638
Flexural Modulus	15900	MPa	ASTM D790
Flexural Strength	82.7	MPa	ASTM D790
Compressive Strength	262	MPa	ASTM D695
Impact	Nominal Value	Unit	Test Method
Notched Izod Impact	24	J/m	ASTM D256A
Thermal	Nominal Value	Unit	Test Method
Deflection Temperature Under Load (1.8 MPa, Unannealed)	188	°C	ASTM D648
CLTE - Flow	1.4E-5	cm/cm/°C	ASTM D696
RTI Elec	150	°C	UL 746
RTI Imp	150	°C	UL 746
RTI	150	°C	UL 746
Electrical	Nominal Value	Unit	Test Method
Dielectric Strength			ASTM D149
-- <sup>1</sup>	13	kV/mm	ASTM D149
-- <sup>2</sup>	11	kV/mm	ASTM D149
Arc Resistance	180	sec	ASTM D495
Flammability	Nominal Value	Unit	Test Method
Flame Rating			UL 94
1.59 mm	V-0		UL 94
3.18 mm	V-0		UL 94
Injection	Nominal Value	Unit	
Rear Temperature	60.0	°C	
Middle Temperature	73.9	°C	
Nozzle Temperature	87.8	°C	
Processing (Melt) Temp	98.9 - 116	°C	
Mold Temperature	166 - 188	°C	
Back Pressure	0.207	MPa	
Injection instructions			

Plastication: 50rpmInjection Pressure: Set to give 3 to 5 seconds injection timeHold Pressure: 50 to 100% of injection pressureHold Time: 10 sec  
minimumCure Time, 0.125 in: 30 to 35 secWater Absorption, ASTM D570, 48 hrs, 50°C: 0.15%DTUL @264psi - Unannealed, ASTM D648, Post Baked:  
550°FDielectric Strength, ASTM D149, 60 Hz, Method A, wet: 320 V/milDielectric Strength, ASTM D149, 60 Hz, Method B, wet: 280 V/milBulk Factor,  
ASTM D1895: 2.5 to 3.5Compression and Transfer Molding Conditions:  
Preforming Pressure: 8000 to 12000 psi  
Preheat Temperature: 210 to 235 °F  
Preheat Time: 45 sec  
Mold Temperature: 330 to 360 °F  
Compression Mold Pressure: 2500 to 5000 psi  
Transfer Mold Pressure: 4000 to 6000 psi  
Cure Time, 0.125 in: 40 to 50 sec

#### NOTE

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|----|-------------------------|
| 1. | Method A (short time)   |
| 2. | Method B (step by step) |

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