# Clariant Nylon 6 PA-221

## Polyamide 6

### **Clariant Corporation**

#### Message:

Clariant Nylon 6 PA-221 is a polyamide 6 (nylon 6) material. This product is available in North America and is processed by injection molding. The main features of the Clariant Nylon 6 PA-221 are: flame retardant/rated flame Impact modification Copolymer Good toughness Impact resistance Typical application areas include: safety equipment Electrical/electronic applications Wire and cable House engineering/industrial accessories

General Information				
Additive	Impact modifier			
Features	Impact modification			
	Copolymer			
	Impact resistance, good			
	Good toughness			
Uses	Safety helmet			
	Conveyor accessories			
	Power/other tools			
	Guardrail			
	Fasteners			
	Connector			
	Shell			
	Medical/nursing supplies			
Agency Ratings	UL 94			
Forms	Particle			
Processing Method	Injection molding			
Physical	Nominal Value	Unit	Test Method	
Specific Gravity	1.08	g/cm³	ASTM D792	
Molding Shrinkage - Flow (3.18 mm)	1.2	%	ASTM D955	
Water Absorption (24 hr)	1.5	%	ASTM D570	
Hardness	Nominal Value	Unit	Test Method	
Rockwell Hardness			ASTM D785	
Class m	75		ASTM D785	

MechanicalNominal ValueUnitTest MethodTensile Strength65.5MPaASTM D638Tensile Elongation (Vield)80%ASTM D780Flexural Modulus2210MPaASTM D780Flexural Strength82.7MPaASTM D780ImpactNominal ValueUnitTest MethodNotched Izod Impact (318 mm)160/mASTM D784Deflection Temperature Under LoadTest MethodTest MethodD48.Na not annealed60.0"CASTM D6481.8 MPa, not annealed60.0"CASTM D6481.8 MPa, not annealed945-5cm/cm/°CASTM D649Valume Resistivity10E+13ohms-cmASTM D570Diedcricis Temperature945-5cm/cm/°CASTM D587Diedcricis Tength17cm/cm/°CASTM D596ElectricalNominal ValueUnitTest MethodValume Resistivity10E+13ohms-cmASTM D597Diedcricis Strength17KVmmASTM D597Diedcricis Strength17wominal ValueUnitTest MethodValume Resistivity0.0E+13ohms-cmASTM D597Diedcricis Strength10E+13ohms-cmMastm D199Diedcricis Test Method17wominal ValueTest MethodValume Resistivity0.2E+0.3Eohms-cmUL 94Digtoring Time2.0-4.0mTest MethodSuggested Max Moisture0.20%Test MethodSuggested M	Class r	105		ASTM D785
Tensile Strength65.5MPaASTM D638Tensile Elongation (Yield)80%ASTM D638Flexural Modulus2210MPaASTM D790Flexural Strength82.7MPaASTM D790ImpactNominal ValueUnitTest MethodNotched Izod Impact (3.18 mm)160J/mASTM D638Deflection Temperature Under LoadNominal ValueUnitTest MethodDeflection Temperature Under Load177°CASTM D648D.65 MPa, not annealed60.0°CASTM D6481.8 MPa, not annealed60.0°CASTM D648Ulurue Resistivity106-15cr/cm/°CASTM D648Odums Resistivity108-13omms:rmASTM D649Ulurue Resistivity108-143omms:rmASTM D649Delectric Strength17V/mmASTM D649PlaneabilityNominal ValueUnitTest MethodVolume Resistivity0.161-13omms:rmASTM D649Dielectric Strength17V/mmASTM D649FlammabilityNominal ValueUnitTest MethodDing Temperature2.0-40%StrengeratureDrying Temperature2.0-40%StrengeratureDrying Temperature2.0-274%StrengeratureMold Temperature249-274%StrengeratureMold Temperature249-274%StrengeratureMold Temperature (Aim)266%StrengeratureMold Temperature (Ai	Mechanical		Unit	
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Notched Izod Impact (3.18 mm) 160 //m ASTM D256   Thermal Nominal Value Unit Test Method   Deflection Temperature Under Load 177 °C ASTM D648   0.45 MPa, not annealed 60.0 °C ASTM D648   1.8 MPa, not annealed 60.0 °C ASTM D648   1.8 MPa, not annealed 60.0 °C ASTM D648   Metting Temperature 216 °C C   CLTE - Flow 9.9E-5 cm/cm/°C ASTM D696   Electrical Nominal Value Unit Test Method   Volume Resistivity 10E+13 ohms-cm ASTM D149   Electrics Strength 17 K//mm ASTM D149   Flarmability Nominal Value Unit Test Method   Injection Nominal Value Unit Test Method   Striggested Max Moisture 20-4.0 Not Score   Drying Temperature 20-9.24 °C Score Score   Middle Temperature 249-274 °C S	Flexural Strength	82.7	MPa	ASTM D790
ThemailNominal ValueUnitTest MethodDeflection Temperature Under Load177°CASTM D6480.45 MPa, not annealed60.0°CASTM D6481.8 MPa, not annealed60.0°CASTM D648Metting Temperature216°CCCLTE - Flow9.9E-5cm/cm/°CASTM D696ElectricalNominal ValueUnitTest MethodVolume Resistivity1.0E + 13ohms ·cmASTM D257Dielectric Strength17KV/nmASTM D149FlarmabilityNominal ValueUnitTest MethodFlarmabilityNominal ValueUnitUL 94FlarmabilityNominal ValueUnitUL 94Programmability0.0Notical 2010Notical 2010Drying Temperature2.0 - 4.0Notical 2010Notical 2010Suggested Max Moisture2.90 - 274°CCNorder Temperature249 - 274°CCProcessing (Meth) Temp264 - 271°CCMidel Temperature (Aim)264 - 271°CCMeth Temperature (Aim)265 - 9.3.3°CCNotestree56 - 9.3.4NPaCInjection RateFastSSBack Pressure0.345 - 0.689MPaCSterw Speed0.100rpmCCushion3.18 - 6.35mmC	Impact	Nominal Value	Unit	Test Method
Deflection Temperature Under LoadASTM D6480.45 MPa, not annealed177"CASTM D6481.8 MPa, not annealed60.0"CASTM D648Melting Temperature216"CTCLTE - Flow9.9E-5cm/cm/"CASTM D696ElectricalNominal ValueUnitTest MethodVolume Resistivity1.0E+13ohms -cmASTM D257Dielectric Strength1.0E+13k//mmASTM D149Dielectric StrengthNominal ValueUnitTest MethodFlame Rating (1.59 mm)HBUltUl 94InjectionNominal ValueUnitUltDying Temperature20.4.0k/-Suggested Max Moisture0.20%-Suggested Max Moisture249-274"C-Vort Temperature249-274"C-Nort Temperature249-274"C-Nort Temperature (Aim)266"C-Mold Temperature (Aim)266"C-Mold Temperature (Aim)266"C-Mold Temperature (Aim)266"C-Mold Temperature (Aim)266"C-Mold Temperature0.345 - 0.689MPa-Sterw Speed0.416mm-Sterw Speed20.100mm-Sterw Speed3.18 - 6.35mm-Cushion3.18 - 6.35mm-Sterw Speed3.18 - 6.35mm-Sterw Speed	Notched Izod Impact (3.18 mm)	160	J/m	ASTM D256
0.45 MPa, not annealed177°CASTM D6481.8 MPa, not annealed60.0°CASTM D648Melting Temperature216°CSTM D648CLTE - Flow99.5.5cm/cm/°CASTM D696ElectricalNominal ValueUnitTest MethodVolume Resistivity10.E+13ohms ·cmASTM D257Dielectric Strength17K//mmASTM D149Flame Rating (1.59 mm)HBUnitTest MethodInjectionNominal ValueUnitTest MethodDying Temperature79.4°C·Dying Time20.4.0hr·Suggested Max Moisture209%·Middle Temperature249 - 274°C·Front Temperature249 - 274°C·Middle Temperature266°C·Mold Temperature666°C·Mold Temperature666°C·Mold Temperature66.9.3.3°C·Injection RateFast··Back Pressure0.345 - 0.689MPa·Strew Speed20.100mm·Strew Speed20.100mm·Strew Speed318 - 6.35mm·	Thermal	Nominal Value	Unit	Test Method
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Melting Temperature216'CCLTE - Flow9.9E-5cm/cm/°CASTM D696ElectricalNominal ValueUnitTest MethodVolume Resistivity1.0E + 13ohms·cmASTM D257Dielectric Strength17K//mmASTM D257Dielectric Strength17K//mmASTM D257Jielectric Strength17K//mmASTM D257Jielectric Strength17K//mmASTM D149FlammabilityNominal ValueUnitTest MethodInjectionNominal ValueUnitTest MethodDying Temperature79.4'C'CDying Time2.0 - 4.0'K'CSuggested Max Moisture2.0 - 4.0'K'CSuggested Max Moisture249 - 274'C'CFront Temperature249 - 274'C'CFront Temperature249 - 274'C'CProcessing (Melty Temp256 - 93.3'C'CMold Temperature (Aim)56.6 - 93.3'C'CMold Temperature (Aim)56.6 - 93.4'C'CMold Temperature (Aim)56.6 - 93.4'C'CMold Temperature56.6 - 93.4'C'CMak Pressure345 - 0.689MPa'CSterw Speed20 - 100pm'CGushion318 - 6.35mm'C	0.45 MPa, not annealed	177	°C	ASTM D648
CLTE - Flow9.9E-5cm/cm/°CASTM D696ElectricalNominal ValueUnitTest MethodVolume Resistivity1.0E+13ohms ·cmASTM D257Dielectric Strength17kV/mmASTM D149FlammabilityNominal ValueUnitTest MethodFlame Rating (1.59 mm)HBUl 1Test MethodDrying Temperature79.4°CCDrying Time20-4.0'n'-Suggested Max Moisture0.20%-Quester Automotive249-274'C-Front Temperature249-274'C-Processing (Melt) Temp266-93.3'C-Mold Temperature (Aim)266'C-Mold Temperature (Aim)56.93.3'C-Mold Temperature (Aim)0.345-0.689MPa-Stere Speed0.310-00rpm-Stere Speed3.18-6.35mm-	1.8 MPa, not annealed	60.0	°C	ASTM D648
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Dielectric Strength17kV/mmASTM D149FlammabilityNominal ValueUnitTest MethodFlame Rating (1.59 mm)HBUnitUL 94InjectionNominal ValueUnitCDrying Temperature79.4°CCDrying Time2.0 - 4.0hrCSuggested Max Moisture0.20%CMiddle Temperature249 - 274°CCFront Temperature249 - 274°CCProcessing (Melt) Temp264 - 271°CCMold Temperature (Aim)266°CCMold Temperature (Aim)65 - 93.3°CCInjection RateFastScrew Speed0.345 - 0.689MPaScrew Speed3.18 - 6.35mmC	Electrical	Nominal Value	Unit	Test Method
FlammabilityNominal ValueUnitTest MethodFlame Rating (1.59 mm)HBUL 94InjectionNominal ValueUnitDrying Temperature79.4°CDrying Time2.0 - 4.0hrSuggested Max Moisture0.20%Rear Temperature249 - 274°CMiddle Temperature249 - 274°CFront Temperature249 - 274°CProcessing (Melt) Temp264 - 271°CMold Temperature (Aim)266°CMold Temperature (Aim)65.6 - 93.3°CInjection RateFast'CBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion3.18 - 6.35mm	Volume Resistivity	1.0E+13	ohms•cm	ASTM D257
Flame Rating (1.59 mm) HB UL 94   Injection Nominal Value Unit   Drying Temperature 79.4 °C   Drying Time 2.0 - 4.0 hr   Suggested Max Moisture 0.20 %   Rear Temperature 249 - 274 °C   Middle Temperature 249 - 274 °C   Front Temperature 249 - 274 °C   Processing (Melt) Temp 254 - 271 °C   Mold Temperature (Aim) 266 °C   Mold Temperature (Aim) 65.6 - 93.3 °C   Injection Rate Fast Intervention   Screw Speed 0.45 - 0.689 MPa   Screw Speed 3.18 - 6.35 mm	Dielectric Strength	17	kV/mm	ASTM D149
InjectionNominal ValueUnitDrying Temperature79.4°CDrying Time2.0 - 4.0hrSuggested Max Moisture0.20%Rear Temperature249 - 274°CMiddle Temperature249 - 274°CFront Temperature249 - 274°CProcessing (Melt) Temp254 - 271°CMelt Temperature (Aim)266°CMold Temperature5.6 - 93.3°CInjection RateFast''Back Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion3.18 - 6.35mm	Flammability	Nominal Value	Unit	Test Method
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Drying Time2.0 - 4.0hrSuggested Max Moisture0.20%Rear Temperature249 - 274°CMiddle Temperature249 - 274°CFront Temperature249 - 274°CProcessing (Melt) Temp254 - 271°CMelt Temperature (Aim)266°CMold Temperature65.6 - 93.3°CInjection RateFastBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmGushon3.18 - 6.35mm	Injection	Nominal Value	Unit	
Suggested Max Moisture0.20%Rear Temperature249 - 274°CMiddle Temperature249 - 274°CFront Temperature249 - 274°CProcessing (Melt) Temp254 - 271°CMelt Temperature (Aim)266°CMold Temperature65.6 - 93.3°CInjection RateFastBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion3.18 - 6.35mm	Drying Temperature	79.4	°C	
Rear Temperature 249 - 274 °C   Middle Temperature 249 - 274 °C   Front Temperature 249 - 274 °C   Processing (Melt) Temp 254 - 271 °C   Melt Temperature (Aim) 266 °C   Mold Temperature 55.6 - 93.3 °C   Injection Rate Fast Screw Speed 0.345 - 0.689 MPa   Screw Speed 20 - 100 rpm rpm rpm	Drying Time	2.0 - 4.0	hr	
Middle Temperature249 - 274°CFront Temperature249 - 274°CProcessing (Melt) Temp254 - 271°CMelt Temperature (Aim)266°CMold Temperature65.6 - 93.3°CInjection RateFastBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion318 - 6.35mm	Suggested Max Moisture	0.20	%	
Front Temperature249 - 274°CProcessing (Melt) Temp254 - 271°CMelt Temperature (Aim)266°CMold Temperature65.6 - 93.3°CInjection RateFastBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion3.18 - 6.35mm	Rear Temperature	249 - 274	°C	
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Melt Temperature (Aim)266°CMold Temperature65.6 - 93.3°CInjection RateFastBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion3.18 - 6.35mm	Front Temperature	249 - 274	°C	
Mold Temperature65.6 - 93.3°CInjection RateFastBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion3.18 - 6.35mm	Processing (Melt) Temp	254 - 271	°C	
Injection RateFastBack Pressure0.345 - 0.689MPaScrew Speed20 - 100rpmCushion3.18 - 6.35mm	Melt Temperature (Aim)	266	°C	
Back Pressure 0.345 - 0.689 MPa   Screw Speed 20 - 100 rpm   Cushion 3.18 - 6.35 mm	Mold Temperature	65.6 - 93.3	°C	
Screw Speed 20 - 100 rpm   Cushion 3.18 - 6.35 mm	Injection Rate	Fast		
Cushion 3.18 - 6.35 mm	Back Pressure	0.345 - 0.689	MPa	
	Screw Speed	20 - 100	rpm	
Injection instructions	Cushion	3.18 - 6.35	mm	
	Injection instructions			

Injection Pressure: Use minimum pressure to achieve 95% fill during the boost inj. pressure phase.Hold Pressure: 30% to 75% of injection pressure.Mold Temp. Target: 180°FScrew Speed Target: 75 RPM

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