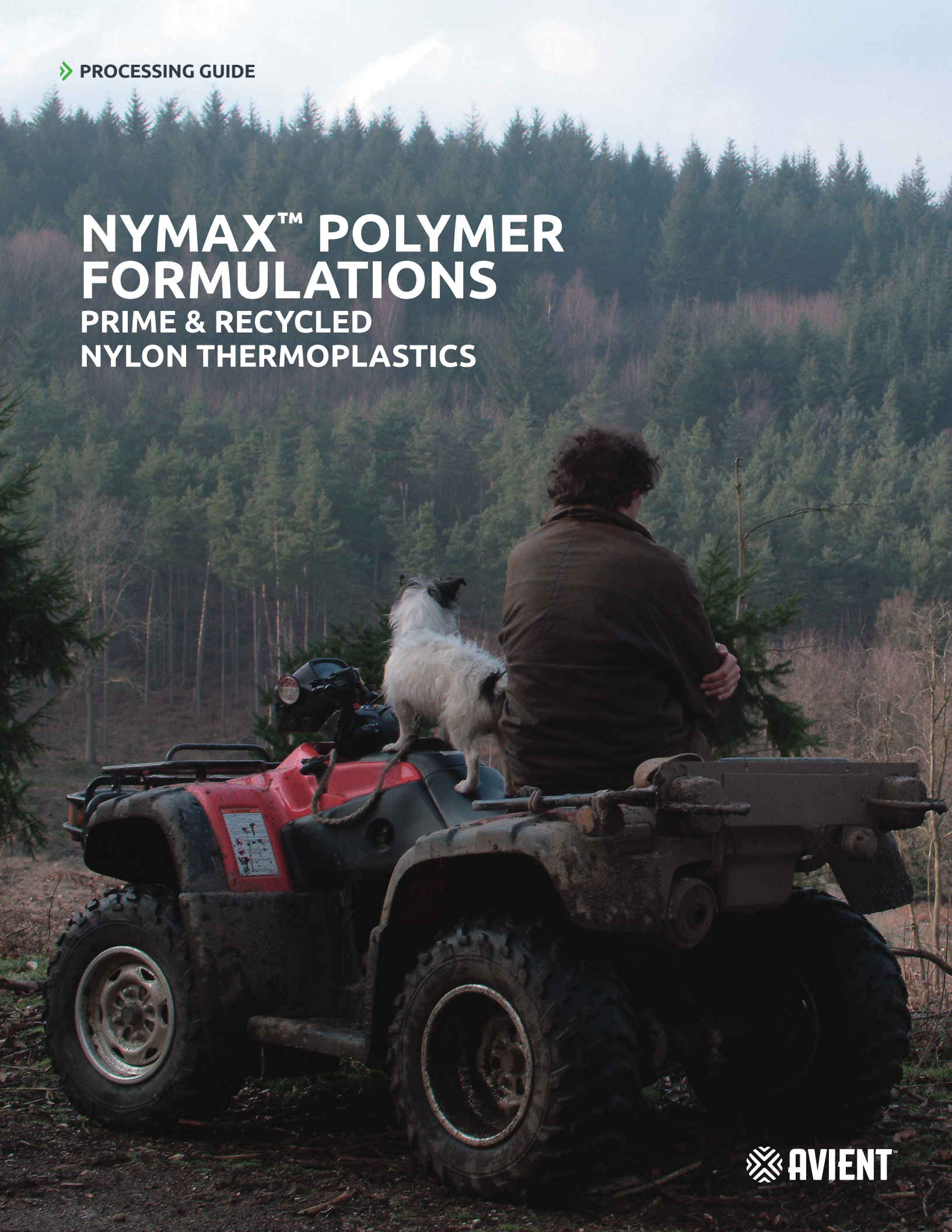
PROCESSING GUIDE

NYMAX™ POLYMER FORMULATIONS

PRIME & RECYCLED NYLON THERMOPLASTICS



AVIENT™

Nymax™ and Nymax™ REC Formulations

Nymax™ thermoplastics include prime and recycled nylon formulations in both unfilled grades and with various levels of glass fiber and mineral reinforcements. The portfolio is specifically formulated for applications requiring high stiffness, tensile properties, heat resistance, impact performance, and durability in harsh environments while offering the ease of processing in most standard thermoplastic processing equipment. In addition, the Nymax™ REC series offers PA6 and PA66 grades with post-industrial recycled (PIR) or post-consumer recycled (PCR) nylon to support a circular economy. Both prime and recycled materials are customizable and well-suited for the transportation, industrial, construction, and consumer markets.

Injection Molding Parameters

Base Resin	PA6	PA6 IM/ST	PA6 GF	PA6 GMF	PA66 IM/ST	PA66 GF
Barrel Temperatures °F (°C)						
Rear Zone	450–490 (232–254)	440–490 (226–254)	490–510 (254–265)	480–500 (249–260)	510–530 (265–276)	510–530 (265–276)
Center Zone	460–500 (238–260)	450–500 (232–260)	500–520 (260–271)	490–510 (254–265)	510–530 (265–276)	520–540 (271–282)
Front Zone	470–510 (243–265)	460–510 (237–265)	510–525 (265–273)	500–520 (260–271)	530–550 (276–288)	530–550 (276–288)
Nozzle	480–520 (249–271)	470–510 (243–265)	515–530 (268–276)	510–525 (265–273)	530–560 (276–293)	540–560 (282–293)
Melt Temperature °F (°C)	480–520 (249–271)	470–510 (243–265)	515–530 (268–276)	510–525 (265–273)	530–550 (276–288)	540–560 (282–293)
Mold Temperature °F (°C)	120–180 (49–82)	120–180 (49–82)	120–200 (49–93)	120–200 (49–93)	140–220 (60–104)	140–220 (60–104)
Pack and Hold Pressure	50–80% of Injection Pressure					
Injection Velocity	1.0–4.0 in/sec					
Back Pressure	25–100 psi					
Screw Speed	35–80 rpm					
Drying Parameters	4 hours @ 180°F (82°C)					
Moisture Allowable	0.1–0.2%					
Cushion	0.250 in					
Screw Compression Ratio	2.0:1–2.5:1					
Nozzle Type	Reverse Taper					
Clamp Pressure	3–5 tons/in^2					

Start Up & Shut Down	Recommendations
Purge Compound	Polypropylene
Recycling	Recycling prime grades up to 20% is permissible and recycling PIR or PCR grades up to 10% is permissible. Testing the application is highly recommended to determine the effect recycling has on the desired physical properties.
Mold Design	**Recommendations**
Gates	1. All types of gates can be used such as pin, fan, tunnel, tab and edge gates. Gate type should be selected based on location and part geometry. 2. Gate diameters should be equivalent to 50–80% of the average wall thickness. 3. A land length of 0.040” (1.0 mm) is recommended.
Runners	1. Full-round or modified trapezoid runners are the best design and provide the least surface to cross section ratio. Half-round or standard trapezoid runners are not recommended. 2. Only naturally balanced runner systems (“H” pattern) are recommended. 3. Each 90° bend in the system should step down in size. 4. Vents should be placed at the intersection of each 90° bend off of the cold slug well and vented to atmosphere. 5. Hot runner molds are acceptable and should be sized by the manufacturer. Externally heated manifolds are recommended.
Cold Slug Wells	1. Place cold slug wells at the base of the sprue to capture the cold material first emerging from the nozzle. 2. Place cold slug wells at every 90° bend in the runner system. 3. Well depths approximately 2–3 times the diameter of the runner provide the best results.
Vents	1. Place vents at the end of fill and anywhere potential knit/weld lines will occur. 2. All vents need to be vented to atmosphere. 3. Cut vent depths to 0.001"–0.002" with a minimum 0.030” land length. Increase the vent depth to 0.010" at 0.100" away from the cavity and vent to atmosphere. 4. Vents should be placed at the intersection of each 90° bend in the runner system off of the cold slug well and vented to atmosphere.
Draft Angle	Draft angle should be ½°–1° per side. Additional draft may be required for grained/textured surfaces.

Troubleshooting Recommendations

Problem	Cause	Solution
Incomplete Fill	Melt and/or mold too cold	• Increase nozzle and barrel temperatures • Increase mold temperature • Increase injection rate • Check thermocouples and heater bands
	Mold design	• Enlarge or widen vents and increase number of vents • Check that vents are unplugged • Check that gates are unplugged • Enlarge gates and/or runners • Perform short shots to determine fill pattern and verify proper vent location • Increase wall thickness to move gas trap to parting line
	Shot size	• Increase shot size • Adjust transfer position to 98% full • Increase cushion
Brittleness	Wet material	• Check moisture. If material is not in the recommended moisture percentage, continue to dry material until it is in an acceptable range for molding.
	Degraded/ overheated material	• Decrease melt temperature • Decrease back pressure • Use smaller barrel • Decrease injection speed
	Gate location and/or size	• Relocate gate to nonstress area • Increase gate size to allow higher flow rate and lower molded in stress
Fibers/Minerals on Surface or Uneven Surface Appearance	Melt temperature too low	• Increase melt temperature • Increase mold temperature • Increase injection speed
	Insufficient packing	• Increase hold pressure and time • Increase shot size

Troubleshooting Recommendations

Problem	Cause	Solution
Sink Marks	Part geometry too thick	• Reduce wall thickness • Reduce rib thickness
	Melt too hot	• Decrease nozzle and barrel temperatures • Decrease mold temperature
	Insufficient material volume	• Increase shot size • Increase injection rate • Increase packing pressure • Increase gate size
Flash	Injection pressure too high	• Decrease injection pressure • Increase clamp pressure • Decrease injection rate • Increase transfer position
	Excess material volume	• Adjust transfer position • Decrease pack pressure • Decrease shot size • Decrease injection rate
	Melt and/or mold too hot	• Decrease nozzle and barrel temperatures • Decrease mold temperature • Decrease screw speed
	Loose clamp	• Reset mold height • Increase clamp tonnage
Shrink	Too much shrink	• Increase cooling time • Decrease mold temperature
	Too little shrink	• Decrease cooling time • Increase mold temperature

Troubleshooting Recommendations

Problem	Cause	Solution
Burning	Process related	• Decrease nozzle and barrel temperatures • Decrease mold temperature • Decrease injection rate
	Mold design	• Clean, widen and increase number of vents • Increase gate size to reduce shear
	Wet material	• Check moisture. If material is not in the recommended moisture percentage, continue to dry material until it is in an acceptable range for molding.
Nozzle Drool	Nozzle temperature too hot	• Decrease nozzle temperature • Decrease back pressure • Increase screw decompression • Verify material has been dried at proper conditions
	Incorrect nozzle	• Use reverse taper tip
Weld Lines	Melt front temperatures are too low	• Increase pack and hold pressure • Increase melt temperature • Increase injection rate • Increase mold temperature
	Mold design	• Increase gate size • Perform short shots to determine fill pattern and verify proper vent location • Add vents and/or false ejector pin • Move gate location
Warp	Process related	• Increase cooling time • Increase melt temperature • Increase pack pressure • Increase pack time • Decrease mold temperature
	Mold design	• Non-uniform mold cooling
	Part design	• Non-uniform wall thickness
	Thermolator incorrect temperature	• Check settings • Inspect thermocouple

Troubleshooting Recommendations

Problem	Cause	Solution
Sticking in Mold	Overfilled cavity	• Decrease injection rate and pressure • Decrease pack and hold pressure • Adjust transfer position • Decrease nozzle and barrel temperatures • Decrease mold temperature • Decrease cooling time
	Mold design	• Increase draft angle • Polish cores in direction of ejection
	Part is too hot	• Decrease nozzle and barrel temperatures • Decrease mold temperature • Increase cooling time

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