TORONTECH

HIGH-SPEED POLYMER MIXER

High-Speed Polymer Mixer - ToronMix™ Pl

ToronMix™ Pl high-speed polymer mixer blends, colors, and dries resin in a 9 L stainless steel chamber before the material reaches a molding machine or extruder. A single impeller spins to 1,500 rpm under stepless speed control, throwing powder and pellets into a fluidized vortex. Electric heating carries the batch to 120 °C, and water cooling brings it back down. Compounders use it for PVC dry blend, pellet coloring, and drying hygroscopic resins.

Speed is what makes the process work. At 1,500 rpm the impeller does more than stir, generating shear that drives liquid additives and pigment onto every particle surface. Stabilizers, plasticizers, and lubricants distribute through the batch in minutes rather than the hours a tumble blender needs. Optimum filling sits between 30 and 60 percent of chamber volume, which leaves room for the vortex to form.

Temperature control decides batch quality. Electric heating handles most work, with a mold temperature controller available when a process needs closer regulation across the chamber wall. Tap water or a chiller removes heat afterward, so material discharges cool enough to bag or feed without caking. The 304 stainless chamber resists corrosion from acidic additives and cleans down between color changes.

APPLICATIONS

High-Speed Polymer Mixer - ToronMix™ Pl Applications

The ToronMix™ Pl handles the preparation step that comes before compounding, molding, or extrusion, wherever powder and granular materials need to be combined, coated, or dried.

- **PVC Dry Blending**: mixes resin with stabilizers, plasticizers, lubricants, and fillers until the batch turns from sticky to free-flowing powder
- **Pellet Coloring**: coats PE and PP granules with pigment or liquid color so the melt develops even shade downstream

- **Hygroscopic Resin Drying**: removes surface moisture from ABS and PC before molding, preventing splay and hydrolytic degradation
- **Masterbatch Premixing**: combines carrier resin, pigment, and dispersant into a uniform charge ahead of the compounding extruder
- **Formulation Development**: prepares small experimental batches so researchers can vary additive loading without production quantities
- **Filler and Additive Incorporation**: distributes calcium carbonate, talc, flame retardants, and stabilizers evenly through a resin base
- **Compounding Line Feed Preparation**: delivers a homogeneous premix so the extruder sees consistent composition at the hopper
- **Recycled Resin Blending**: combines regrind with virgin material and correction additives at controlled ratios
- **University and Institute Research**: demonstrates fluidized mixing, shear-driven dispersion, and frictional heating on a laboratory-scale unit
- **Color Matching and Shade Trials**: produces repeatable small batches for shade approval before committing a production run


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ToronMIX™ PI
High-Speed Polymer Mixer

FEATURES

High-Speed Polymer Mixer - ToronMix™ Pl Key Features

The ToronMix™ Pl combines high-shear mixing, controlled heating, and water cooling in a mobile laboratory-scale unit sized for formulation work.

- **0 to 1,500 rpm Stepless Speed Control**: sets shear intensity to match the formulation, from gentle pellet coating to aggressive powder dispersion
- **Simultaneous Mixing and Drying**: frictional heating from the impeller drives off surface moisture while the batch homogenizes, combining two steps into one cycle
- **9 L Chamber Sized for R&D**: runs meaningful trials on small quantities, which matters when additives are expensive or experimental
- **Dual Heating Options**: electric heating covers routine work, with a mold temperature controller available for closer wall temperature regulation
- **Room Temperature to 120 °C Range**: covers PVC, PP, PE, ABS, and PC pre-treatment on one machine
- **Water or Chiller Cooling**: brings the batch down after mixing so material discharges free-flowing rather than caked
- **304 Stainless Steel Chamber**: withstands corrosive additives and wipes clean without pitting
- **Smooth Interior with No Dead Zones**: leaves no ledges where material collects, which shortens changeover between colors and formulations
- **Mobile Castor Base**: rolls between benches or process areas as laboratory layouts change
- **Compact 520 mm Footprint**: occupies little floor space for a machine handling a full 9 L working volume

THEORY & METHOD

Theory and Method

High-speed mixing works by fluidizing a batch rather than folding it. The impeller sits close to the chamber floor and throws material outward, where it climbs the wall, loses momentum near the top, and falls back through the center. That circulation replaces the whole batch through the blade zone many times per minute. Every particle therefore passes the high-shear region repeatedly, which is what produces uniformity in a short cycle.

Shear at the blade tip does the distribution work. Tip speed climbs with rotational speed, and the resulting collisions between particles smear liquid additives into thin films across each surface. Dry pigment behaves the same way, breaking agglomerates against neighboring particles until color develops evenly. A tumble blender moves material without this shear, which is why it can mix free-flowing solids but cannot coat them.

Friction adds heat whether the operator wants it or not. Particle collisions convert mechanical energy into heat, so batch temperature climbs on its own during a run. PVC dry blending relies on it, since warming the resin opens its porous structure so plasticizer absorbs into the particle instead of coating it. The blend turns from sticky to free-flowing powder once absorption completes, which is where cooling begins.

TECHNICAL SPECIFICATIONS

High-Speed Polymer Mixer - ToronMix™ Pl Technical Specifications

Parameter	Specification
Chamber Capacity	9 L
Optimum Filling Capacity	30 % to 60 % of chamber volume
Mixing Speed	0 to 1,500 rpm, stepless regulation

Parameter	Specification
Number of Mixing Blades	1
Temperature Range	Room temperature to 120 °C
Heating Method	Electric heating, or mold temperature controller (optional)
Cooling Method	Tap water or chiller
Chamber Material	304 stainless steel
Compatible Materials	PVC, PE, PP, ABS, PC
Voltage	AC 380 V ±10 %, 50 Hz, 2 kW
Overall Dimensions (W × D × H)	520 × 580 × 1,120 mm
Weight	Approx. 128 kg
Mobility	Castor-mounted base

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