TORONTECH

LABORATORY SINGLE-SCREW EXTRUDER

Laboratory Single-Screw Extruder - ToronExt™ SSE 20

The ToronExt™ SSE 20 laboratory single-screw extruder gives polymer researchers, formulators, and quality laboratories a compact platform for compounding, coloring, and shaping thermoplastics. A 20 mm screw turning at up to 125 rpm produces about 3 kg/h, enough material for property testing without tying up a production line. Three heated barrel zones reach 360 °C, with the die head controlled to 280 °C. The extruder, water trough, and pelletizer share one mobile cabinet.

Engineering plastics, modified compounds, and color masterbatch make up the typical workload. The screw geometry, a 28:1 length-to-diameter ratio with a 2.4:1 compression ratio, gives the melt enough residence time to disperse pigments, fillers, and additives evenly. Melt pressure and motor current readouts let operators watch how a formulation behaves as it plasticizes. Those readings translate directly into the process window a scale-up team needs, so laboratories can document repeatable conditions rather than approximate them.

Modularity defines how the ToronExt™ SSE 20 adapts to changing work. Swapping the die and auxiliary equipment turns the same base unit into a strand pelletizing line, a tube extrusion setup, a sheet line, or a filament drawing rig. The extruder also feeds cast film units, laboratory blown film towers, and gel or impurity inspection systems. One capital purchase therefore covers several polymer processing experiments.

APPLICATIONS

Laboratory Single-Screw Extruder - ToronExt™ SSE 20 Applications

The ToronExt™ SSE 20 suits any laboratory that develops, modifies, or verifies thermoplastic formulations before committing to production volumes. Its output supports both sample preparation and small-batch manufacturing.

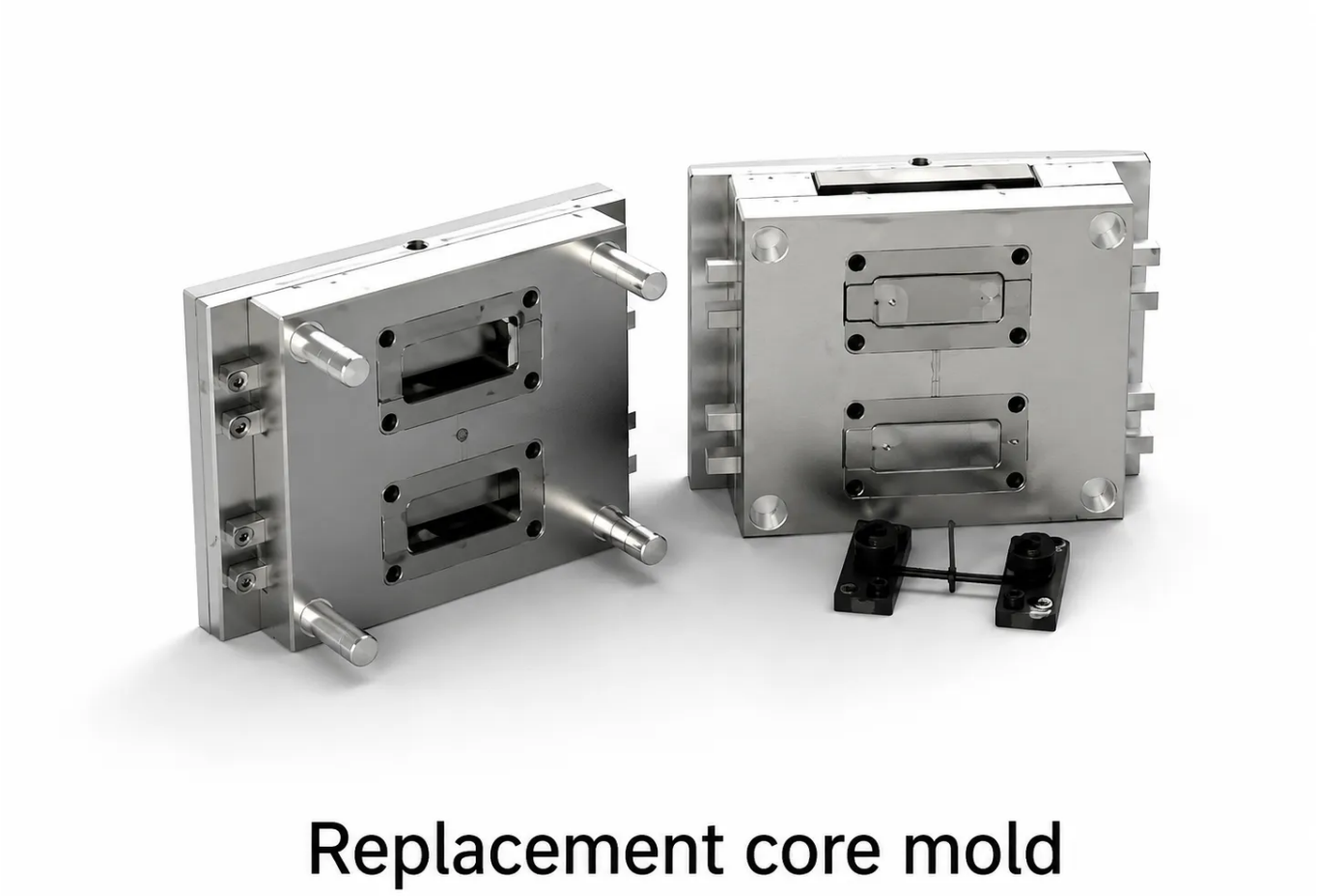
- **Polymer Research and Development**: produces trial compounds in kilogram quantities so formulators can screen resins, additives, and processing windows at low material cost

- **Color Masterbatch Production**: disperses pigments and carriers into a uniform concentrate for tinting trials and shade matching
- **Filled and Modified Compounds**: blends fillers, impact modifiers, flame retardants, and stabilizers into engineering resins for property development work
- **Test Specimen Preparation**: converts experimental blends into pellets or strand for downstream injection molding, mechanical testing, and thermal analysis
- **Cast and Blown Film Trials**: feeds laboratory cast film machines and blown film towers with melt at controlled temperature and pressure
- **Tube, Sheet, and Profile Extrusion**: forms small-diameter tubing, thin sheet, and simple profiles through interchangeable dies
- **Filament and Wire Drawing**: draws monofilament and coated strand for textile, additive manufacturing, and cable research
- **Gel and Contamination Screening**: supplies a steady melt stream to impurity detectors and gel counters for resin quality checks
- **Recycled Resin Evaluation**: re-pelletizes reclaimed material so laboratories can assess degradation, color shift, and melt stability
- **University and Institute Teaching Labs**: demonstrates plasticization, mixing, and die forming on a bench-sized machine that students can operate safely


TORONTECH
ToronExt™ SSE 20
Laboratory Single-Screw Extruder

FEATURES

Laboratory Single-Screw Extruder - ToronExt™ SSE 20 Key Features



Replacement core mold

The ToronExt™ SSE 20 packages a full extrusion line into a bench-sized cabinet, with the process visibility a development laboratory expects.

- **Modular Single-Machine Platform**: accepts different dies and auxiliary units so one base extruder covers pelletizing, tube, sheet, film, and filament work
- **20 mm Screw with 28:1 L/D**: provides the mixing length needed to disperse pigments and fillers while keeping material consumption low
- **Nitrided Alloy Steel Screw and Barrel**: resists abrasion from filled and glass-reinforced compounds for a longer service life between rebuilds
- **Four-Zone Thermal Management**: holds three barrel zones to 360 °C and the die head to 280 °C, covering commodity resins through higher-temperature engineering polymers
- **Five-Channel Temperature Measurement**: adds an extra monitoring point beyond the four controlled zones so operators see melt behavior, not only heater setpoints
- **Integrated Melt Pressure Transducer**: reads 0.1 to 50 MPa at 0.5 % FS accuracy, turning die pressure into a recordable process parameter
- **Main Motor Current Transmitter**: reports drive load in real time as an early indicator of viscosity change or overfeeding
- **Wide Speed Range**: runs from 1 to 125 rpm, letting operators trade residence time against throughput for shear-sensitive materials
- **Planetary Gear Drive with Timing Belt**: delivers steady torque at low speed with minimal backlash for consistent output
- **IP55 Ultra-Quiet Cooling**: three sealed plug-in fan sets provide forced air cooling, with water cooling available for demanding thermal profiles
- **Volumetric Feeding with Manual Adjustment**: sets a repeatable feed rate without the cost or calibration overhead of a gravimetric system
- **Mobile Cabinet Construction**: puts extruder, water trough, air knife, and pelletizer on castors so the line moves between benches or laboratories
- **Broad Auxiliary Compatibility**: connects to cast film machines, blown film towers, impurity detectors, and external pelletizers already in the laboratory

THEORY & METHOD

Theory and Method

Single-screw extrusion moves polymer forward by drag flow. Pellets drop from the hopper into the screw channel, where the rotating screw and the stationary barrel wall create a velocity difference that drags material toward the die. Friction against the barrel generates heat, and the barrel heaters add more. A thin melt film forms at the barrel wall, and the advancing flight scrapes it into a melt pool that grows as the solid bed shrinks.

The channel gets shallower along the screw, and the 2.4:1 compression ratio squeezes the shrinking solid bed against the barrel to accelerate melting and drive out entrained air. Across 28 diameters of length, the polymer spends long enough under shear to reach uniform temperature and viscosity. The metering section then acts as a pump, building the pressure that pushes melt through the die. Net output equals drag flow minus pressure-driven backflow, so die resistance and screw speed together set throughput.

Temperature control decides whether that sequence stays stable. Five measurement channels and four control channels hold each zone at setpoint, while a melt pressure transducer reports the resistance the die actually presents. Rising pressure at constant screw speed usually signals a viscosity shift, a loaded screen pack, or a formulation problem. Downstream, the strand quenches in the water trough, an air knife dries it, and the pelletizer cuts uniform granules ready for molding or testing.

TECHNICAL SPECIFICATIONS

Laboratory Single-Screw Extruder - ToronExt™ SSE 20 Technical Specifications

Parameter	Specification
Screw Diameter	20 mm
Screw L/D Ratio	28:1
Screw Compression Ratio	2.4:1 (standard)
Screw Material	Nitrided high-strength alloy steel
Maximum Output	3 kg/h
Screw Speed Range	1 to 125 rpm
Feeding Method	Volumetric, manually adjusted
Maximum Temperature	Zones 1/2/3: 360 °C; die head: 280 °C
Temperature Control	5 measurement channels, 4 control channels
Melt Pressure Measurement	0.1 to 50 MPa, accuracy 0.5 % FS
Main Motor Current Transmitter	0 to 10 A
Drive System	1:20 planetary gear reducer with timing belt
Cooling System	3 sets of IP55 ultra-quiet plug-in fans, forced air cooling or water cooling
Extrusion System Power Supply	AC 380 V / 220 V ±10 %, 50/60 Hz, 5.6 kW
Pelletizing System Power Supply	AC 220 V single-phase, 0.4 kW (110V is also available)
Cooling Water Trough Length	0.56 m
Overall Dimensions (L × W × H)	3,000 × 450 × 1,300 mm
Net Weight	550 kg
Configuration	Benchtop extrusion line on mobile cabinet

TORONTECH.com

TORONTECH

Torontech Inc.
251 Consumers Road, Suite 1200
Toronto, Ontario, M2J 4R3, Canada

Phone: +1 416 368 2721 | Fax: +1 416 981 7652
Email: info@torontech.com

Torontech, LLC
601 Brickell Key Drive, Suite 700
Miami, FL 33131, USA

Toll-Free: 1-866-383-7919
Email: sales@torontech.com

Torontech ME FZE
Meydan Grandstand, 6th Floor,
Meydan Road, Nad Al Sheba,
Dubai-261440, UAE

Phone: +971 488 19252
Email: me@torontech.com

USA | Canada | EU | UAE | GCC | KSA | India | Africa | Latin America | Asia