AVEX Series – High-Performance Extruders for Large-Scale Thermoplastic 3D Printing

# Executive Summary

The AVEX Series (AVEX15, AVEX20, AVEX32) comprises industrial extruders engineered for large-scale thermoplastic 3D printing. Benchmarked with PETG +30% GF, AVEX delivers reliable, high-output performance up to 40 kg/h, with printing temperatures reaching 450 °C. As an official KUKA System Partner and technology partner of ENCY, Ai Build, and Adaxis, Avenco integrates robust hardware with advanced robotic CAM and AI-driven optimization workflows.

# About Avenco

Avenco Robotics & Automation is a global engineering company specializing in robotic systems for additive manufacturing, milling, and automation. With exports to 40+ countries across 6 continents, Avenco delivers solutions trusted by leaders in construction, marine, automotive, and manufacturing. Partnerships include KUKA (Official System Partner), ENCY, Ai Build, and Adaxis.

# Sectors Served

* Defense: rapid prototyping of housings and enclosures, low-volume tooling, jigs & fixtures, composite mold masters (non-ITAR production support).
* Aerospace: layup tools, vacuum form tools, drill jigs, non-flight composite tooling, aerodynamic mockups and form/fit prototypes.
* Marine: hull sections, fairings, cores, custom molds; corrosion-resistant materials for marine environments.
* Furniture: large sculptural shells, ergonomic forms, upholstery molds, custom fixtures for production lines.
* Interior Design: parametric panels, bespoke décor, lighting housings, architectural elements with complex geometry.
* Automotive: prototype body panels, bumpers, fixtures, composite tooling, assembly aids.
* Construction/Architecture: façade panels, molds for casting, large-format functional components.

# AVEX Series Overview

AVEX extruders are designed for continuous, high-throughput production of large-format parts using reinforced thermoplastics. Each model includes multi-zone heating, reinforced-polymer-ready screw/barrel geometry, and interfaces for seamless robotic integration.

## Product Range

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Model | Screw Diameter | Output Capacity (PETG +30% GF) | Heating Zones | Max Temperature | Primary Use Cases |
| AVEX15 | 25 mm | 15 kg/h | 4 | 450 °C | R&D labs, universities, mid-size prototypes |
| AVEX20 | 25 mm | 20 kg/h | 4 | 450 °C | Industrial prototyping, tooling & molds |
| AVEX32 | 35 mm | 40 kg/h | 4 | 450 °C | Heavy-duty production, large structural parts |

## AVEX15

AVEX15 features a 25 mm screw, 4 independent heating zones, and a maximum extrusion temperature of 450 °C. It delivers up to 15 kg/h (benchmarked with PETG +30% GF) for reliable, repeatable output.

* Highlights:
* Compact footprint with industrial reliability for labs and pilot lines.
* Ideal for mid-size parts, method development, and materials R&D.
* Quick-change nozzle concept and service-friendly layout.

## AVEX20

AVEX20 features a 25 mm screw, 4 independent heating zones, and a maximum extrusion temperature of 450 °C. It delivers up to 20 kg/h (benchmarked with PETG +30% GF) for reliable, repeatable output.

* Highlights:
* Workhorse extruder for industrial prototyping and tooling.
* Balanced throughput vs. footprint for factory environments.
* Proven with GF-reinforced filaments and pellets.

## AVEX32

AVEX32 features a 35 mm screw, 4 independent heating zones, and a maximum extrusion temperature of 450 °C. It delivers up to 40 kg/h (benchmarked with PETG +30% GF) for reliable, repeatable output.

* Highlights:
* High-throughput system for heavy-duty production and large assemblies.
* Stable melt quality at high flow rates for structural parts.
* Designed for continuous operation with reinforced polymers.

# Materials & Process Guidelines (Typical)

The following ranges are indicative; exact parameters depend on polymer grade, filler percentage, and part geometry. Benchmarking and tuning are recommended for each application.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Material | Typical Nozzle Ø | Layer Height Guideline | Melt Temp Window | Notes |
| PETG +30% GF (reference) | 1.5–6.0 mm | 30–60% of nozzle Ø | 250–300 °C | Reference material for AVEX throughput; good dimensional stability. |
| PP +20–30% GF | 1.5–6.0 mm | 30–60% of nozzle Ø | 220–260 °C | Lightweight with chemical resistance; shrinkage management required. |
| PA6/PA12 + GF/CF | 1.5–6.0 mm | 30–50% of nozzle Ø | 260–320 °C | High strength; moisture control and enclosure recommended. |
| PC / PC blends | 1.5–6.0 mm | 30–50% of nozzle Ø | 280–320 °C | High heat deflection; enclosure improves layer adhesion. |
| ABS / ASA (reinforced) | 1.5–6.0 mm | 30–50% of nozzle Ø | 240–270 °C | General-purpose; ASA offers better UV stability. |

# Software & Workflow

* CAD/CAM Pathing with ENCY: generate robotic toolpaths (bead width, layer height, deposition angles).
* AI Optimization with Ai Build: simulate, optimize, and validate extrusion paths to reduce defects and improve quality.
* Robotic Additive with Adaxis: streamline robot programming, calibration, and cell coordination for multi-axis printing.
* Closed-Loop Best Practices: optional sensors (temperature, flow, vision) and feedback routines for consistency.

# Integration & Interfaces

* Robotic Platforms: validated with KUKA, ABB, and Fanuc robots.
* Mounting: flange mounting; dimensions and hole patterns provided in technical drawings.
* Controls: supports standard robot-controller signaling and synchronization (digital I/O and robot-native interfaces).
* Cooling: water-cooled barrel and nozzle for thermal stability in high-throughput scenarios.
* Safety: interlocks and temperature protections designed per industrial best practices.

# Quality, Reliability & Compliance

* Continuous operation proven in long-duration production deployments.
* Design follows CE principles; detailed risk assessment and documentation available upon request.
* Factory acceptance tests (FAT) and site acceptance tests (SAT) procedures available.

# Accessories & Options

* Nozzles: multiple diameters for varying bead widths and deposition rates.
* Material Handling: hopper and dryer integration guidance for reinforced pellets.
* Calibration Aids: alignment gauges and flow calibration routines.
* Enclosures & Shields: thermal and safety enclosures where required by process.

# Installation, Commissioning & Training

Avenco provides commissioning support, operator training, and process tuning. Recommended on-site package includes mechanical mounting assistance, parameter setup for reference materials (PETG +30% GF), and workflow handover covering ENCY, Ai Build, and Adaxis toolchains.

# Support & Service

• 1-Year Free Technical Support is included with every AVEX extruder.  
• Advanced Support Subscription: extended remote support, on-site visits, and periodic process audits.  
• Spare Parts & Preventive Maintenance programs available globally.

# ROI & Business Impact

* Reduce lead times for large tooling and prototypes from weeks to days.
* Lower material waste vs. subtractive methods by targeted deposition.
* Enable design freedom for lightweight, high-strength geometries.
* Scale throughput with AVEX32 for production; deploy AVEX15/20 for development and pre-series.

# Ordering Information

* Select model (AVEX15 / AVEX20 / AVEX32) based on required throughput and part scale.
* Confirm material set and nozzle assortment.
* Define integration scope with the target robot platform.
* Optional: choose support subscription and training package.

# Contact

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